

Proceedings of International Conference on Social and Education Sciences

October 19-22, 2023 - Las Vegas, NV, USA

 **iconses**

October 19-22
Las Vegas, NV, USA **2023**

Editors

Prof. Dr. Mack Shelley

Prof. Dr. Valarie Akerson

Mevlut Unal





www.iconses.net

Volume 1, Pages 1-765

Proceedings of International Conference on Social and Education Sciences

© 2023 Published by the ISTES Organization

ISBN: 978-1-952092-48-0

Editors: Mack Shelley, Valarie Akerson, & Mevlut Unal

Articles: 1-60

Conference: International Conference on Social and Education Sciences (IConSES)

Dates: October 19-22, 2023

Location: Las Vegas, United States

Conference Chair(s):

Prof. Dr. Valarie Akerson, Indiana University, United States

Prof. Dr. Mack Shelley, Iowa State University, United States

Dr. Elizabeth (Betsy) Kersey, University of Northern Colorado, United States

© 2023 Published by the International Society for Technology, Education, and Science (ISTES) Organization

The proceedings is licensed under a Creative Commons Attribution-NonCommercialShareAlike 4.0 International License, permitting all non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

Authors alone are responsible for the contents of their papers. The Publisher, the ISTES Organization, shall not be liable for any loss, actions, claims, proceedings, demand, or costs or damages whatsoever or howsoever caused arising directly or indirectly in connection with or arising out of the use of the research material. All authors are requested to disclose any actual or potential conflict of interest including any financial, personal or other relationships with other people or organizations regarding the submitted work.

The submissions are subject to a double-blind peer review process by at least two reviewers with expertise in the relevant subject area. The review policy is available at the conference web page: www.iconses.net

Presidents

Prof. Dr. Valarie Akerson, Indiana University, United States

Prof. Dr. Mack Shelley, Iowa State University, United States

Dr. Elizabeth (Betsy) Kersey, University of Northern Colorado, United States

Scientific Board

Valarie Akerson, Indiana University, United States

Mack Shelley, Iowa State University, United States

Elizabeth (Betsy) Kersey, University of Northern Colorado, United States

Brian Webster, Edinburgh Napier University, United Kingdom

Chandra Pratama Syaima, University of Lampung, Indonesia

Chris Plyley, University of the Virgin Islands, Virgin Islands

Christine Thomas, Georgia State University, United States

Claudiu Mereuta, Dunarea De Jos University of Galati, Romania

Dana Aizenkot, Ashkelon Academic College, Israel

El Takach Suzanne, Lebanese University, Lebanon

Farouk Bouhadiba, University of Oran 2, Algeria

Frank Angelo Pacala, Samar State University, Philippines

Hasse Møller, University College Copenhagen, Denmark

Hou-Chang Chiu, Fu-Jen Catholic University Hospital, Taiwan

Irena Markovska, Assen Zlatarov University, Bulgaria

Iwona Bodys-Cupak, Jagiellonian University, Poland

Jaya Bishnu Pradhan, Tribhuvan University, Nepal

Kassa Mickael, Addis Ababa University, Ethiopia

Kemmanat Mingsiritham, Sukhothai Thammathirat Open University, Thailand

Luis Mauricio Rodriguez Salazar, Instituto Politécnico Nacional, Mexico

Milan Kubiátko, Jan Evangelista Purkyně University, Czech Republic

Natela Doghonadze, International Black Sea University, Georgia

Neide Da Fonseca Parracho Sant'anna, Colegio Pedro II, Brazil

Ossi Autio, University of Helsinki, Finland

Patricia Moyer-Packenham, Utah State University, United States

Pierre Job, ICHEC, Belgium

Shenglei Pi, Guangzhou University, China

Silviya Kostova, The D.A. Tsenov Academy of Economics, Bulgaria

Sindorela Doli Kryeziu, University of Gjakova, Albania

Siti Sarawati Johar, Universiti Tun Hussein Onn Malaysia, Malaysia

Sodangi Umar, Federal University Gusau, Nigeria

Tryfon Mavropalias, University of Western Macedonia, Greece
Volodymyr Sulyma, Dnipropetrovsk Medical Academy, Ukraine

Organizing Committee

Valarie Akerson, Indiana University, United States
Mack Shelley, Iowa State University, United States
Elizabeth (Betsy) Kersey, University of Northern Colorado, United States
Chris Plyley, University of the Virgin Islands, Virgin Islands
Dana Aizenkot, Ashkelon Academic College, Israel
Hou-Chang Chiu, Fu-Jen Catholic University Hospital, Taiwan
Iwona Bodys-Cupak, Jagiellonian University, Poland
Kristyna Balatova, University of Zilina, Slovakia
Omer Tayfur Ozturk, Necmettin Erbakan University, Turkey
Ossi Autio, University of Helsinki, Finland
Shenglei Pi, Guangzhou University, China
Siew Nyet Moi, Universiti Malaysia Sabah, Malaysia
Sodangi Umar, Federal University Gusau, Nigeria
Theodore Chadjipadelis, Aristotle University of Thessaloniki, Greece
Volodymyr Sulyma, Dnipropetrovsk Medical Academy, Ukraine
Patricia Moyer-Packenham, Utah State University, United States
Draga Vidakovic, Georgia State University, United States

Table of Contents

Introducing Real Life Applications of Mathematics through Projects in Lower-Division Mathematics Classes ...	1
Actively Engaging Students in Remote, Hybrid, and Face-to-Face Modalities	10
International Chip Crisis: Country Approaches	24
Comprehensive Report on Early COVID Impact.....	37
Adverse Childhood Experiences (ACEs), Resiliency, and Academic Performance in Veterinary Students	61
Using Self-Evaluation Assignments to Teach 3D Coordinate Transformations in Robotics.....	72
Building Competencies through Perception of Music in Early Childhood and Primary School Education.....	81
Games as a Mode of Instruction in Object-Oriented Concepts	89
Higher Education in the 21st Century: Between Depression and the Longing for Joyle	109
Standing in Responsibility: Lessons Learned in Developing a Gamified Simulation on the Indian Child Welfare Act (ICWA)	125
Can A Teacher’s Mental Health Impact Teaching Pedagogies in The New Normal?	135
Online Exam Proctoring Services: Students’ Perceptions of Privacy and Equity.....	146
Core Competencies Critical to Create Communications Required in Construction Discipline: Perception of the Global Academia.....	156
Connecting the Clinical to the Classroom.....	168
Recruitment Strategies for Master’s Degree in AI among High Achieving Low-Income Engineering Students	175
Familiarizing Pre-Service ESOL Teacher Candidates with the Funds of Knowledge Approach	187
ACEs are Wild: How Educators Can Positively Influence the “Hand” Students are dealt	202
Investigating Student Achievement in Special Education: A Comparative Analysis of Online Schools and Traditional Face-to-Face Institutions	215
From Research Learning to Research Production: Collective Methodology	223
101 Dogs and the Terms We Use to Define Their Roles: A Scoping Review	229
Disparities in Health Coverage across the Cancer Continuum: A Secondary Data Analysis	245
Axiomatic Theory of Economics, Epistemology Chapter.....	256
Preparing STEM Students for Peer Mentoring: Lessons Learned and Future Directions.....	281
Knowledge in Project Management by Community Action Board Leaders - Case of the Township of Suba (Bogotá - Colombia)	287
Ready Student One! Exploring how to build a Successful Game-based Higher Education Course in Virtual Reality	304

Examining the Pros and Cons of Resuming Face-to-Face Teaching: A Case Study of the Leveling Course at Universidad de las Fuerzas Armadas - ESPE Sede Latacunga	321
Focus on their Strengths: Recruiting & Retaining Online Adult Learners in a Hyper-Competitive Environment	331
Exploring Feminism in Social Media.....	338
An Educational Perspective on Narrative and Ethnography: A Monolithic Study	345
Predictors of Growth Mindset among Ghanaian Classroom College of Education Teacher Trainees.....	351
Two Preadolescents' Perceptions of Developmental Issues in a Deconstructing Society.....	358
Reviewing the Anxiety and Motivation in Foreign Language Learning	371
Exploring Barriers to Time Spent on Social Studies and Science in K-6 Classrooms.....	380
DEI in the Culture Wars: How to Advocate for Diversity, Equity, and Inclusion without Alienating Others....	399
Teaching Latinx Traditional Medicine <i>Curanderismo</i> in Higher Education.....	414
Impact of the Lockdown during COVID-19 on the Opioid Crisis in the State of Louisiana	425
The Effect of Education on Women Entrepreneurs' Success: Evidence from Vietnam's Economy	433
Assisting Construction Plan Comprehension Through the Use of Augmented Reality Technology	448
What Are the Elements That Make Up an Official Museum Video? An Analysis of the Official Video Content of the Museum on the Bilibili Video Website	458
Lingua Cultural Concept as a Language, Culture, and Person Descriptive Methodology	480
Work-Climate and Its Relationship with Officer Performance	496
Keyword Survey and Thematic Focuses in Educational Research: A Review of 2023	515
Impact of the KISS Program on Sexually Transmitted Infections (STIs) Awareness: Participants Insight and Implication	528
The Activity of "Missione Al Cubo": An Academic Spin-Off of University of Calabria Devoted to Science Education and Public Engagement with Science	540
Interactions between Schools and Universities: The Example of Lab2go in Calabria.....	548
The Basic Course in Communication: A Critical Intercultural and Participatory Approach	556
STEM Family Engagement Program for Families with Young Children	563
Promoting Geometry Learning in Middle School through Ethno-Mathematics	569
Teacher Candidates' Views on the "Text Analysis Methods" Course in the Context of Language and Literature Education	582
Content Analysis of Graduate Thesis Titled World Literature in Turkey	606

Educational Robotics Applications as Tools to Support the Social Interactions and Integration of Refugee Children in the Community of Schools of Primary Education.....	617
Children with Autism and Educational Robotics: Education and Development of Social and Cognitive Skills	634
Navigating Global Concerns: Comprehensive Examination of the Fukushima Wastewater Release: Scientific Communication and Citizen Science Engagement in the Information Age	652
Impact of Cultural Competence in Graduate School Settings.....	680
Opinions of Prospective Social Studies Teachers on Distance Education during the Pandemic Process	691
The Concept of “Identity” and the Formation of “National Identity”: Turkish Identity	695
Impact of COVID-19 Pandemic on International Research Collaboration: A Pilot Interview Results.....	706
Exploring Social Phenomenon: A Review of Social Capital in the Modern Society.....	727
GPTZero vs. Text Tampering: The Battle that GPTZero Wins	734
Quantitative Research on China’s Pension Policy from the Perspective of Policy Tools	745

Introducing Real Life Applications of Mathematics through Projects in Lower-Division Mathematics Classes

Haohao Wang

Southeast MO State University, U.S.A.,  <https://orcid.org/0000-0001-7942-5623>

Natalya Kustsevalova

Southeast MO State University, U.S.A.,  <https://orcid.org/0009-0001-6857-0232>

Abstract: This paper investigates the effects of project-based teaching on students' learning. The aim of this study is to examine if incorporating mini projects in mathematics teaching can enhance students' understanding of mathematics and stimulate students' interest in mathematics. To achieve the research purpose, three pairs (or six sets) of data were collected from two different courses, each pair (or two sets) of data consists of two groups of students where one group received project-based instruction and the other group did not. For each pair (or two sets) of data, an independent unpaired t-test was conducted using SPSS (Statistical Package for the Social Sciences) to obtain the findings. A significant difference was found. The results show that project-based teaching with appropriate technology stimulated students' interest in mathematics, enhanced students' desire to discover and solve mathematics problems, increased students' confidence in mathematics, and enhance students' soft skills, including communication, teamwork, and problem solving. Thus, the project-based teaching approach is highly recommended for educational use by students and should be encouraged in universities.

Keywords: Project-based teaching, Technology, Mathematics learning

Citation: Wang, H. & Kustsevalova, N. (2023). Introducing Real Life Applications of Mathematics through Projects in Lower-Division Mathematics Classes. In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023-- International Conference on Social and Education Sciences* (pp. 1-9), Las Vegas, NV, USA. ISTES Organization.

Introduction

Few students start college with a clear idea of what they can do with mathematics, especially first-generation, minority, and those from underrepresented populations. There are multiple reasons why students do not seriously enjoy learning mathematics, including: (a) not connecting mathematics with their daily lives, (b) little public recognition and peer encouragement for activities and achievements related to applications of mathematics, and (c) uncertainty of how mathematics could be useful unless they want to become mathematics teachers. As a result, mathematics programs across the United States have been experiencing decreasing

enrollments; however, available data from the U.S. Bureau of Labor Statistics (BLS) indicates that the job market demand for mathematicians is on the rise (growth of 23% from 2012-2022).

Mathematics is one of the oldest disciplines in the world and is useful in solving many practical real-life problems in agriculture, construction, industry, accounting, taxation, and other social and bureaucratic areas. Humanity's progress would not be possible without the development and application of mathematics. Using real-life applications in teaching mathematics provides the opportunity for students to enjoy mathematics learning and develop skills that are needed in life. There is a long list of benefits, for instance, increasing students' engagement; enhancing students' comprehension of the key concepts; enabling students to apply their knowledge to their lives, helping students connect mathematics to other disciplines – not only in the area of science, technology, and engineering, but also in the area of arts, crafts, designs; and growing students' desires to discover mathematics in the world around them. A study by Lee (2012) reveals that project-based teaching is a critical component of mathematics to real-life. Premadasa and Bhatia (2013) show that students in lower-division classes significantly prefer problems which have a certain level of intrigue and are easily related to their life. Furthermore, a host of research Carducci (1996), Jaiswal, Lyon, Zhang, & Magana (2021), Klymchuk & Spooner (2020), Spooner, Nomani & Cook (2023) finds that through the real-life applications and mathematical modelling lessons, students develop a new-found interest in mathematics, and gain a greater understanding.

Technology is a valuable asset in the learning process. Modern technological progress has advanced to the level where the results of complicated problems can be computed with explicit algorithms in moments; abstract concepts can be easily visualized by computer-generated graphics; interactive models, lessons, and projects can be created and exhibited on screens. With the proper use of technology, students could shift their focus from long, boring, and tedious computations to the interesting outcomes induced by the changes on the numerical conditions. This will lead them to a better understanding of the cause and effect, as well as logical and mathematical reasonings lurking behind the computations. In addition, technology has a significant impact on how to teach, having enabled us to simultaneously and asynchronously work on the same document in the same virtual space regardless of geographical location. For example, classrooms are now equipped with various technologies for local and distance learning; self-grading for homework assignments, quizzes, and tests are incorporated in the computer software systems; and group discussions can be initiated in virtual classrooms. Thus, the technological part of project designs should be simple, user friendly, and provide flexibility and freedom for students, especially those students with limited technical skills. The technology should help the students to understand and execute the projects independent of time and location. The goal of modelling real-life problems is for students to discover the cause-and-effect relationships between inputs and outputs; hence, the technology used should be able to display patterns of the input-output relationships. The aim of the use of technology is to make the learning process engaging and intriguing, and to provide greater understanding and motivation, where motivation is the most important facilitator of learning (Ralph, 2016).

Our project-based teaching utilizes real-life applications in our mathematics classes. The aims of introducing real-life applications of mathematics through group projects in lower-division mathematics classes are twofold:

to introduce mathematics and the career paths to freshmen; and to motivate freshmen to become promoters and ambassadors of mathematics among their peers. We intend to stimulate students' interest in mathematics through hands-on activities and expose them to a variety of means for exploring mathematics career options. Also, we intend through these pilot projects to build students' mathematics curiosity and drive to discover mathematics in their daily life, foster a positive attitude and confidence regarding mathematics, and encourage students to become promoters and ambassadors for mathematics among their peers. The ultimate goal of our projects is to related directly to Southeast Missouri State University's mission to "Educate students to succeed and make positive impacts in their communities." Specifically, our projects are designed according to Southeast's Strategic Action Plan to: (a) "improve academic programs continuously" by integrating "career exploration, career readiness, and experiential learning opportunities into academic programs"; and (b) "support a range of opportunities for engagement, skill development and persistence for all students" by expanding "academic, community, and alumni partnerships that provide valuable experiential learning opportunities" to promote "engaging and healthy student life experiences."

This study analyzes student performance data in lower division mathematics courses. To achieve the research purpose, three pairs (or six sets) of data are collected from two different courses, each pair (or two sets) of data consists of two groups of students where one group without project-based teaching and the other group with project-based teaching. The final exam grades of the three pairs were compared and an independent unpaired t-test was then conducted. By conventional criteria, the difference is considered extremely statistically significant. The results show that the project-based teaching with appropriate technologies stimulated students' interest in mathematics, enhanced students' desire to discover and solve mathematics problems, increased students' confidence regarding mathematics, and prepared students' professional competencies. Thus, the project-based teaching approach is highly recommended for educational use by students and should be encouraged in universities.

Method

MA140 Calculus I

Striving to accommodate students' needs and improve their interests and performance in mathematics learning, a real-life application component was introduced into MA140 Calculus I, a hybrid format mathematics course for undergraduate students in fall 2022. This component consisted of five projects where the learning objects connect mathematics with their daily life. In addition, the students were encouraged to present their learning outcome in the format of text, audio, video, and animation to enhance their digital media literacy skills in their discipline and profession. The same faculty taught the course without implementing these projects in fall 2021.

Five mathematics projects were incorporated in the course: (1) the photo project: the students were required to take a photo by themselves, give a short explanation of the photo, ask a mathematics question related to the photo, and provide an answer to the question; (2) the logo design project: the students were required to design a

logo with computer software, and explain how the design is related to mathematics; (3) the craft project: the students were required to make a craft with shapes, give a short description of the craft, and explain how the choice of the shapes impacted the craft; (4) the surface graphing project: the students were required to generate a graph of a surface using a computer software package such as Mathematica, Maple, or MATLAB, and explain where such a surface occurs in daily life; (5) the poster project: the students were required to create a poster presentation on integration, and exhibit the key content they learned that is closely related to daily life or other disciplines.

This study collected and analyzed student performance data in this hybrid course. Specifically, the final course grades of the students enrolled in the MA140 without a real-life application component were compared with the final course grades of the students enrolled in the MA140 with the real-life application component. The final exam grades of these two groups were compared and an independent unpaired t-test was then conducted.

MA123 Mathematical Reasoning and Modeling

The Mathematical Reasoning and Modeling Course is designed for students not majoring math. Many students who take this course have been avoiding mathematics as much as possible. They consider mathematics to be abstract, dry, and irrelevant. Many of them often remark that they are not good in mathematics, they don't like fractions or symbols, they feel frustrated with mathematics, and they have never used and most likely never will use mathematics in their lives. There are various reasons for this mindset, which may have developed since early childhood. It is extremely challenging to make any drastic change toward their mathematics background. The goal is to improve their attitude, perceptions, and expectations toward mathematics by connecting mathematics to their daily life through relevant and interesting mathematics projects.

In the course, we utilize Microsoft Excel (MS Excel) and Desmos Graphing Calculator (desmos.com). Both tools are easy to use and have great computational and visualization functionalities. MS Excel is widely used in many companies and organizations, and is useful in creating dashboards, tables, charts, and graphs, which make projects more alive and interesting. Most students are familiar with the program and can use it without any problem. Incorporating these technologies is meant to promote collaboration and conversations among students, increase the communication between instructor and students, and build students' mathematics confidence.

The following projects are completed during the course: (1) Application of Bayes' theorem - introduction of characteristics of diagnostics tests such as specificity, sensitivity, positive/negative predicted value. This project guides students in creating confusion matrix and allows them to evaluate the performance of the diagnostic tests based on Bayes' theorem. The aim of the project is to help promote a deeper understanding of Byes' theorem, and to demonstrate that some complex problems can be solved by a simple set of skills and tools. (2) Application of Expected Value – most suitable choice of two health insurance plans based on the individual circumstances in the decision-making process using MS Excel. The goal of the project is to show students how to apply the expected value formula to estimate the average cost of each medical insurance plan, and reflect on

advantages and disadvantages of each case, and justify the risk level associated with their choice when making the final decision. (3) Regression Models - create linear and exponential regression models in MS Excel using real-life data. Students are required to exam different models and select the best fit models to make predictions. (4) Finance Project - using a dashboard, an interactive and dynamic tool that is created in MS Excel that allows users to observe the effects of changing input parameters on outcomes, to select the most effective payment option to a credit card loan, to learn low and high risk level loans and to analyze the difference in the total payment amount between those cases.

Results

MA140 Calculus I

For MA140 Calculus I, a comparison of the descriptive statistics for the two groups revealed that the mean, median, and mode were all higher for the group with the real-life application component, where Group 1 is the class without the real-life application component, and Group 2 is the class with the real-life application of mathematics project component. First, the range of scores was smaller for Group 1 (See table 1). For the final exam scores of Group 1, the range was 31.13%, the median was 77.53%, and the mode was B. For the final scores of Group 2, the range was 33%, the median was 87.98%, and the mode was A (90%-100%=A, 80%-89.9%=B, 70-79.9%=C, 60%-69.9%=D, 0-59.9%=F). There was a big difference between Group 1 and Group 2 in terms of median, mode, and range. Group 1 consists of 16 students, among which 9 students obtained a final exam score between 80.16% and 88.13%; whereas Group 2 consists of 28 students, among which 15 students received a final exam score between 90.5% and 98%. Table 1 reveals that Group 2 performed better in the final exam than Group 1. An independent unpaired t-test was then conducted using SPSS (Statistical Package for the Social Sciences) to determine if there was a significant difference in final exam scores between the two groups of students participating in this study. The two-tailed P-values equal 0.0003. By conventional criteria, this difference is considered extremely statistically significant. The mean of Group 1 minus Group 2 equals 10.4503, and 95% confidence interval of this difference is from -15.8470 to -5.0535. Intermediate values used in calculations are: $t=3.9078$, $df=42$, and standard error of difference equals 2.674. The data shows that Group 1: Mean=77.5319, SD=8.7253, SEM=2.1813, N=16; Group 2: Mean=87.9821, SD=8.4245, SEM=1.5921, N=28.

Table 1. Medians, Modes and Ranges of the Final Exam Scores for the Two Groups

	Median	Mode	Range
Group 1	77.53%	B	57%-88.13%
Group 2	87.98%	A	65%-98%

MA123 Mathematical Reasoning and Modeling

Implementation of projects went through many stages. Originally, this course incorporated only one major project in fall 2021 and spring 2022; then in fall 2022, three major projects were implemented, and it grew to

four projects in the spring 2023. There have been significant positive effects on students' learning and students' attitude toward the course. Students were usually excited to see how mathematics are used when comparing 15-year and 30-year long mortgages, or the payment schedules for house/car loans. They found that these project problems provide them with practical knowledge and skills that can be used and appreciated throughout their lifetime. Furthermore, the projects brought fascinating discussions and collaborations among students. Students often commented that it was amazing to see how mathematics interacts with other disciplines and areas of life, especially the use of technology in projects, which helped them visualize the big picture and enhanced their understanding. The fact that students can learn how to use technology, applications, and software to solve serious real-life problems gives them a new level of confidence and a great feeling of accomplishment. Quite a few times, students expressed that mathematics made sense for the first time in their life.

In general, students enrolled in the spring semester are the students who withdraw from the fall semester and are repeating the course. Therefore, two separate comparisons are performed, where table 2 compares the performances of the two groups of students from fall 2021 and fall 2022, whereas table 3 compares the performances of the two groups of students from spring 2022 and spring 2023. Two separate and independent unpaired t-tests are conducted using SPSS to determine if there was a significant difference in final exam scores between two groups of students from fall 2021 and fall 2022 semesters and spring 2022 and spring 2023 semesters, respectively.

For MA123 Mathematical Reasoning and Modeling, a comparison of the descriptive statistics for two fall semesters listed in Table 2 revealed that the mean, median, and mode were all higher in fall 2022 than fall 2021. Note that in fall 2022, one final test score of 6.8% is an outlier and is not included in table 2. The two-tailed P-value equals 0.0193. By conventional criteria, this difference is statistically significant. The mean of fall 2021 minus fall 2022 equals -12.514, and 95% confidence interval of this difference is from -22.869 to -2.159. Intermediate values used in calculations are: $t = 2.4534$, $df = 35$, and standard error of difference = 5.101. The data shows that fall 2021 class: Mean=70.877, SD=14.979, SEM=2.938, N=26; and fall 2022 class: Mean=83.391, SD=11.957, SEM=3.605, N=11.

Table 2. Medians, Modes and Ranges of the Final Exam Scores for Fall 2021 and Fall 2022 Semesters

Semester	Median	Mode	Range
Fall 2021	72.4%	B	44%-99.2%
Fall 2022	86.6%	A	63.6%-97.7%

Table 3. Medians, Modes and Ranges of the Final Exam Scores for Spring 2022 and Spring 2023 Semesters

Semester	Median	Mode	Range
Spring 2022	78.3%	C	42.6%-92.2%
Spring 2023	73.8%	A	41%-100%

Similarly, for MA123 Mathematical Reasoning and Modeling, a comparison of the descriptive statistics for two spring semesters listed in Table 3 reveals that the mean, median, and mode were all higher in spring 2023 than spring 2022. The two-tailed P-value equals 0.5318. By conventional criteria, this difference is not statistically significant. The mean of spring 2023 minus spring 2022 equals 3.766, and 95% confidence interval of this difference is from -8.379 to 15.910. Intermediate values used in calculations are $t = 0.6324$, $df = 31$, and standard error of difference = 5.955. The data shows that spring 2022 class: Mean=78.960, SD=12.895, SEM=3.329, N=15; and spring 2023 class: Mean=75.194, SD=19.801, SEM=4.687, N=18.

The difference shown in the data in Table 3 is not statistically significant. We credit this to several changes made in spring 2023 – the addition of the fourth project, the change of the weights of the projects in the grading system, and the loss of three class periods due to weather related university closing. However, there are obvious improvements observed in the spring 2023 class comparing against these in spring 2022 class – the mode of letter grade is improved from “C” to “A,” and the upper bound in the range of final exam grades is increased from 92.2% to 100%. It is obvious that the loss of three class periods generated a significant amount of anxiety regarding the learning process. However, it is difficult to determine the contribution of the additional fourth project and the change of grading policy to the P-values. The instructor suggests that a further study should be conducted.

Discussion

Based on the collected student projects in MA140 Calculus I, it shows that through photographs, arts and crafts, and design projects, students reduce their mathematics anxieties, gradually build mathematics confidence, learn to discover mathematics in their daily life, and develop a desire for applying mathematics in other disciplines. Students who did not really know where mathematics are used in the real-life at the beginning of the semester had better understandings through the assigned projects and realized that mathematics occur anywhere and everywhere and are extremely useful. The experience through these projects increases the students’ mathematical appreciation which may have an impact on their future. In addition, these projects provide opportunities and motivate students to learn to use mathematical software which is crucial to their mathematical skills. By using interactive mathematics software, students create graphics, animations, and posters. Using technology not only fosters a deeper conceptual and meaningful understanding of mathematics, but also advances students’ abstract thinking skills. Furthermore, these technology skills are highly desired in a variety of professions. Providing students an early exposure to useful and practical technology skills prepares students’ professional competencies, improves their career marketability, and strengthens their eligibility in career choices.

Based on the instructor observation in MA123 Mathematical Reasoning and Modeling, projects sparked more discussions and collaborations among the students. This in turn brought the students together. They were less likely to hide behind the desks, and more willing to share their ideas and help one another. It is clearly shown

that the students gradually connected mathematics with other disciplines and their own life experience. In particular, the use of technology in these projects assisted the students in overcoming their weakness in arithmetic computations, eased their fear in numbers, and improved their understanding of the mathematical principles lurking behind the applications. There were a lot of “Aha!” moments for the students throughout the projects, and it was obvious that they finally clicked on the mathematics they have been using without realizing it. These moments of enlightenment are the foundations for the change of their attitudes toward mathematics and have a positive and motivational impact on their future learning in mathematics.

Another interesting aspect of involving projects in the teaching is that there are some unexpected positive outcomes in addition to those predictable outcomes. One of the surprising outcomes observed by the instructor of MA123 Mathematical Reasoning and Modeling is that the students are eager to share their experiences with technology. For instance, MA123 Mathematical Reasoning and Modeling was taught as a Zoom-based online distance learning class. In such a delivery mode, the instructor lectured in a classroom that was designated as a digital hub for multiple sections from several remote satellite campuses. To overcome the separation in the physical locations and engage all students, small in-class activities or mini real-life projects using technology were injected throughout the class period. The students in the satellite campus actively participated in class via Zoom by exchanging tech ideas or tips on the types of technology that worked the best for their projects, shortcuts that were useful, and how to approach specific parts of the projects with a particular technology. It is amazing to see how much they understood each other, made each other comfortable and confident, and learned from each other. It is undeniable that these conversations contributed to students’ learning.

Conclusion

The real-life applications of mathematics through group projects were implemented in a few lower-division mathematics classes. The data analysis shows that an extremely statistically significant improvement in students’ performance in mathematics. In addition, these projects stimulated students’ interest in mathematics, enhanced students’ desire to discover and solve mathematics problems, increased students’ confidence of mathematics, and prepared student’ professional competencies. Furthermore, the discussions and collaborations among students demonstrate that the students are likely to apply the knowledge and skills learned through the projects to their daily lives and make more informed decisions.

Recommendations

This study provides unmistakable evidence that well-planned project-based teaching has a strong positive impact on students’ mathematics learning, and significantly reduces the math anxiety among students. The students learn important social skills through discussions and collaborations and become socially and emotionally supportive of one another. This in turn promotes their mathematics learning and starts to build a small mathematics community. This research found that when students are exposed to real-life applications in their

education, a better understanding and an appreciation of mathematics are achieved, and these projects with appropriate technologies improved students' social and emotional support for one another. Thus, the project-based teaching approach is highly recommended for educational use and should be encouraged in universities.

Acknowledgements

We would like to thank Dr. Emmanuel Thompson at Southeast Missouri State University for his collaboration in our pilot project grant application entitled "Introducing Real-Life Applications of Mathematics through Group Projects in Lower-Division Mathematics Classes." We regret that he is not able to collaborate with us on this paper. We also would like to thank the reviewers for carefully reading our submission.

References

- Bureau of Labor Statistics, U.S. Department of Labor, Occupational Outlook Handbook, Mathematicians and Statisticians, at <https://www.bls.gov/ooh/math/mathematicians-and-statisticians.htm>
- Carducci, O. M. (1996). An excursion into mathematical modeling. *Primus*, 6(3), 253-256. <https://doi.org/10.1080/10511979608965828>
- Jaiswal, A., Lyon, J. A., Zhang, Y. & Magana, A. J. (2021). Supporting student reflective practices through modelling-based learning assignments. *Eur. J. Eng. Educ.*, 46(6), 987-1006.
- Klymchuk, S. & Spooner, K. (2020), University students' preferences for application problems and pure mathematics questions. *Teaching Mathematics and Its Applications: International Journal of the IMA*, 39(1), 29-37. <https://doi.org/10.1093/teamat/hry014>
- Lee, J. E. (2012), Prospective elementary teachers' perceptions of real-life connections reflected in posing and evaluating story problems. *Journal of Mathematics Teacher Education*, 15, 429-452.
- Premadasa, K. & Bhatia, K. (2013), Real-life applications in mathematics: What do students prefer? *International Journal for the Scholarship of Teaching and Learning*, 7(2). <https://doi.org/10.20429/ijstl.2013.070220>
- Ralph, R. A. (2016), Post secondary project-based learning in science, technology, engineering and mathematics, *Journal of Technology and Science Education*, 6(1), 26-35. <http://dx.doi.org/10.3926/jotse.155>
- Spooner, K., Nomani, J., & Cook, S. (2023). Improving high school students' perceptions of mathematics through a mathematical modelling course. *Teaching Mathematics and Its Applications: International Journal of the IMA*. hrad001, <https://doi.org/10.1093/teamat/hrad001>

Actively Engaging Students in Remote, Hybrid, and Face-to-Face Modalities

Byron C. Phillips

Associate Professor, Eastern Gateway Community College, USA

Johnna Provenzano

Assistant Professor, Eastern Gateway Community College, USA

Abstract: Actively Engaging Students in Remote, Hybrid, and On-Ground Modalities In this interactive presentation, we will discuss how to actively involve students regardless of modality and delivery. We will discuss the importance of creating daily announcements, weekly videos, and posting daily in discussion forums. We will discuss substantive posting and how to facilitate and lead discussion forums that include the ABC's of Effective Posting and Discussion Forums. A) Actively involve every student B) Build on the previous learning of each student C) Engender creative thinking and other levels of vertical and horizontal thinking. At the end of this presentation, attendees will be able to: 1. Create more substantive posts in discussion forums in all modalities of teaching and learning. 2. Create differentiated posts and creative videos to meet students on their current level of learning. 3. Engage students with creative posts, videos, and other methods accessible to students. Byron Phillips, Assistant Professor, Business and Management, Eastern Gateway Community College
Johnna Provenzano, Assistant Professor, Business and Management, Eastern Gateway Community College

Keywords: active engagement, remote learning, remote teaching, instructional videos, discussion forum posting, creative teaching and learning, blooms taxonomy, hybrid teaching and learning, improving instruction in all modalities

Citation: Phillips, B. C. & Provenzano, J. (2023). Actively Engaging Students in Remote, Hybrid, and Face-to-Face Modalities. In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023-- International Conference on Social and Education Sciences* (pp. 10-23), Las Vegas, NV, USA. ISTES Organization.

Introduction

We can engage students in every modality. Modalities and deliveries include:

- Remote
- Hybrid
- Face-to-Face
- Zoom
- Blended

Online and remote learning was palpable long before the covid disaster forced quantum leaps in the transition from face-to-face to online learning environments. The ubiquitous nature of remote learning was accelerated by the pandemic, but was occurring regardless. The pandemic simply placed online learning in much bolder relief. Effective instructors can engage students in every teaching and learning modality. Every day—often in social situations—I am asked how can we have fruitful discussions in an online classroom in the manner that we do in traditional face-to-face modalities. My answer is that it is possible to have even more robust and open discussions in the online, asynchronous world. In the online asynchronous world, students have time to ponder their response without dealing with potential bias of classmates. Online discussions remove the “cloak-of-invisibility” that many non-volunteers exhibit in bricks and mortar classes. Dynamic, charismatic, and often good-looking students cannot intimidate other students with quick responses to instructor-initiated questions. In many ways—the online, asynchronous climate provides a much more egalitarian and democratic process of student involvement in discussions. The great Benjamin Bloom indicated that Bloom, Benjamin S. (March 1968). "Learning for Mastery" (PDF). *UCLA - CSEIP - Evaluation Comment*. Vol. 1.

The online, asynchronous environment never sleeps. Therefore, the online student can work as often as desired, and can complete discussions when he or she is in the best, peak performance time for their own learning preferences and natural body clock. Slower students are not embarrassed as they are in face-to-face, synchronous classroom climates in which energetic, “fast” students sitting in the first two rows often want to dominate the discussion.

No instructor or academic administrator would argue with the importance of actively involving students regardless of modality and delivery of learning and teaching. Lao Tzu, the great Chinese philosopher—who predated Confucius—inspired my thinking when he said, (Tsu, 1891)The writer’s thinking evolved and revised Lao Tse’s quotation to, “To save my students, I need to serve my students.” This commitment to serving students translates to my availability 24/7 to my students via email, text, or phone in almost “real-time.” We can engage students in every modality. “To lead, we must follow” is a constant reminder that the writer does not always have to be the “sage-on-the-stage”, “the-guide-on-the-side”, or even the “whack-in-the-back.” Rather, the instructor must be flexible and agile and meet every student where he or she is, every minute. Meeting students where we think they are, or wish they are, or where the lesson plan and curriculum indicate that they are, is never appropriate.

In designing any lesson, the writer follows a model developed many decades ago in a treatise he wrote titled, “A Guide to Master Teaching.” (Phillips B. , 1981) The dimensions in the model include:

1. Planning
2. Setting the stage for learning
3. Managing
4. Modeling
5. Motivating
6. Direct and indirect instruction

7. Questioning strategies
8. Checking for learning—Bloom—KC and a Silly Elephant
9. Practice
10. Closure

This model has been implemented in school districts and institutions of higher learning throughout the country and transcends any grade level, subject area, college, university, post-university, or work environment. Instructors have implemented this model from kindergarten through post-doctoral teaching situations.

Face-to-face is traditional, and in many ways, things are more observable in this modality. Most professionals begin and plan with a face-to-face paradigm, then attempt to build an online class. After years of teaching in all five modalities—the writer’s mental model has slowly evolved and shifted to one in which the writer plans the online dimension of every class, and then builds the face-to-face syllabus and activities. Over time—every class embodies the components of an online class. Professionals who lack the experience of online teaching have fear and trepidation with remote teaching and learning. We can avoid much of the dystopian view of online delivery with the following tips.

1. The environment should mirror the regular classroom as much as possible—especially in zoom or synchronous settings.
2. Content must be simple and focused and often not quite as detailed as face-to-face.
3. Extreme planning is necessary as are specific expectations and guidelines for students.
4. Involve every student without destroying the passive, non-volunteer. There is a delicate balance in maintaining work/life harmony by protecting the privacy of non-volunteers.
5. Greet every student, regardless of modality. In a face-to-face delivery, the instructor should greet each student as he or she enters the room. In a synchronous, online delivery, such as Zoom, the instructor should be on the class 15 minutes before the scheduled start time, and 15 minutes after the end time for small-talk, exchanging welcoming pleasantries and encouragement, and clarifying any muddy points.
6. It is vital to begin the formal part of the class at exactly the designated time and to finish at precisely the ending time. This formal process involves setting the stage, building the barn, and getting to the content as soon as possible so we do not lose those sacred four to eight minutes at the beginning of class.

One should no longer simply rely on the traditional Four R’s. The traditional Four R’s included:

- Reading
- Writing
- Arithmetic
- Responsibility

We must follow the new Four R’s of Effective Teaching. The new Four R’s Include:

- Relationship
- Results
- Retention
- Rigor

The beginning of any instructional sequence is sacred. As the instructor greets each student as he or she walks into the room and assumes a seat, a ‘Do Now’ is written on the top right corner of the white-board or chalk-board so students know exactly what to do immediately, and begin.

The writer strongly recommends cameras be turned on in synchronous classes, but we understand privacy for those who must “blur-the-lines”, and are striving to maintain work/life balance, and must keep audio and video to a minimum.

The first four minutes of any lesson are vital and we must set-the-stage for learning. The writer termed this model, “Building-the-Barn.” That is, the effective instructor does the following within the first four minutes of any instructional sequence. Building the Barn is:

1. Build on previous learning
2. Actively involve students
3. Relate learning to life
4. Name the learning

At the beginning of the first face-to-face class session, the students complete a one-page document in which they introduce themselves. This introduction includes schools attended, interests, loves and loathes, hobbies, academic interests, what they intend to get from the class, and a discussion of short and long-term career goals and life goals. These student introductions may take the entire class session as we weave in the syllabus, class expectations, grading criteria, and the course content for the first week of class.

In the online, asynchronous class, the very first activity is each student introducing himself or herself with a 250 word discussion post. The writer places his bio first in the discussion forum to serve as a model for all students. This insures proper word length, etiquette, netiquette, and civility. If Monday is day one of the academic week, the expectation is that each student will complete the introduction by 11:59 pm on Tuesday, which is day two. Each student is expected to reply to every student bio by Thursday at 11:59 pm. Students are graded on the quality of their introductory responses and on the quality of their replies to their classmates. The writer does not require citations during week one, as this can overwhelm and destroy students with high anxiety, but beginning in week two—APA Formatting and citations for all work is expected and required. All written assignments and deliverables must be in accordance with APA Formatting and a plagiarism checker is used for every student submission. A weekly video delineating how APA will be used in all learning activities and goals is posted each week. An announcement is posted every day and slide presentations and micro-lectures are included, even

in face-to-face classes. Sagacious and plentiful use of videos in all classes is vital, regardless of delivery. Effective videos are embraced by students and should be short and student-centered. It is crucial to capture all student learning styles. The following trade secrets are effective in creating videos and recorded micro-lectures:

Prework:

- Be thoughtful and intentional in dress and student involvement

The work:

- Planning and set-up
- Clear script expression
- Thoughtful of background and studio

Shooting:

- Use a tripod
- Exhale, breathe with chest up, and space above the head
- Use a variety of clothing
- Shoot outside for variety, coloring, light, and variation of backgrounds
- Audio is crucial and can impact the visual

The centerpiece of student engagement transcends any particular modality whether it be face-to-face, remote, hybrid, blended, or Zoom. Regardless of modality, the writer delivers quality in the following ways:

1. Active involvement of self and students
2. Daily announcements
3. Weekly videos
4. Daily posting
5. High expectations and following the ABC's of Effective Teaching and Posting which are:
 - a. Acknowledging the previous comment or post
 - b. Building on the learning from the previous post
 - c. Clarifying and/or asking a critical thinking question to expand the discussion
6. Individual videos and announcements for all specialized learning and exemplars are provided, as well as examples of outstanding student work. Formal announcements are posted to include APA Formatting, Citations, References, Avoiding Plagiarism, and Phillips' Laws of Etiquette, Netiquette, and Civility. The laws are:
 - a. Be respectful to others
 - b. Follow the ABC's of Effective Posting
 - c. Never flame or attack
 - d. Use higher-order, academic language
 - e. Be aware of your e-footprint and impressions
 - f. Be patient
 - g. Be selective using emoji's, humor, and texting lingo
 - h. Recommended word length for a post is 250 words

- i. Substantive posting that stimulates creativity, horizontal, and vertical thinking
 - j. Call me 24/7 with questions and issues concerning content or process.
7. Being available to students in almost real-time via email, cell phone, or text.

In today's world, nothing matters more than the active engagement of students and taking each student from his or her present level. There are no excuses for not engaging regardless of delivery or modality.

We must emphasize listening skills and questioning skills. We must insist on creating an open climate of collaboration in which students can speak openly and respectfully. To create this climate, we teach and model Phillips' Laws of Etiquette, Netiquette, and Civility, as listed above. Applying Socratic questioning and its evolution, which is precision questioning and precision answering, is a vital aspect to the effective approach to teaching. In short, we ask questions until we receive, "I-do-not-know" responses. Then we teach and reteach the content.

We must teach patience, open-mindedness, critical thinking, and mutual respect. Especially in face-to-face classes, the Socratic method of questioning will last forever—but we prefer the lexicon of precision questioning and precision answering.

The effective instructor considers four types of questions:

1. Factual (straight-forward)
2. Convergent (yes or no questions and answers)
3. Divergent (many answers)
 - a. Ex: "If we could swap out electric batteries in e-cars rather than charging them overnight, would this make electric cars more appealing to you? Why?"
4. Evaluative
 - a. "What are the similarities and differences..."

Keys for the ultimate engagement for students, regardless of modality, include:

1. Caring. Teddy Roosevelt said, "People don't care what you do, until they know you care." Nothing replaces genuine caring. Students learn better, faster, and easier when they know that we genuinely care. Caring cannot be faked.
2. Our own active involvement in class, regardless of delivery. An instructor can preach active involvement by students, but the words are hollow unless the instructor is actively involved in the course every day.
3. Robust discussions. Buirldly, substantive discussions are possible when a minimum word count of 250 words is required and modeled by the instructor. Student interest is piqued when we practice active engagement and apply the ABC's of Substantive Involvement in all discussions.
4. High expectations for everyone. The Rosenthal Studies **cited were illuminating in showing that students perform according to the expectations of instructors. It is imperative that instructors believe

that all students can learn—even if it is at different rates. In student reviews online and internal to the school, students quite often state that their professor held high expectations, but inspired them to meet and exceed those expectation and feel enormous pride in themselves, creating a desire to learn more.

5. Love, acceptance, reinforcement, rigor, respect, and retention. A statement of inclusion should be present in every syllabus, and in every class. We must visibly assure our students that they belong with us and are treasured and valued, including all differences and similarities.
6. Keeping in our consciousness the traits, qualities, and skill-sets that employers need, expect, and demand which are:
 - a. Communication: Every study relating to student and employee success includes the importance of effective communication. Students need exit-skills when they leave the program to successfully interview for jobs, acquire jobs, and retain jobs that can lead to successful careers.
 - b. Teamwork: Nearly every position today involves team-work. The vision of a strong, independent worker is passé, and replaced by people who are viable, fully-functioning members of teams. The increase in remote work has made effective teaming more vital than ever.
 - c. Ethics: One cannot listen to a news story or read a newspaper without witnessing ethical lapses in business and society. We need to teach students the difference in right and wrong and prepare students for a work force of ethics and morality.
 - d. Electronic savvy: Every professional position today involves at least a rudimentary understanding of technology. Organizations need life-long learners who will function effectively and will contribute in a global economy.

The role of evaluation and grading is of utmost importance and can never be deemphasized. Grading and evaluation matter and count for students and should matter and count for every instructor. Although I question this age-old wisdom, in this context, this is relevant and appropriate. “What gets measured, sometimes gets done.”

There is an art to developing effective discussion questions. This thoughtful process includes creating open-ended and divergent questions that promote critical thinking. These instructor questions should tap all levels of Bloom’s Taxonomy and align with the written and tested curriculum.

Discussion posting, written responses and replies, researching, oral presenting, ethics, case studies, and team activities are vital. If these imperatives are not visible to students by grades, we lose the students who are intrinsically driven. Particularly in the classes that I have control over—40% of the grade is based on discussion responses and replies as they are the lifeblood of effective courses. Discussion forums are the lifeblood of every effective class. Benefits of effective discussion forums—regardless of delivery—include:

- Ultimate interaction
- Learning from one another

- Confidence and self-efficacy
- Processing of information is enhanced for more students
- Retrieval is improved for most students
- Application to the life of student
- Students learn effective time and event management by distinguishing important/unimportant, and urgent/non-urgent tasks

It is vital to set high expectations for student participation and active involvement in every aspect of a class regardless of modality. In a perfect world, student participation in discussions would be rewarded with a grade for responses and replies. The writer creates a video describing word length, expectations, requirements, and evaluative criteria. These instructions are communicated in a variety of ways to insure quality.

We must model the work we expect and be excited about our prompts. It is crucial that we target the head, the heart, and the gut. The effective instructor avoids factual questions for there is no “grist-for-the-mill.” The instructor can ask why a student agrees or disagrees with a previous student’s post. The instructor should avoid the cupcake response, the meatball question, and being the ‘Master of the Obvious.’ The effective instructor should be aware of questions that are too complex and work to leverage images to create critical thought and then connect the prompts to the images. The instructor should not allow google to answer a discussion question. The instructor must know his or her role, provide structure, summarize, and apply active and passive listening skills.

The effective instructor privately engages the non-engaged students, while publicly acknowledging exemplary posts. The wise instructor encourages the community of inquiry and showcases teaching presence, but does not dominate discussion. It is a next-best practice to re-engage students by asking them to explain a concept in a different way.

The instructor can offer closure and showcase presence while strengthening the community of learners. The instructor can extend learning by showcasing individual contributions. It is effective to wrap up the learning with a video.

It is of paramount importance for the instructor to be present and engaged in every classroom. A weekly video is powerful, describing the goals, objectives, and activities for the week. The effective instructor is involved in forums every day, providing active feedback in the form of coaching and mentoring. It is wise to implement an open student forum in which anything can be discussed relating to the course, career, business, and life. The writer calls his open student forum, Phillips’ Café and this is placed at the top of the discussion forum. This can promote friendship, relatability, collegiality, and esprit de corps between students.

A common complaint by instructors and students is that some students wait until day seven to complete posts.

This problem can be eradicated by implementing soft and hard deadlines and rewarding early student responses and replies with robust responses and replies by the instructor, and early grading. Students commit when the instructor commits. The more active the instructor is, the more active the students will be. If it is going to be, it is up to me.

We must make attempts for students to be involved every day in class and set the example with our own total involvement. We must remember to: “be a model, not a critic”, and “to be a light, not a judge.”

In grading students, the writer incorporates traditional written feedback, but also audio and video feedback. Reaching out privately by email and phone call to students who are not actively involved is effective. The writer invites his students to his youtube channel for business and management in which he creates course content-relevant videos every day. You can subscribe to this channel at @dr.byronc.phillipsmba4754 .

If the instructor feels bold, he or she can ask the students to evaluate and rank every discussion form question when the course is completed.

An example of an effective grading breakdown may be:

1. Discussion responses—20 points
2. Discussion replies—20 points
3. Midterm essay/exam—20 points
4. Final essay/exam—20 points
5. Final research project and presentation—20 points

The instructor must constantly engage in every modality including online, for failure to do this would be akin to teaching a face-to-face class in which the instructor wrote a discussion question on a white board, exited the room, and expected the students to answer the questions on their own, and to discuss without instructor encouragement, reinforcement, evaluation, and leadership.

The goal is a classroom of inquisitive learners, regardless of modality. We want insatiable, hungry learners and it is the objective to create an inquisitive culture and environment. We need to prepare students for NOW and in the future, and meet them on their minute-by-minute level. We have the ability to influence every student, one student at a time, and one team at a time.

The writer has taught middle school, senior high school, community college, university undergraduates, graduate students, doctoral students, and post-doctoral students. My favorite placement is community college because of my influence and the gratitude I received each day. My community college students often seek a second chance, a third chance, and even a fourth chance at higher education. This is a challenge—but more so, a wonderful opportunity.

Keys to teaching these students with active engagement are:

- Caring for each student
- Believing every student can learn
- Trusting every student and being trusted
- Practicing diversity, inclusion, and recognizing and embracing the uniqueness of every person

To create an inquisitive culture these trade secrets are vital:

1. Open-ended questions
 - a. Ex. “Help me understand...”
 - b. Ex. “Have you considered...?”
2. Embrace silence (respond, but do not react)
3. Ask a stream of questions

Effective listening is vital to the entire teaching process and combines active listening (close attention), plus passive listening (spaces for silence.)

We need to meet every student on his or her level and never leave one behind. We must learn as much as possible about every student to ensure effective next-step learning.

The content for the entire class should always be loaded electronically before the first formal class session, but it is advisable to make nothing visible except the material for the current week. It is not recommended that students work ahead in a course, unless the student has special accommodations.

All classes are electronic and online in many ways. The classroom is flipped in many circumstances and the students can view videos, slides, and micro-lectures before a face-to-face meeting.

These next-best practices have been gleaned from years of asking students what they love and loathe about courses:

1. We must model relevance in all we do and teach.
2. We must be available for students for issues of content and process—the inability to get a response from an instructor in real-time when a student is working with finite time availability is a top complaint.
3. Students often perceive non-graded work as “busy-work.” A discussion forum not tied to specific grading criteria will be perceived as the “busy-work” that it is.
4. \$400 textbooks cannot be assigned and not used in the course.
5. Quizzes and examinations must be content-valid, match the written curriculum, and align with the course objectives and textbooks.
6. We must prepare students for the next-step learning.

7. We must prepare students for the next course, the next degree, the next career, and life itself.

John Dewey wrote that students learn “what they do.” What students will do and learn in classes is vitally important. One of my favorite quotations, source unknown, guides every minute of every day of my teaching:

Watch my thoughts, for they become words.

Watch my words, for they become actions.

Watch my actions, for they become habits.

Watch my habits, for they become character.

Watch my character, for they can become destiny.

As stated above, employers are desperately searching for business graduates with particular skill-sets and traits.

Employers need these traits, qualities, and skill sets:

- Communication (written, spoken, and electronic)
- Teamwork
- Ethical behaviors
- Technological savvy

How should students learn to accomplish these imperatives and how should we teach?

- Real-world and organizational problems—case studies. This is valuable as students can be more able to solve real-work issues. For too long, students were bombarded with knowledge and facts and the “empty-vessel” theory in which students were poured content into, as an empty container, was prevalent for too long.
- Team activities. The writer incorporates team activities into every class. Ideally, students are assembled into groups of three or four and they work together to solve an organizational issue. The writer insists that every team member has a speaking part in a ten minute presentation that culminates the activity. Each team submits answers to questions and offers a collaborative solution to the organization study or issue.
- Oral and written assignments. The writer acknowledges that what gets graded gets done. Whether we like this or not. In face-to-face classes—oral presentations are vital since business graduates are required to be effective communicators as demanded by employers. The writer includes, in all class announcements, guides for effective oral and written presentations. These instructive resources give examples and tips for ultimate success.
- Experiences in what they need in career and in life. It is particularly important with more mature students to address real-world, real-work, and immediate issues confronted in life. This is why andragogy is superior to pedagogy when working with mature students, as may in the community college, or executive MBA programs.

Actively involving students is possible regardless of modality with the sagacious use of:

1. Our own personal and active involvement

2. Daily announcements
3. Weekly and situational videos
4. Daily posting

Substantive posting by us sets the bar high for each student to post substantively in discussion forums. To accomplish this, we must:

1. Have an expectation of students responding to discussion questions by 11:59pm on Tuesday (soft deadline)
2. Expectation of replies by students no later than Thursday at 11:59pm (soft deadline)
3. Our own daily active involvement in every discussion
4. Tying grading to discussion forums
5. Following the ABC's of Posting, which again is:
 - a. Actively engaging every student in affirming and acknowledging all comments and posts
 - b. Building on previously stated comments or posts
 - c. Clarifying and asking critical thinking and creative thinking questions

How do we create substantive posts?

- Ask open-ended questions that cannot be answered in a purely factual manner or using a yes or no response. Acknowledging that students must learn to improve writing skills to be more employable, the discussion forum should be a proving ground and practice for enhanced writing skills. The instructor can set the example for everyone by responding and replying substantively to student work. This involves acknowledging the student work, building on the student's ideas in the work, and challenging all students with critical thinking and creative thinking questions which tap various levels of thinking.
- Setting high expectations and modeling more than the energy and enthusiasm expected of students. Student will not typically perform at a more robust level than the instructor in a class.
- Making posting more than 40% of the total grade. Some students are motivated intrinsically, but most students are motivated extrinsically. If we are sincere in challenging students and teaching them in a manner than prepares them for the rigors of the world, it behooves us to attach a large percentage of the grade to the active involvement of everyone in the discussion forum.
- Celebrate and reward positive behavior and posting. People often repeat behaviors that are reinforced and rewarded. A common complaint in organization life is that people are not recognized for outstanding efforts and production. Examples of employee or student recognitions are:
 - Higher grades
 - Personal recognition in a discussion forum
 - A personal email or phone call expressing gratitude for individual student contributions
 - Volunteering to write a letter of recommendation for an outstanding student when the course is over

- Enter the world of the student and make every post applicable to student life, career, and future career. The outstanding instructor connects to the lives of students. Assignments and graded work should include opportunities for students to study, research, and write about real-world and real-work problems that can make them better at their current and future jobs. Again, meeting students where they are and inspiring them to attain higher levels of performance should be every instructors goal.
- Teach for career and future job success.
- Create happy students who want to learn more. Studies show student who are happier, learn more and learn better.
- Make myself available 24/7 by phone, email, or text.

Once again, how do we engage students regardless of modality?

1. Know our students' loves and loathes
2. Robust discussions
3. High expectations
4. Love, acceptance, and reinforcement
5. Active involvement starts with us
6. Stressing communication, team-work, research, writing, discussing ethics and relevance, and appreciation for social and cultural diversity

Discussion posting, written responses and replies, researching, oral presenting, ethics, and team activities are crucial. If these imperatives are not visible to students with grades, we lose students who are extrinsically driven.

We underestimate the influence we have over others. Most important, we sometimes dismiss the ubiquitous influence we have over students. What a reward when we read our student evaluations—especially the anonymous ones on sites such as, ratemyprofessors.com.

These moments of recognition, gratitude, and adulation make everything worthwhile. The time, the effort, the emails, the voicemails, the text messages—the hundreds of hours of planning, changing, and adapting make those moments possible.

Psychological researchers taught us that we influence our students immensely. There is no “cloak-of-invisibility” for an instructor. Every video, every post, every fast or slow reply to an email, a voicemail, a text, every time we are absent from a discussion—the students are noticing and forming judgements. Yes—students observe us even when we think they are not paying attention. We must be attentive to student needs during the entire course 24/7. The perception of students is reality.

The heartbeat of education is instilling curiosity so that students continue to study the topics as they learn by doing. Learning is doing and being.

Thank you. It was such a pleasure.

References:

Bloom, B. S. (1968). Learning for Mastery. Instruction and Curriculum. Regional Education Laboratory for the Carolinas and Virginia, Topical Papers and Reprints. *Evaluation comment*, 1(2), n2.

Legge, J. (1891). *Translator*. Sacred Books of the East, Vol 39.

Phillips, B. (1981). *A Guide to Master Teaching*. Pittsburgh, Pennsylvania

Tzu, L. (2020). Lao Tzu: Tao Te Ching (p. 0). *Strelbytskyy* Multimedia Publishing.

International Chip Crisis: Country Approaches

Oguzhan Isik

Inonu University, Malatya, Turkey

Kayode Inadagbo

Prairie View A&M University, Prairie View, USA

Yunus Emre Bulbul

Middle East Technical University, Ankara, Turkey

Murat Isik

Drexel University, Philadelphia, USA

Ismail Can Dikmen

Inonu University, Malatya, Turkey

Abstract: Chip crisis occurs when the chips embedded in many electronic devices, we use every day cannot be supplied in sufficient quantities due to physical or sociological changes. A few examples would be the supply-demand imbalance experienced during the pandemic, disruptions in the supply chain, changes in consumer preferences, the trade war between the United States and China, as well as adverse weather patterns. There have been price increases or shortages in automobiles, graphics cards, video game consoles, computers, and other semiconductor-containing products due to the chip crisis. Countries support companies in announcing huge investments to prevent similar problems in the future. In addition to contributing to the problems of international relations, the chip gap does not appear to be slowing down any time soon. It is estimated that the world will not experience a chip crisis again after the new chip production facilities are commissioned after 2025. This paper includes studies made by countries to prevent the global chip crisis.

Keywords: Chip Shortage, International Relations, Countries Investment, Semiconductor Marketing.

Citation: Isik, O., Inadagbo, K., Bulbul, Y. E., Isik M., & Dikmen, I. C. (2023). International Chip Crisis: Country Approaches. In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023--International Conference on Social and Education Sciences* (pp. 24-36), Las Vegas, NV, USA. ISTES Organization.

Introduction

An integrated circuit unit, also called a microchip, computer chip, or integrated circuit is an integrated circuit

manufactured on a microscopic scale using a semiconductor material such as silicon or, to a lesser extent, germanium. Transistors and conductors, which are used in electronic power sockets, are connected to the electrical grid by etching complex connections into layers. The semiconductor silicon, which is used in the chip industry, can have its conductivity increased if desired. Throughout the world, silicon is a raw material that can be made from sand. In order to produce silicon surfaces for chips, only silica sand can be used. Chips are composed of chemicals, gases, and light from an organism called photolithography. Typically, computer chips are made of silicon and consist of several components, such as transistors, that transmit electronic data. In the second half of the 20th century, they became popular because of their small size, affordable price, high efficiency, and ease of manufacture. Among the primary materials used in the chip industry is silicon. In addition to silicon, other materials like phosphorus and boron can also enhance the conductivity of semiconductors. In this way, a current can be switched on or off. In other pipeline connection paths on the chip, aluminum is typically used to form a thin metal layer. Photolithography is then used to remove the metal layer and reveal the conductive connections. The chips have electronic circuits located on thin silicon surfaces. A chip contains miniature electrical circuits made up of transistors. The multilayer lattice of interconnected shapes is created on the silicon structure by adding and removing materials. It's good news that silicone is made of sand. Second in importance to oxygen is sand, which we breathe from the earth. A large cylinder is poured with melted sand during the sand conversion process. Chips are small electronic circuits, also known as integrated circuits, that are an integral part of many electronic devices, especially computers. The process of chip-making is extremely delicate, and it is often performed in a "clean room," because even microscopic contamination can cause a chip to malfunction. Increasingly smaller transistors made the chips more powerful as technology progressed (Chip Manufacturing Detailed Website, 2022), (Topolski, 2017), (Verheyden, 2022).

By running machines more efficiently, faster, and more conveniently, semiconductor chips have replaced older generations of generations. Several advances have been made in design and dimensions to reduce weight, design stylish smartphones, and make them suitable for use in a variety of US units. The global chip crisis continues to bring everyone together. Despite the demand for semiconductors, small companies are still unable to meet it. Many electronic products failed to be produced due to the pandemic. On top of that, a demand explosion emerged unexpectedly and now, even automobile production is still being disrupted. Companies declare that they will invest heavily in chips to prevent similar problems in the future. The new chip production facilities that will be commissioned after 2025 are expected to prevent another chip crisis. Semiconductor chips are essential for modern life, which is why they must be restored and increased in production. Microchip manufacturers use silicon because it is plentiful, inexpensive, and easy to use. A variety of devices have also proven to be reliable with this semiconductor. Microchip technologies are shrinking in size, and more components are being squeezed into microchips as ever-increasing demands for more performance and data are being met. Silicon, however, is reaching its practical limits. A variety of solutions are being developed by researchers in an effort to bring electronics into the future (Rae, 2022).

In the technological age, chips are considered to be the new oil; they are a common component of automobiles, smart devices, medical devices, airplanes, and wearable devices. Machines have become faster, cheaper, and

more efficient as semiconductor chips have replaced tubes. In various industries, advances in design and size have led to lighter and smarter phones and equipment. Data transfer and Artificial Intelligence (AI) applications such as virtual reality and 5G connectivity are enhanced by the chips. In the field of electronic systems in vehicles and household appliances, in the defense industry, and even in wearable technologies, semiconductors can be defined as components that play an essential role. The automotive industry also relies heavily on these semiconductors. The brain of a vehicle is located at a critical point (Gupta, 2022), (Degli Abbati, 2021). A total of 1400 chips are set up inside the car. The number of chips was 200 in the early 2000s. These chips include all details from the engine to the brain, from the brain to the vehicle electronics. Many options and comforts are provided by these chips. It is possible to use fewer chips in production if some comforts and options are abandoned. However, it is not possible to produce a chip less car during this period of digitalization (Yurttas, 2022). The availability of innovative equipment such as start-stop, navigation, lane tracking system, adaptive cruise control, and blind spot warning system may be limited. Automobiles are subject to technological restrictions due to the crisis. The global chip shortage highlights the importance of semiconductor chips and the need to produce and increase their production in sufficient numbers to meet the needs of the current technological age. Researchers say that the world works with chips and semiconductors because there are about 1 trillion chips produced each year (Pennisi, 2022). Even though the increase in chip prices continues rapidly, it gives hope that Taiwan Semiconductor Manufacturing Company (TSMC), one of the largest chip manufacturers, started production in June 2021. To overcome the crisis, Intel's \$20 million investment plan for establishing chip-producing factories in Arizona in March and those it plans to open in Europe will play an important role. Nevertheless, these investments are not expected to yield results for at least two or three years. The recent chip crisis cannot be attributed to a single cause, as is considered the right approach. The entire semiconductor supply chain needs to be addressed in order to reach a complete solution (Lazure-Vieira, 2022).

Methodology

The chip crisis has been a major concern for many countries in recent years. Digitalization and increased reliance on technology have led to an increase in chip demand. The sudden surge in demand has, however, resulted in a shortage of chips, affecting many industries, including automotive and electronics. Our study examined how different countries have handled the chip crisis and the impact it has had on their economies. This paper describes the methodology and results used in the study in a comprehensive manner. This research began with the selection of a bibliographic portfolio. A number of scientific articles were selected, using specific criteria for inclusion, such as the relevance of the article to the discussion of the chip crisis and its publication date. References were chosen based on their contribution to the understanding of the chip crisis and the various approaches taken by countries in order to mitigate its effects. Afterward, we present the results of their research, which include a comparison of the approaches taken by different countries to address the chip crisis. As part of our analysis, we have analyzed different initiatives taken by the government to support the chip industry, incentives for chip manufacturers, and trade agreements between countries. Additionally, we discussed how these measures would affect the economy and industry. We have also discussed the contribution of their

research to science and innovation in addition to presenting the results. The chip crisis and the different approaches countries have taken to mitigate its impact are important to understand. The implications of their research for future studies and policymakers have also been discussed. In conclusion, we summarize the key findings of their research and the contribution their study makes to the understanding of the chip crisis. We have emphasized the importance of continued research on the topic, to better understand the impact of the crisis and the best approaches to mitigate its effects. The rest of the paper is organized as follows: **Section III** presents the Chip shortage analysis. **Section IV** provides the US Semiconductor Strategy. Made in China 2025 Policy and European Chips Act are reported in **Section V** and **Section VI**. **Section VII** concludes the paper.

Chip Shortage Analysis

Chip crises have changed over the past two years. The semiconductor industry will face supply challenges until the end of 2023 and the beginning of 2024, according to experts. It is not exactly new for the semiconductor industry to have a number of shortcomings. A number of factors can contribute to this, including supply chain issues, Covid-19, the US-China chip ban, Russia-Ukraine war are shown in Figure 1. To date, semiconductor troubles have usually been short-lived, lasting between six and twelve months. As a result of the current chip shortage, we are facing unprecedented challenges and processes. In the aftermath of Covid-19's impact on the chip crisis, the onset of the pandemic in 2020, and the need for technology accelerated with many employees working from home. Technology equipment sales are on the rise, and home entertainment equipment such as Playstation and Xbox, as well as smartphones, are in great demand. Technological products increased in popularity, but their effects varied by sector (Wu, 2021), (Brown & Linden, 2011).

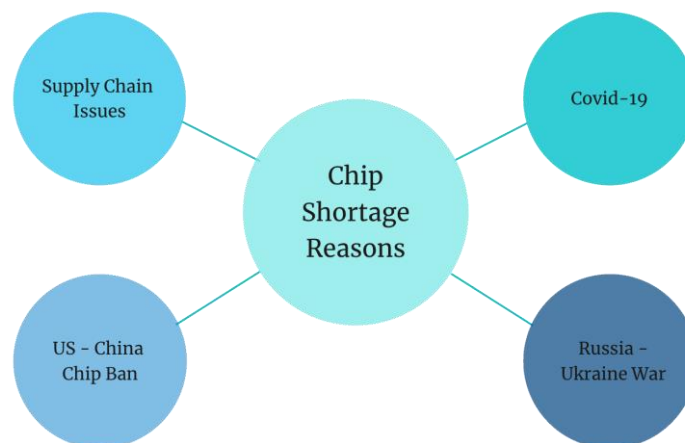


Figure 1. Chip Shortage Reasons

The chip crisis caused 10.5 million sales in vehicle production in 2021, and prices increased by 16%. There are disruptions in 2022 as well. Companies drastically reduced their chip orders as they knew that there would be big drops in sales in the automotive industry. Technology products for the home were made from some of the same chips used in cars. It is possible to find results in time even if some companies start with special

engineering teams. Apart from Covid-19, the Renesas factory in Japan caught fire in March 2021, which prevented chip production for three months. The automotive industry generally uses these chips. The fire in Ukraine in early 2019 forced the suspension of semiconductor packaging material production. Due to the constant curfew in China, the workforce decreased significantly, and production was delayed. Consequently, chip manufacturers have stopped production and the supply chain has been disrupted or a permanent shortage has resulted. New semiconductor factories are planned to meet the current chip shortage in the future with new-generation technologies. Despite the current chip crisis, professionals work to maintain a balance between new and old technologies (Dziczek, 2022), (Soni, 2022), (Kumar, 2022).

Chip Demand by Income

(billion dollars)

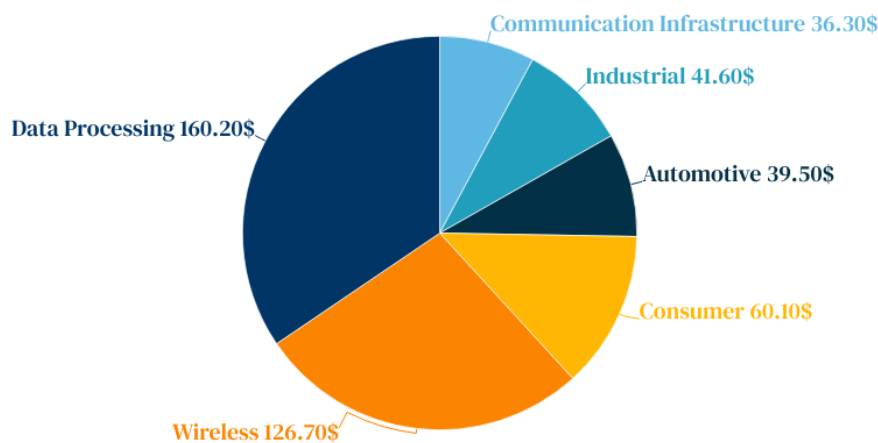


Figure 2. Chip Demand by Income

The countries have begun planning for the opening of 29 new semiconductor factories. China and Taiwan are the two countries with the most factories that can produce large quantities, followed by the United States, Japan, and South Korea. The year 2022 sees the establishment or construction of 10 new companies. Thirteen new factories are expected to be built in 2023. A total of 200 factories are expected to open for 300mm technology by 2026 (Understanding the current global semiconductor shortage, 2022). Chip capacity has also been increased by international governments. Congress passed the \$52 billion CHIPS (Creating Helpful Incentives to Produce Semiconductors) bill in July 2022 to research and produce semiconductors. TSMC and Sony are partnering with the South Korean government to open a new factory while the EU plans its "Chips Act.". The Made In China 2025 policy is likely to remain in place.

The US Semiconductor Strategy

Following US sanctions, China has established its ambition to become a global technology leader.

Semiconductors play a significant role in this. The semiconductor industry has been developed in China for decades, and a budget has been set aside for it. The US sanctions have made China's vulnerability to semiconductors very evident over the past few years (Grimes, 2020). It is the goal of both the US and China to become tech superpowers. In addition to accusing China of intellectual property theft and human rights violations, the US has blocked some Chinese firms from accessing US technology. AlixPartners estimates the damage caused by the chip crisis in the automotive industry in 2021 was 110 billion dollars as shown in Figure 7. The chip crisis will also result in a loss of approximately four million vehicles, according to a report by the Semiconductor Industry Association (SIA) and Boston Consulting Group, the semiconductor industry will have to invest approximately three trillion dollars in R&D and capital expenditures over the next 10 years to meet growing demand (Lawrence, 2021).

Total automotive semiconductor market (in Billion USD)

Total of IC: integrated circuits & OSD: optical, sensors and discrete



Figure 3. Total Automotive Semiconductor Market

The USA has passed a new bill to solve the semiconductor chip crisis and announced that it has imposed some restrictions on manufacturing companies. Within the scope of the new bill, it is trying to prevent investments in "countries that pose a national security threat" to the USA. There are four countries that US intelligence sees as threats to national security: China, Iran, North Korea, and Russia. For this reason, we can say that the companies benefiting from the investments will be prevented from investing in the specified countries (Oxford Analytica, 2022), (Trautman, 2022). It was emphasized that the investment will enable the production and development of the world's most advanced chip technology in the USA, with grants and loans under the law known as CHIPS and the Science Act. CHIPS and the Science Act are described as important steps toward strengthening US leadership in the semiconductor industry. A law to increase domestic semiconductor production, signed by US President this month and enacted this month, aims to alleviate the chip shortage that disrupts many sectors,

including the automotive industry (Shivakumar, 2022). The US government believes that Chip and Science Act to increase domestic semiconductor production and strengthen the US position against China and describes it as a "once-in-a-generation investment opportunity". The Chip and Science Act signed today is a law that the American people can be proud of as a once-in-a-generation investment opportunity and the future of the chip industry will be manufactured in America. We show the Integrated Circuit (IC) production value chain in Figure 3. There will be \$28 billion in loans and grants distributed as part of the \$50 billion investment plan to enable advanced logic and memory chips to be manufactured in the United States. This amount is used for the construction and expansion of production, testing, assembly, and packaging facilities. A total of approximately 10 billion dollars is expected to be spent on chips that will be used in vehicles, communication devices, medical devices, and defense devices. In addition, while there are 11 billion, a resource will be allocated to research and life (CHIPS Alliance Website, 2022). Semiconductor-conductor structures have a clear view of the changes that need to be made for the US to rebuild the leader in chip frameworks, and a comprehensive approach that addresses the entire distribution chain is needed.

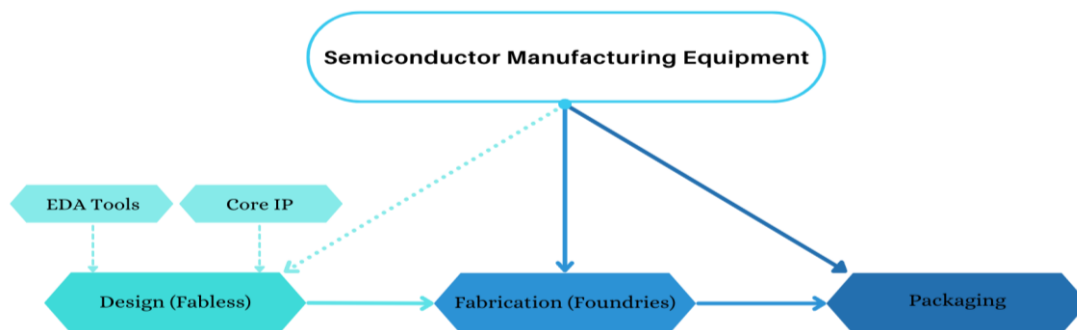


Figure 4. IC Production Value Chain

Made in China 2025 Policy

Chinese start-ups and other semiconductor companies in the industrial value chain are being invested in by companies like Huawei. A16 Bionic chips are found in Apple's newly produced iPhones and are the fastest chips in smartphones. The chips are manufactured by TSMC. Taiwan and TSMC are now in a unique position and showed their key role in Figure 4. That's a big part of the geopolitical complexity we discussed earlier. It is Taiwan that lies at the center of this geopolitical struggle. Taiwan is regarded by the Communist Party as a part of old China and is only waiting for reunification. It is unknown if they have made any public announcements stating that they have no hesitation in this matter. Violence has not been abandoned in the quest to reunite the country. There is a prediction that global supply chains and the semiconductor industry will be disrupted by China's invasion of Taiwan (Momoko, 2022). As Taiwan plays such a critical role in the manufacture of these chips, there is concern that if China succeeds, it will take over Taiwan's manufacturing industry or semiconductor industry. China could put communist party members on TSMC's board or exert other influence in other ways if it acquired the company.

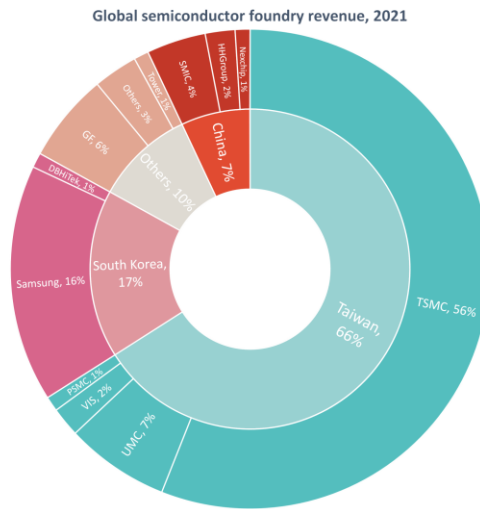


Figure 5. Global Semiconductor Foundry Revenue

In terms of production facilities, the company is estimated to have the most advanced establishments in the world. These facilities, however, do not produce anything for the company. All its production goes to technology giants such as AMD, NVIDIA, and Apple. There is no doubt that TSMC is one of the most strategic and important companies in the world. In order to solve these problems with high processing power and low energy, these chips must be manufactured with the latest technology. TSMC has assumed such a critical role that it is among the first to be saved in a possible China war for America (Bown, 2020). TSMC is now the world's largest semiconductor manufacturer. As its closest competitor, Samsung, uses its own products to produce its own products, it cannot produce high-capacity production for third parties. The income graph for the last 15 years shows TSMC to be one of the most talked about companies in the world. Its revenue has reached 50 billion dollars today. In order to punish aggression and prevent future conflicts with Taiwan, China spends billions of dollars to reduce its dependence on technology imports (Moore, 2019). All countries' semiconductor values are shown in Figure 5.

Chip 4 members are the main players in the global semiconductor industry

(%, semiconductor industry value added by region; 2021)

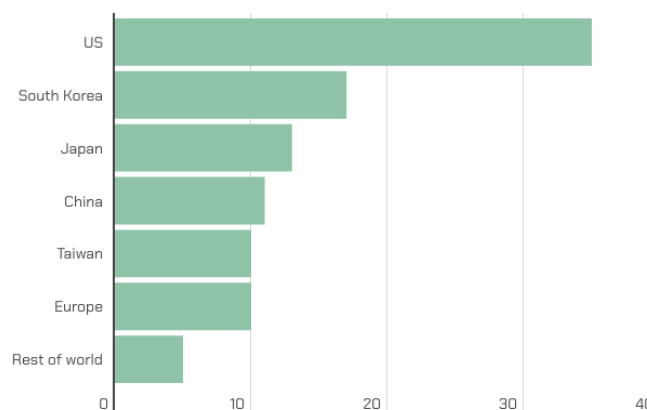


Figure 6. Main Players in Global Semiconductor Industry

The main reason for the formation of Made In China ACT 2025 was to protect China from the crisis. Made in China aims to become a self-sufficient high-tech center from its position, in other words, the "center of production", which is achieved by low labor costs and strategic procurement planning. In May 2015, the world's electronics value, particularly semiconductor value, was announced. Research indicates that China started these plans before the crisis (Wubbeke, 2016), (Wernberg-Tougaard, 2020).

While the Chinese government is targeting domestic chip production in this regard, the material content is expected to reach %70 by 2025. The Chinese government supports new initiatives and policies to increase production with \$300 billion or more. Technology companies that are successful are taxed less, the government provides direct financing and support to businesses for research and development, and finally, foreign companies and foreign technology companies are encouraged to purchase from the government. By 2025, 40 R&D centers will be built in places determined by the Chinese government (Zenglein, 2019). Ten of the most important protection divisions. In addition to adopting robotics and digitization, new materials are the basis of domestic production.

Semiconductor industry market revenue in Europe from 2006 to 2022

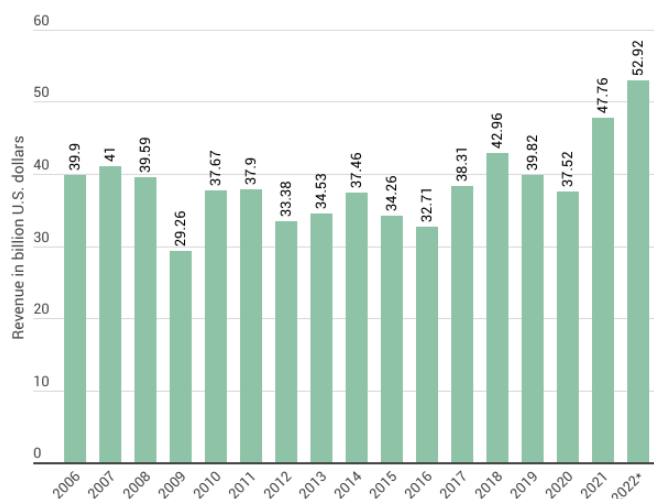


Figure 7. Company Revenue

Chinese-made products, which possess some measures against imitators, are valuable cards for the Chinese government. Indeed, China has a global presence in aviation, biotechnology, information technology, smart manufacturing, maritime engineering, enemy transportation, electric vehicles, consumer products, biomedicine, agricultural equipment, and pharmaceuticals. Despite the fact that Made In China is aimed to be successful until 2025, it will last until 2035. The country wants to reach medium electric power by 2035 and become a global manufacturing power by 2049. It is also a well-known fact that reaching the goal in this mixed issue of semiconductor design and production is a high level of success in addition to having an ambitious industrial plan.

After seven years, no tangible results have been achieved because of Made in China 2025. For China to achieve its own goals, it must maximize the international sea bream mill to some extent. It is unclear whether we have the audacity to exclude them from the technology export market because they have access to the best in equipment and design, good relations with the US and its competitors, and the list of exceptions to the so-called blacklist (Yan, 2022). Technology R&D investment by governments does not always yield equal results as shown in Figure 6. This is a dual task with easy-to-observe results. The result in meetups and the hope for ordinary currencies is another complement.

European Chips Act

The chip crisis in Europe occurred for a variety of reasons and resulted in a reduction in semiconductor production. This part of the paper focuses on the chip crisis in Europe, but there is a chip crisis around the world as well. The chip crisis in the world has been ongoing for three years, but European countries and non-member countries (UK) have been experiencing problems with chip production for 30 years. It will be evident over time how life-saving the situation will be even if the European Union gets a handle on the crisis. We'll examine the chip law of the European Union. A proposed chip law in the European Union (EU) includes a massive helping of around 52 billion deliveries and significant tax breaks on semiconductor manufacturing setups. In addition to providing direct financial incentives, this law also reduces taxes and increases production (Huggins, 2022).

These are the leading cities to assess the current state and potential future of Europe's semiconductor industry: Leuven (Belgium); Dresden (Germany); Eindhoven (Netherlands); Grenoble (France); and Cardiff (England). These are key cities in Europe for the change in chip manufacturing to come into operation and increase production. A total of 2.3 billion euros are invested annually in R&D in the Eindhoven region. Cardiff University and IQE, an advanced global supplier, have signed a venture agreement that is one of Europe's most significant achievements. Due to the chip crisis and the company's inability to access semiconductor chips during the pandemic, BMW, like other vehicle manufacturers, experienced a significant drop in production and profits during the pandemic. Nevertheless, the German manufacturer believes this situation will improve by 2023, according to the latest statements. Audi created a "special team" and began to employ this team specifically to handle this crisis. Engineers at this company are working on new technologies that can manufacture basic vehicle structures without some parts. Although the European Union is ready to provide millions of dollars of aid to prevent these problems from occurring again, it has been acknowledged that studies are done for incentive purposes and to improve quality, in addition to the EU's million-dollar investments. Furthermore, the work that can be done includes setting up test environments in universities and hiring qualified researchers (European Chips Act Website, 2022).

Conclusion

To summarize, the chip crisis is caused by people who have become ill and unavailable in the pandemic over the

past few years, a decrease in production because of working from home to avoid the pandemic and shipping issues. This resulted in the suspension of production in several factories. This situation has affected a wide range of companies, from household technologies to automotive. The damage is estimated to be billions of dollars. It is estimated that the chip crisis will continue for a while due to the drought and the Russia-Ukraine conflict. Since chip demand is still high and smart devices are becoming more connected to each other, it is unlikely that the crisis will be easily resolved in the near future. Chip factories require billions of dollars of investment to establish. Furthermore, establishing a test environment for complex chips or increasing factory capacity takes time. The construction of new factories and additional production lines will cost 446 billion dollars in the next five years, according to chip manufacturers. In our study, we examined the investment plans of companies based on these national plans. The USA, China, and the EU offer extensive incentives for chip production. It has been decided by more than 40 companies that their silicon layer production increases by more than 750,000 by 2022 in order to prevent the crisis that may occur at the beginning of 2020. By 2024, it is expected that production will increase by 17% if this trend continues. As a result of the increase in population, when new chips are produced to meet their needs in the future, we may face new crises in the future, as production needs to be increased again and demand for technologies like electric vehicles increases. Multilateralism, along with similar policies implemented simultaneously by like-minded countries, is an ideal approach for a successful policy balancing commercial interests and national security concerns. Climate change, pandemics, food security, and chips all play a key role in the next global challenge. The importance of supplying a reliable supply, investing in R&D, having a variety of suppliers, and shortening supply chains cannot be overstated.

References

- Bown, C. P. (2020). How the United States marched the semiconductor industry into its trade war with China. *East Asian Economic Review*, 24(4), 349-388.
- Brown, C., & Linden, G. (2011). Chips and change: How crisis reshapes the semiconductor industry. *MIT Press*.
- Chip Manufacturing Detailed Website. (n.d.). Retrieved December 17, 2022, from https://thinktech.stm.com.tr/uploads/docs/1630419742_stm-blog-global-cip-krizi.pdf
- CHIPS Alliance Website. (n.d.). Retrieved December 17, 2022, from <https://chipsalliance.org/>
- Degli Abbati, L., Ullmann, R., Paganini, G., Coppetta, M., Zaia, L., Huard, V., Montfort, O., Cantoro, R., Insinga, G., Venini, F., & others. (2021). Industrial best practice: cases of study by automotive chip-makers. In *2021 IEEE International Symposium on Defect and Fault Tolerance in VLSI and Nanotechnology Systems (DFT)* (pp. 1-6). IEEE.
- Dziczek, K., & others. (2022). Why the automotive chip crisis isn't over (yet). *Chicago Fed Letter*. Federal Reserve Bank of Chicago.
- European Chips Act Website. (n.d.). Retrieved December 17, 2022, from <https://www.csis.org/blogs/perspectives-innovation/european-chips-act-strategy-expand-semiconductor-production-resiliency>
- Grimes, S., & Du, D. (2020). China's emerging role in the global semiconductor value chain.

- Telecommunications Policy*, 101959. Elsevier.
- Gupta, S. (2022). Chip demand pushes automotive and lubricant industry changes. *Tribology & Lubrication Technology*, 78(3), 22-24. Society of Tribologists and Lubrication Engineers.
- Huggins, R., Johnston, A., Munday, M., & Xu, C. (2022). The Future of Europe's Semiconductor Industry: Innovation, Clusters and Deep Tech.
- Investment Detailed Website. (n.d.). Understanding the current global semiconductor shortage. Retrieved December 17, 2022, from <https://www.spglobal.com/engineering/en/research-analysis/understanding-the-current-global-semiconductor-shortage.html>
- Kumar, A., Agrawal, R., Wankhede, V. A., Sharma, M., & Mulat-Weldemeskel, E. (2022). A framework for assessing social acceptability of Industry 4.0 technologies for the development of digital manufacturing. *Technological Forecasting and Social Change*, 174, 121217. Elsevier.
- Lawrence, K. (2021). "Chipageddon": What the Global Chip Drought Means for Manufacturing and Supply Chains. In SAGE Business Cases. SAGE Publications: SAGE Business Cases Originals.
- Lazure-Vieira, D. (2022). Semiconductor chip shortages (2022-1). Munk School of Global Affairs and Public Policy.
- Momoko, K. (2022). Taiwan's TSMC as a Focal Point of US-China High-Tech Conflict. *Asia-Pacific Review*, 29(1), 5-12. Taylor & Francis.
- Moore, S. K. (2019). Another step toward the end of Moore's law: Samsung and TSMC move to 5-nanometer manufacturing-[News]. *IEEE Spectrum*, 56(6), 9-10. IEEE.
- Oxford Analytica. (2022). US security review will stress China threat. Emerald Expert Briefings, oxan-db. Oxford Analytica.
- Pennisi, S. (2022). Pandemic, shortages, and electronic engineering. *IEEE Circuits and Systems Magazine*, 22(3), 41-49. IEEE.
- Rae, M. (2022). United States and European Union expand chip manufacturing. In SAGE Business Cases. SAGE Publications: SAGE Business Cases Originals.
- Scruton, R. (1996). The eclipse of listening. *The New Criterion*, 15(30), 5-13.
- Shivakumar, S., Wessner, C., & Howell, T. (2022). The Pillars Necessary for a Strong Domestic Semiconductor Industry. JSTOR.
- Soni, G., Kumar, S., Mahto, R. V., Mangla, S. K., Mittal, M. L., & Lim, W. M. (2022). *A decision-making framework for Industry 4.0 technology implementation: The case of FinTech and sustainable supply chain finance for SMEs*.
- Topolski, K., Bochniak, W., Łagoda, M., Ostachowski, P., & Garbacz, H. (2017). Structure and properties of titanium produced by a new method of chip recycling. *Journal of Materials Processing Technology*, 248, 80-91. Elsevier.
- Trautman, L. J. (2022). *Tik Tok! TikTok: Escalating Tension Between US Privacy Rights and National Security Vulnerabilities*. Available at SSRN.
- Verheyden, A. G., Van De Walle, G., Amory, B., Thomas, R. C., Waldman, C. A., & Zhang, Y. (2022). The EU Commission proposes a chip act to confront semiconductor shortages and strengthen Europe's technological leadership. *e-Competitions Bulletin*, February 2022. Concurrences.

- Wernberg-Tougaard, E. (2020). *China's Industrial Policy Plan Made in China 2025* (Master's dissertation). Copenhagen Business School.
- Wu, X., Zhang, C., & Du, W. (2021). An analysis on the crisis of "chips shortage" in automobile industry Based on the double influence of COVID-19 and trade friction. *In Journal of Physics: Conference Series* (Vol. 1971, No. 1, pp. 012100). IOP Publishing.
- Wubbeke, J., Meissner, M., Zenglein, M. J., Ives, J., & Conrad, B. (2016). Made in China 2025. Mercator Institute for China Studies. *Papers on China*, 2, 74.
- Yan, S., Yao, X., & Ma, B. (2022). Chinese transnational corporations in the Ukraine crisis: risk perception and mitigation. *Transnational Corporations Review*, 1-11. Taylor & Francis.
- Yurttas, A. (2022). How the Semiconductor Shortage Affected Production and Sales of German Car Manufacturers and What are Strategic Conclusions? [*Doctoral dissertation*].
- Zenglein, M. J., & Holzmann, A. (2019). Evolving Made in China 2025. *MERICS Papers on China*, 8, 78.

Comprehensive Report on Early COVID Impact

Jorge L. Morejón-Benitez

University of Miami, USA,  <https://orcid.org/0000-0001-6334-831X>

Abstract: The COVID-19 pandemic that started on the Spring of 2020 posed a considerable challenge for college students and educators. The lockdown that took place after Spring Recess of that year demanded urgent adjustments in instruction as well as instructional methods. The sudden shift, from in-person to online teaching, required the immediate use of asynchronous learning to guarantee effective communication between students, faculty and the administration. While new initiatives emerged as possible solutions to the crisis, the issue of whether they actually allowed students to accomplish their educational expectations became an important question. This study summarizes the results of a research work which main purpose was to measure the degree to which students felt cared about during instruction before and after the pandemic, before and after online teaching. The results are evident as it becomes clear that, despite qualitative accounts of feeling cared about, online teaching does quantitatively decrease the perception students have about been cared about by their professor. Both, the quantitative and qualitative data sets have been important in understanding the broad general points of my research as well as the details and depth associated with two very different instructional methods and sets of circumstances.

Keywords: Social presence, Cues-filtered-out theory, Trust-building techniques, Verbal-immediacy, Reflective practitioner

Citation: Morejón-Benitez, J. (2023). Comprehensive Report on Early COVID Impact. In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023-- International Conference on Social and Education Sciences* (pp. 37-60), Las Vegas, NV, USA. ISTES Organization.

Introduction

Given the new set of circumstances derived from the World pandemic, I had to come up with very important decisions about how to deliver dance and arts instruction. I decided to teach asynchronously; a type of class that allows the instructor to facilitate information-sharing outside the constraints of time and place. This meant teaching through instructional materials that students would learn from on their own time. The students' response was encouraging since they were all used to my "learner-centered" approach, which allows students to "assume responsibility for their own learning" (Blumberg, 2017). Besides, they were all still in a process of chaotic re-adjustment that would have never made synchronous online teaching a viable alternative at this point.

This process was at first purely intuitive, as I was already well experienced in using Blogger, a publishing service that allows multi-user blogs with time-stamped entries, as a "pedagogical tool" (Ikpeze, 2015). I had

developed the habit of blogging class content and students' work to build student-teacher relationship through virtual spaces. The nature of embodied learning, in which, if the students are not present, they cannot experience what was like to be in class, makes it inconvenient for some students. I am referring to students who at one-point need to be absent, e.g. student-athletes who have to leave campus to compete, who need to at least know what was taught. Thus, blogging has become a way for me to give those students who could not make it to class, a place to make up for what they missed. It has also become a way to document not only instruction, but the students' work, which once published make them feel proud of their accomplishments. It allowed them the possibility of commenting on each other's work as well as on class issues. It became, as I perfected my blogging practice, a form of text-book on which to access definitions, links, videos and pictures.

Given the nature of the COVID 19 pandemic, I continued planning instruction through my blogs as I referred students to the blog entry for that day and as I integrated the academic and the experiential parts of my classes. Then, for a class to witness each other's work, students would have to post their exercise responses, their content answers and their recorded assignments on the university's Blackboard, specifically on their own course's Discussion Board. The latter is a feature that allows participants to carry on discussions online. At any time of the day or night, with no need for the participants to be logged into the site at the same time, students were able to complete their assignments.

This combination seemed ideal since the blog still allowed me to keep ownership of my teaching material in an aesthetically pleasing way, while Blackboard's tools officially archived the students' work following the university's standards and protocol. I knew this was not a perfect choice because an important part of the experiential aspect of the arts and dance-learning was going to be missing. The interactive human contact that attracts our students from all fields of knowledge to our Teaching & Learning and Dance Program respectively was no longer going to be available. However, I felt this was a chance for me to model "problem-solving skills" and "leadership adaptability in a high stress situation" (McCain, 2005; Murphy, 2015; Kokemuller, n.d.). At that point, the students and I had already established a sense of connection which would help us to overcome these sudden changes together as a team.

Method

As a reflective practitioner, constantly evaluating the effectiveness of my teaching methodology, content delivery and practice, I used self-study as a methodological tool for self-assessment (Ikpeze, 2016). Therefore, I immediately tried to access a way to measure how online instruction would affect my students' learning in order to know if the quality of my teaching practices had been affected by asynchronous instruction. I realized I needed both quantitative data to get me the numbers to prove the broad general points of my research as well as qualitative data to provide myself with the details and the depth needed to understand their full implications. After searching for the best available tool, I found the document "Ensuring Fair and Reliable Measures of Effective Teaching: Culminating Findings," which derived from the 2013 "Measures of Effective Teaching

(MET) Projects Three-Year Study.” According to the project’s findings, measures of validity and content-knowledge should show that teachers who perform better on that measure are generally more effective in improving student outcomes. The test for “validity,” central to the (MET) project’s analyses, measures high-quality classroom observations, well-designed student-perception surveys, and teachers’ prior records of student-achievement-gains on state tests. I decided that the (2013) student-perception survey (SPS), as a measure of how effective my asynchronous teaching methods had been during the COVID-19 pandemic, was the most applicable to this study. I needed to collect, quantify and measure data based on my instructional approach and how my methodology affected students’ perception of their learning. This process of self-study would in turn enable me to “recognize, articulate and reconstruct” my own pedagogic practices (Ikpeze, 2016).

Originally tailored for grades K-2, 3-5 and 6-12, the surveys helped assess teachers’ content knowledge, pedagogy, and relationship-building skills. They allowed students to assess their classroom experience with each teacher across the 7 dimensions listed below. Thus, the ‘Seven Cs’ Surveys, administered through Cambridge Education, measured “what teachers do and “what students experience” (Student Perception Surveys, 2012). The SPS’ Seven C’s, became the ideal tool to measure the degree to which my instructional methods had been effective. The Seven Cs’ are: 1. Caring about students (Encouragement and emotional support); 2. Captivating students (Learning seems interesting and relevant); 3. Conferring with students (Students sense that their ideas are respected); 4. Clarifying lessons (Success seems feasible); 5. Consolidating knowledge (Ideas get connected and integrated); 6. Challenging students (Press for effort, perseverance, and rigor) and 7. Controlling behavior (Culture of cooperation and peer support).

Because items designed to address ages 6-12 of the Student Survey could be easily adapted to the kind of survey needed to measure college students’ experience, I decided to use the Seven C Items for that particular age group with my college students. In this survey, for each item, students have the option of selecting from choices such as: “Totally True”, “Mostly True”, “Somewhat True”, “Mostly Untrue” or “Totally Untrue” to evaluate both, “what teachers do and what students experience.” The list of items included in the Seven Cs’ survey were adapted to the higher education setting as it was also posted on Discussion Board towards the end of the semester. Within the Seven Cs’ Survey for Higher Education, out of indicators such as: I. Care, II. Captivate, III. Confer, IV. Clarify, V. Consolidate, VI. Challenge and VII. Control, I decided to research domain I, “Care.”

Results

“Care” is the dimension students value more than teachers do (Weimer, 2013). Teachers tend to place their focus on instructional aspects of their educational role such as: standards, organization and clear, stimulating and effective instruction. However, although students agree that these aspects of instruction are important, they care as much about the personal aspects of teaching. Therefore, for the purpose of this study, given the large amount of data collected, focusing on the domain “Care” has made it easier to understand and explain the process and results of the study. Students want teachers who “welcome their questions, who acknowledge their

input, and who are available” (Weimer, 2013). Thus, establishing rapport with individual students and the class as a whole is the best way to show one cares for them. Research on “verbal immediacy,” for instance, has identified a number of behaviors that convey caring to students, which I am aware of and intuitively practice in my own studio. Strategies such as: using personal examples, asking questions and encouraging students to talk, using humor in class, addressing students by name, etc., are the most characteristic aspects of my instructional style. However, despite my own personal assessment; I was curious to see the results of the survey. This study documented only some of the quantitative data on domain “Care” across the 8 courses that I teach. Below, I share the data on DAN 291 (Dance/Movement Therapy), the first course from which I was able to collect information.

DAN 291 / Dance Movement Therapy

The 13 students who took the survey earned 3-units at the end of the semester. Although DAN 291 is listed as a lecture-style course, it is also experiential since dance/movement therapy requires for students to learn by doing. Fortunately, by the time the pandemic erupted, the class had arrived at a point where almost all the methodologies of the field of Dance/Movement Therapy (DMT) had been covered. However, some methodologies were still to be discussed; thus, after Spring Recess, when our campus closed, I tried to keep the order we had already established in the class. The class usually began with a circular formation in which students had the opportunity of checking-in or express how they felt. We continued with a discussion about the methodology for that day. Then, we applied the methodology through an experiential exercise in which students role-played the interactions between therapists and clients. In closing, they discussed their experience with the whole class before they wrote their reflections on their journals.

The adaptation to online instruction took a certain degree of ingenuity. The check-in had to be now shared in writing. The methodology had to be explained through a video. The experiential part of it had to be devised by having students imagine a scenario in which they were their own client. Their final reflections along with the rest of the elements covered in class had to be posted on our Discussion Board. What was left to complete for the rest of the semester was the organization and scheduling of the students’ presentations. Therefore, the task was to keep track of who was going to present when; which mode of presentation were they going to use, with whom they would partner to create a team and how were the rest of students going to respond to the presentations.

Students came up with their own very creative ways of presenting online. Some used power point, some used YouTube, some used a combination of both. Along with their oral/recorded presentations they had to also find a case study that illustrated the role of DMT in the treatment of the specific population they chose to present on. The case study had to also document the specific diagnosis they focused on as a group. The presentation was also accompanied by a summary which they would provide to the rest of the class as a reminder of the main points they discussed. The evaluation of the different parts of their presentations were documented in a rubric that was sent to them via email, via blog as well as via Blackboard. The rest of the students proved their

attendance by commenting on their classmates' presentations and answering content questions articulated by the presenters. Below, I share some of the quantitative data on "Care" for the DAN 291 (Dance Movement Therapy) class before and after Spring Recess.

Data: Before Spring Recess

- I. Caring about students (Encouragement and emotional support)
 - a. My professor in this class makes me feel that he/she really cares about me.
 1. Totally True: 13 students / 100%
 - b. My professor really tries to understand how students feel about things.
 1. Totally True: 12 students / 92.3 %
 2. Mostly True: 1 student / 7.6 %
 - c. My professor seems to know if something is bothering me.
 1. Totally True: 6 students / 46.2 %
 2. Mostly True: 5 students / 38.5 %
 3. Somewhat: 2 students / 15.4 %

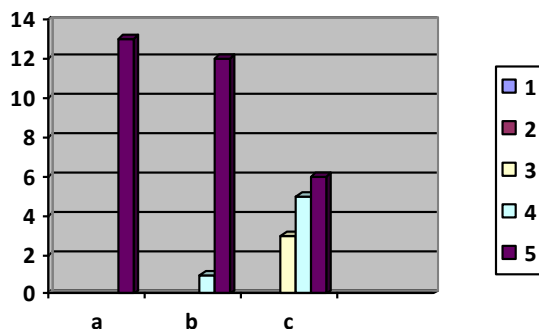
Survey and Chart Analysis for the Care Domain before Spring Recess

Prior to the pandemic when instruction took place face-to-face, students of Dance Movement Therapy answered question "a" unanimously (100 %) by checking the "totally-true" option (with a numerical value of 5), to say that I "made them feel that I really cared about them." For question "b" twelve students or 92.3 % of those who completed the survey felt "I really tried to understand how they felt about things" by checking the "totally-true" choice. One student felt it was "mostly-true" (the second best choice with a numerical value of 4) to say that I "really tried to understand how they felt about things." When it comes to question "c", (knowing if something was bothering them), only 84.7 % of students (6 checked "totally-true" and 5 checked "mostly-true"), felt I knew. Two students or 15.4 % of those who took the survey checked the "somewhat-true" choice (which numerical value is 3) to say "I somewhat knew if something was bothering them." When the three items are averaged in the rank of "totally true and "mostly true" my score for caring is 92.3 % or the equivalent of 12 students within that 13 student sample; not counting the two students who checked the choice "somewhat-true." No student checked choices "mostly- untrue" (with a numerical value of 2) or "totally-untrue" (with a numerical value of 1). To evaluate my general performance in reference to the three questions related to the domain "Care" the average of students who felt it was "totally true" that I cared for them was 79.5 %. Please, see the chart bellow along with a further discussion.

I. Domain: Care – Chart / Before Spring Recess

Y axis: Number of Students who answered the specific question.

X axis: 3 questions (a, b, c) and the 5 Choices (1 - 5) per question.



Discussion

The triple bar chart shown above provides three pieces of information for each category. The bars are color-coded to represent each piece of information. When looking at the chart, one can observe that for question “a” (e.g. my professor in this class makes me feel that he/she really cares about me), the bar reflects the 13 students (Y axis) that checked “totally-true.” For question “b” (e.g. my professor really tries to understand how students feel about things) the bar reflects 12 students checked the “totally-true” choice and one checked “mostly-true.” For question “c” (e.g. my professor seems to know if something is bothering me), the bars show 6 students checked “totally-true,” 5 checked choice “mostly-true” and 2 checked “somewhat-true.”

When analyzing the chart, one can see that most students expressed that “I make them feel that I really care about them.” They also feel “I really try to understand how they feel about things.” However, although most students think that “I seem to know if something is bothering them,” some felt “I somewhat knew,” which implies I knew only sometimes. The bars describe a descending order from questions “a” to “c” as the bars also increase in number, from one bar for question “a” to two bars for question “b,” to three bars for question “c”. One can assume that this is due to the need for an increasing level of engagement with students as one navigates the complexities of: a) making them feel one cares for them, b) having them perceive one is really trying to understand how they feel about things, and c) knowing if something is bothering them. The latter requires a level of perceptive abilities that are more challenging to develop when one is in charge of a whole class. It means that more work needs to be done for me to develop acute perceptive skills during the delivery of instruction in real time and face-to-face classes.

Data: After Spring Recess – Online

- I. **Caring** about students (Encouragement and emotional support)
 - a. My professor in this class makes me feel that he/she really cares about me.
 - Totally True: 10 students – 76.9 %
 - Mostly True: 3 students – 23.07 %

b. My professor really tries to understand how students feel about things.

Totally True: 11 students / 84.9 %

Mostly True: 1 student / 7.6 %

Somewhat: 1 student / 7.6 %

c. My professor seems to know if something is bothering me.

Totally True: 5 / 38.4 %

Mostly True: 4 / 30.7 %

Somewhat: 1 / 7.6 %

Mostly Untrue: 3 / 23.07 %

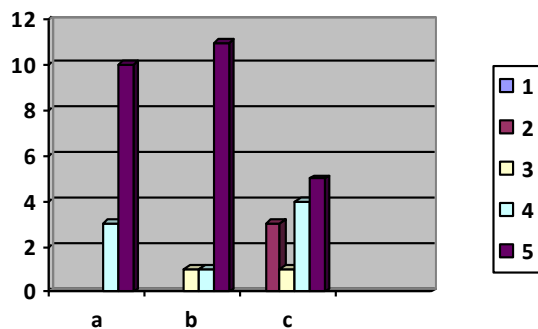
Survey and Chart Analysis for the Care Domain after Spring Recess

After the pandemic, when instruction took place asynchronously, 76.9 % or 10 students of Dance Movement Therapy answered question “a”; they checked the “totally-true” option (with a numerical value of 5), to say that I “made them feel that I really cared about them.” 23.07 % or 3 students checked “mostly true” to say that “I made them feel that I really care about them.” For question “b” eleven students or 84.9 % of those who completed the survey felt “I really tried to understand how they felt about things” by checking the “totally-true” choice. One student or 7.6 % felt it was “mostly-true” that I “really tried to understand how they felt about things,” (the second best choice with a numerical value of 4). Another student (7.6 %) answered that the statement was somewhat true (with a numerical value of 3). When it comes to question “c”, (knowing if something was bothering them), only 38.4 % or 5 students checked “totally-true,” (30.7 %) or four students checked “mostly-true,” (7.6 %) or one student checked “somewhat true” and (23.07 %) or three students checked “Mostly Untrue). When evaluating my general performance in reference to the three questions related to the domain “Care” during asynchronous instruction the average of students who felt it was “totally true” that I cared for them was 66.7 %. Please, see the chart bellow along with a further discussion.

I. Domain: Care / Chart - After Spring Recess

Y axis: Number of Students who answered the specific question.

X axis: 3 questions (I, II, II) and the 5 Choices (1 - 5) per question.



Discussion

The triple bar chart shown above provides three pieces of information for each category. The bars are color-coded representing each piece of information. When looking at the chart, one can observe that for question “a” (e.g. my professor in this class makes me feel that he/she really cares about me), the bar reflects that 10 students (Y axis) checked “totally-true,” while 3 students checked the “mostly-true” choice. For question “b” (e.g. my professor really tries to understand how students feel about things) the bar reflects 11 students checked the “totally-true choice,” one student checked the “mostly-true choice” and one student the “somewhat-true” choice. For question “c” (e.g. my professor seems to know if something is bothering me), the bars show 5 students checked the “totally-true choice,” 5 students checked choice “mostly-true” and 2 students checked “somewhat-true.”

When analyzing the chart, one can see that while most students still expressed that “I make them feel that I really care about them;” the response to whether this item is “totally true” or “mostly true” was not unanimous as it was before Spring Recess. In terms of whether “I really try to understand how they feel about things,” compared to our face-to-face interaction prior to Spring Recess, 1 student felt that I “mostly knew” and 1 felt “I somewhat knew.” Although most students think that “I seem to know if something is bothering them,” the bars show a more diversified data than the data referring to the period before Spring Recess. One student felt “I somewhat knew if something was bothering them” while 3 students thought that was “mostly untrue.” This implies that I knew only sometimes, which makes sense since we did not see each other and we were quarantined in our own respective homes during online instruction.

In general, the bars describe a descending order from questions “a” to “c” as the bars also increase in number, from two bars for question “a”, to three bars for question “b”, to four bars for “c”. One can assume that this is due to the need for an increasing level of engagement with students as one navigates the complexities of expressing “Care” while a) making them feel one cares for them while teaching online, b) having them perceive one is really trying to understand how they feel about things while explaining the assignments online, and c) knowing if something is bothering them as they complete or not, their online assignments. Different from face-to-face instruction, when only one item seemed critical (e.g. knowing if something is bothering them), after Spring Recess all items related to “Care” seem to have become critical. The most critical of all being “knowing if something is bothering them.”

It feels it is difficult to know if something is bothering a student when one is not in their presence or vice versa. Unless they express it in well-articulated written language, there is no way to show the student that one knows how he/she feels. However, it seems still possible to show that one cares about them. Based on the quantitative data observed above, a working hypothesis derives, which is that students’ perception of being “cared about” by the professor, in this case me, when teaching takes place online, decreases. For item “a” (my professor in this class makes me feel that he/she really cares about me), the data decreases by 0.1 %; for item “b” (my professor

really tries to understand how students feel about things), it decreases by 7.4 %. And for item “c” (my professor seems to know if something is bothering me) it decreases by 14.9 %. In general, the students’ perception of being cared for by me decreased 12.8 %.

Qualitative Analysis

DAN 291 / Dance Movement Therapy

The informal feedback seen bellow, is the result of a whole semester of teaching, however, students are responding mainly to our interactions during the lockdown period. Out of the 25 students in the class, I was able to collect qualitative data on 7 of them who spontaneously offered their response to their experience in the course. This class did not write a reflection at the end of the semester. Thus, the information collected is based on personal emails they sent me. I noticed the word “thank you” was used 6 times out of 7. The words “caring” and “cares”, in reference to my performance, were used in 2 different emails. The word “enjoyed” was used twice in two different emails. This data was added to the overall Qualitative Analysis of Other courses, which I have documented in the following section.

1. Thank you for so caring about me. I am in China now and stay in hotel for forced quarantine right now. Here is my work for your video link. I know it is a little bit late so you can deduct some points for this. Thank u for your video since I really feel depressed and anxiety in a couple of weeks since this is my last semester and I have 7 courses to finish in this semester. But with the situation like now I didn’t do well in this class. I really appreciate your session of Check-in because I can express my bad mood in somewhere like writing a diary. Thank you and also thanks for your class. Please take care and stay safe too. L.G.
2. How are you? How is your family, I hope everyone is well? Thank you once again for a great semester. S.M.
3. Thank you so much! I appreciate your response. Thank you for a great semester and have an awesome summer. Stay safe and healthy! S.R.
4. Thank you so much for this semester. I enjoyed getting to know you and will take the lessons I learned in this class into the future. Hope all is well. E.R.
5. Thank you for everything this semester, although the school year ended up being a lot different than anticipated, I really enjoyed your class and I look forward to definitely taking your classes in the future. It means a lot to have a professor like you who really cares about his students & their well-being. C.R.
6. Wonderful. Thank you for a meaningful and great semester! M.S.
7. Sorry for consuming a lot of your time with the questions but I really appreciate you being patient with me, this helped relieve a lot of stress. I hope you enjoy the rest of your day! T.W.

DAN 102 / Stretching Body Work (Laboratory)

Before Spring Recess, this one-unit class was basically teaching a stretching routine with the objective of allowing students to learn it, practice it and integrate it into their daily lives. The class met once a week from

9:05 AM to 9:55 AM; which means that their improvement depended really on their own self-motivation and discipline. It takes place in a dance studio at the University of Miami's Wellness Center, where our Dance Program is hosted. The 1 hour and 15 minutes' lesson has four sections: Warm Up, Alignment, Stretching and Relaxation. I led the routine and executed the stretches as I guided them verbally. Integrated into the stretches were breathing, focus and concentration techniques.

After Spring Recess, due to the pandemic, I tried to keep the same order of instruction. Thus, in their blog entry for the day, they had a video that modeled the warm up, one section on illustrated alignment, a 20-minute video routine that exemplified the main yoga poses, which ended in relaxation, and a question about a specific muscle group and how it was affected by stretching. I ended a short video accompanied by a question on how stretching benefits one's health. In this last video section, I tried to include either an interview with a practitioner, an office/work setting where stretching was beneficial, or a mini-lesson on the importance of stretching. These materials all tried to create consensus so that they felt inspired to continue their own practice at home.

Besides answering the questions about the video, which counted as their attendance; they had to write a brief reflection on how they felt during the practice of their routine for that day. I made sure I responded to every single one of their posted reflections. The final assignment was to perform their routine, as they called each pose by its name; then, record it and post it on our Blackboard's Discussion Board. Below, I share some excerpts of the final reflections some students wrote when they posted their last assignment. For the sake of my students' privacy, I am only using their initials to identify those who wrote the comments. The comments are numbered in a continuum in order to keep track of the total number.

8. Thank you so much for everything, you have been a kind, empathetic, charismatic, compassionate, and overall, amazing professor. I wish you well, and I will be attaching my survey soon. R.M.
9. Overall, though, the most useful mantra I think I've taken from the course is the importance of being happy and having that reference point of relaxation to bring you down to Earth. This is something I've already started to utilize every day, and will continue to do in conjunction with a more robust, albeit short, morning routine to stretch and meditate. Thanks again Professor! N.G
10. Going through the daily stretches and focusing on my body has helped me shift my focus to the things that are in my control rather than worrying about the things that I cannot control. Despite the interruption, thank you for a great semester. I enjoyed your class! M.D.
11. This class has had a tremendous impact in my ability to regulate stress and anxiety on an everyday basis. The routines that I have learned this semester will help me continue to have the ability to reduce my stress levels through my adult life. In addition, I have noticed how much more flexible I am now, compared to the beginning of the year. Thank you for a great semester, I greatly enjoyed this class and miss meeting for class in person! S.S.
12. For me this semester has been especially hard to self-regulate my stress and anxiety as having to do a lot of my work at home was extremely hard since it's hard to stay focused. Also, not being able to learn from a teacher face to face was difficult for me as I always have a lot of questions and for me it's harder to learn virtually. However, this class was actually enjoyable for me as I realized I needed to

find those moments throughout the day for myself and even to just reflect and be in tune with my body. Being in quarantine makes it hard sometimes to be motivated but I found that lately I have been wanting to stay active and have seen a huge progress in the ways that I handle my stress and anxiety. Thank you for an incredible semester. A.P.

13. While the end of the semester has been stressful, I have been able to regulate my stress by redirecting my energy into productive things like working out, yoga and crafts like crochet and baking. This class has provided me with a tool to regulate my stress and anxiety through yoga, breathing and stressing. It genuinely has helped me tremendously. J.P.
14. It was great being in your class. Despite the circumstances, it was clear that you really cared about your students and your wellbeing. Thank you for a great semester. M.A

DAN 130 / Orientation to Dance (Laboratory)

This class takes place twice a week, Tuesdays and Thursdays, from 11:00 AM to 12: 15 PM. I have been able to collect and share some of the voluntary feedback students expressed to me via email when the semester ended. Some of the comments are particularly useful since they address my performance, in terms of “Care,” before and after Spring Recess Although this class counts for only 2 units, it is an important part of our curriculum since it introduces the students to the rest of the program. Thus, although it is listed as a laboratory class, I also bring to the students’ attention aspects of dance they may not be familiar with such as dance and politics, dance and anthropology, dance and philosophy, dance and religion, dance as art, dance as history, dance as therapy, etc.

Every single class they not only discuss relevant issues related to dance but they also dance them. As the instructor of this class, I feel it is a fair combination that makes the subject fun and at the same time meaningful. Most of our students think of dance as merely a form of entertainment until they take this course. See below some of the final reflections students wrote when they posted their last assignment. As I did with the previous set of comments, for the sake of my students’ privacy, I only used their initials to identify who wrote them. I have edited their reflections so that only the parts that pertain to “Care” are shown.

15. I really enjoyed this class!!! Thank you so much. L.M.
16. Thank you, professor! You are one of the best professors that I ever met! M.Z.
17. I really enjoy learning with you for the entire semester, and we actually learned a lot from both before and after the spring break. Thank you so much for your encouragement and caring!!! Have a nice day and stay safe!!! Y.G,
18. Thank you for everything you have done in this class. It was a pleasure, even though half of it was online. You still made it fun, engaging, and I was able to learn a lot. A.J.
19. I’m so sorry for the last minute submission, it has been hectic at home. However, thank you for this past semester. You were an incredible professor in class and online as well! I wish you the best! K.S.

20. I really enjoy learning with you for the entire semester, and we actually learned a lot from both before and after the spring break. Thank you so much for your encouragement and caring!!! Have a nice day and stay safe!!! C.G.

DAN 190 / Improvisation (Laboratory)

Dance Improvisation is a 2-units course that takes place twice a week, Tuesdays and Thursdays, from 3:30 PM to 4:45 PM. It is a difficult class to teach because most of our students have never taken dance before. Dance Improvisation is the kind of subject that is the most fun, creative and productive when students have acquired enough movement vocabulary to simply let go and enjoy dancing. However, as a program, we welcome all our students knowing that for some students our classes will be their last chance to ever explore dance before they graduate. Thus, the class is really a mixture of conditioning their bodies to be able to move creatively, providing an environment in which they feel safe to take creative risks and working on their performance confidence so that they are able to produce an ensemble piece and a solo piece before the end of the semester.

What made this Spring semester particularly challenging after the Recess was planning a dance lesson that was to take place at home without my direct input, without my face-to-face encouragement and without the level of accountability and reliability that comes with presence. When the initial adaptations were made and communicated to students, I was up-front about the class functioning under an honor system. I expressed to them my assumption that they would make the time to follow all the instructions documented in the blog for that day and post their video-recorded work on the Discussion Board's thread for that day as well.

Most of the students in this class were international students, thus, writing instructions was a meticulous process that entailed the careful and simple articulation of the tasks in order to avoid confusion. Every blog post had its corresponding thread on our Discussion Board, accompanied by an explanatory email. The three had to be consistently coherent in order to avoid adding to the stress and anxiety that students were already experiencing.

Their online lessons followed a predictable routine. The first part of the class was a body- isolations warm-up demonstrated through a video. Then followed a section that brought attention to their alignment, which they had already become familiar with during class. Added was a routine that facilitated body movement in a creative, pedestrian-like way, also demonstrated through a video. The core of the instruction was based on specific improvisational ideas that stimulated their movement production illustrated by a video. Their explorations at home were accompanied by music, recorded and posted on Discussion Board.

Finally, they were exposed to examples of improvisational solo dancers and speakers whom illustrated dance improvisation and hopefully inspired them. Every step of the way, they were to reflect on their experience and answer questions that guided their thought process. Because of the adaptations made as a result of the pandemic, their final dance was going to be a solo recorded at home and posted on Discussion Board. To bring closure to the semester, they had the choice of writing a self-reflective paper or write a review about a dance improvisation

performance. Bellow, I share a mixture of their reflections, taken from their papers, and their personal feedback, sent to me via email. Some of the phrasing may sound unusual since many of my international students know English as a second language.

21. I am really thankful for the experience that I gain from dance improvisation by Professor Morejón. He did very well in teaching and was very patient with us so that we learned a lot from him, not only dance movements, but also a positive attitude towards difficulties in life. Y.M.
22. To conclude, Dance Improvisation was a great course and taught me so many different things, that a regular lecture class cannot provide. It was a course filled with interaction, wisdom, and soulfulness. It was a great way for me to become more in touch with my body and my emotions. It showed me how to move my body in a way that embodies inner thoughts and feelings. Dance Improv. broke me out of my comfort zone, which I never thought I would get out of a class. I'm so glad I had the opportunity to take this course and learn so much! Thank you Jorge! L.T.
23. I am glad I had the DAN 190-54 class with my classmates and professor Morejón, I learned from them. I use this paper to review what I learned from this class in the past semester and say thanks to all the people who I studied with. Q.S.
24. I miss our studio class so much; that was the best time I had. I learned lots of techniques in this class. The teacher is patient and excellent, and classmates are kind. There is no judgment in class. Furthermore, I am very interested in dancing now, and I will continue to learn. Dance is never right or wrong and I think dance is the best and most effective way to communicate. Dance can express emotions that dancers cannot express in words. Y.W.
25. It has been a pleasure meeting you and taking your class, you are truly and inspiring and such a positive person, we need more people like you in this world, truly. E.A.
26. My work is a testament to your incredible teaching. I am so proud of how much I have developed both personally and dancing-wise due to our classes. I will carry forward my newly acquired mindset and dance habits for the rest of my life! Have an amazing summer! R.B.
27. I have completed this survey. Thank you for always being patient with us! F.D.
28. Thank you for teaching me. I am so glad to meet you. You are the best. Having a nice vacation. Please be safe! C.J
29. After I finished DAN190 this semester, and after a lot of interesting training in the classroom, I think dance is gender-neutral. Women can dance, as do men. People have confirmed this in ballet performances a long time ago. Men can have different wonderful performances in dance. So I am very grateful that I can take such a different and wonderful dance class this semester. Thank you, professor. J.S.
30. Thank you so much for keeping us engaged and learning! I always enjoy having you as a professor and I appreciate how approachable you are. Stay healthy! R.S.
31. Thank you for your patient teaching. I have learned a lot this semester. Thank you very much for your teaching and have a wonderful and most importantly, safe summer vacation! See you next semester. J.Y.

DAN 211 / Modern Dance – Level Two (Laboratory)

Modern Dance II is a 3-units course that requires of all my skills as a facilitator for it to work. It is a class that attracts students who have danced before, mostly females, and a large number of male students who never danced prior to taking the class. Thus, the differences in levels of abilities is extreme. In addition, the class attracts a great number of student-athletes for whom the class represents a challenge in terms of having to accomplished physical tasks that fall outside the realm of their usual training. A large number of international students also take the class because it allows them to experience what is like to be in a class where verbal language is not an issue. For these reasons, my methodology is very eclectic. Instead of teaching complicated techniques of various styles as most teachers would do, I use creative exercises while I also acknowledge the main innovations made by the pioneers of Modern Dance.

This methodology has proven to be effective as every semester more students register to take it. This semester alone there were 39 students moving in the largest studio of the Wellness Center ready to experience dance in a very unique way. The class began with body isolations warm-up, the exercise on alignment, an exercise on developing dance skills in relation to a specific tenant of modern dance and a creative exercise. Throughout the process, I stopped to ask for their feedback on how they felt and what they discovered during the exercise. This allowed them to connect their body experience with their thinking process. At the same time, it allowed me to create consensus about the importance of dance education. It was also a way to validate their individual experiences as those who are more resistant to body movement began to feel this class is a serious attempt at making dance part of their way of living.

The creative exercise's main objective is to provide students with new movement vocabulary to be used for their solo and their ensemble work. Every class they completed a new phrase for their solos or their ensemble pieces. By a process of accumulation, they were expected to have their pieces done towards the end of the semester when they would perform them for each other. This process was unfortunately thwarted by the pandemic but it is usually a festive, self-assuring and collectively rewarding celebration. The comments at the end of the semester often attest to the value of embodied learning through creative dance.

Instruction online completely changed the dynamics of the class as I was now forced to plan lessons that somewhat communicated modern dance through videos and written exercises. I was successful in explaining to them their new tasks through the use of our blog, our Discussion Board and emails. Every class, they watched a video about a specific modern dance choreographer, their technique and the repercussion of their work for modern dance. They also responded to a number of questions that accompanied each section. To end, they would create a four movement phrase at home. Every three classes they would have an eight movement phrase of their own that they were able to memorize and post on Blackboard. Every three classes, I introduced a new choreographer. We covered a total of four choreographers who were some of the most prominent American Modern dancers.

They only performed their solos at home. Given the circumstance's they were not able to perform their ensembles pieces. Both are conceptually important. The solos give them an opportunity to express themselves in their own unique way, while confronting their own stage fright. The ensemble work demands for them to adjust to the group's choreography as they bond with each other in a very special way. Their solos were recorded and posted on their Discussion Board hoping they would all have a chance to witness each other's dance pieces. They ended the course by writing a self-reflective essay in which they revisited their overall embodied experience. Bellow, I share some of the responses that best describe their perception of my performance as the facilitator of the class in regards to the "Care" domain.

32. Thank you for everything that you have taught me this year. You have been a great role model in my life, and I wish the best for you, professor. I hope that we can cross paths again someday. B.E.
33. Thank you for allowing me to stay in your class and I appreciate all the new things you were able to teach me even through this awful pandemic. K.M.
34. I am thankful for a great class despite the circumstances that we were all faced with. S.N.
35. Thank you, professor for your work and dedication on what could have been a disaster but you still managed to turn it around and made it a success. P.A.
36. Thank you for all of your feedback. I read all your emails, but I will only answer this one so that I don't bombard your email account once again! I really enjoyed all the work we did. I can tell you put a lot of effort into it. It was definitely not what I envisioned, but none of us did, so we had to adapt to the circumstances. And I learned a lot. Thank you for being such a great teacher and for caring so much for your students. I always enjoy your classes so much, and I can tell how passionate you are about dance and teaching. Your classes are interesting, and you always leave filled with hope, positivity, and happiness. I looked forward to going to all of your classes always. It was like a fun break for me from all the stress of the day. Like always it was an honor to have you as a teacher, and I hope to take more classes with you in the future. I hope everyone gets to have you while at UM because you truly are the definition of a great and caring teacher! Thank you for your endless patience and understanding with my technological problems. I appreciate all the help you gave me. A.Ca.
37. Thank you so much for your support and warm feedback! The most important thing I have taken out of your class is being confident while dancing and not caring what anyone else thinks. That is the best way for me to improve! J.C.
38. I thoroughly enjoyed creating this piece, and I have actually been dancing in these past couple of days (it's been so freeing). Your class brought me back to my love of dance, and I am so appreciative of that! I will be sure to keep in touch. Thank you so much for an amazing semester. I wish you all the best! A.C.
39. Thank you for your comments and encouragement. I will keep dancing in my life! X.H.
40. Thank you very much for everything you taught me during TAL 324, DAN 285, and DAN 211. I am sure that everything I learned in these courses will help me achieve my dream of becoming a teacher and changing the education system in Panama, being sure that all students get the education that they deserve through different methods and practices. I.I.
41. Thank you Professor! Your class is very inspiring! S.L.

42. Thank you so much for providing me the safe space to explore my dancing interests. I don't really know what else to say besides how much gratitude I have towards you and your teaching style. Keeping being awesome thanks for the lessons, techniques, and generosity. A.L.
43. Thank you so much for being so supportive and so sweet as both a teacher and a very good friend! Your presence is very special to me, because as an education major student, I am observing our professors all the time. Not in a bad way, I am just observing how to develop a special bond with students. I see these bonds within you and us. You actually care about every one of us and offer help as a dear friend, and you are literally like "I'm here". J.R.

DAN 385 / Methods of Teaching Dance K- 12 (Lecture)

This 3-units course introduces students to the art of teaching dance. A great part of the work assigned to the group had already been completed since part of the course included the actual teaching of a lesson. Thus, by the time we went on Spring break, students had already learned about the Miami-Dade County Public Schools Dance Curriculum, about mission and vision statements, about how to develop their own teaching philosophy, about how to write a lesson plan with goals and objectives, about how to implement the student-centered approach using creative dance and movement methodologies, about the various educational theories and about how to write an Action Plan taking into account behavior modification strategies. They even had to create a flyer advertising their hypothetical future class, making sure they included all the relevant information needed by parents and children to register. Thus, before recess, they had already signed up for their teaching schedule. Two students were going to teach a dance class, every time we met, with a duration of 30 min. each. Part of the assignment was to have their lesson plans ready by the time they had to teach their lessons to the whole class.

Because students were asked not to return to campus, we had to immediately readjust the manner in which they were going to teach their lessons from home. I sent them a rubric for their teaching-lesson and a rubric for their lesson plan, specifying those aspects of both, lesson and lesson plan, that I was going to pay attention to and evaluate. They were going to record their lessons and post them on Discussion Board while the rest of the class watched them and gave them feedback in writing. Most of them taught from their hotel room in China during quarantine; others, here in the US, taught from whatever available spot they could find at home. The various dance styles they chose to teach were very interesting and their responses encouraging. From Hip Hop to Jazz Dance, from Latin Ballroom to integrating Math and Dance; they managed to turn their isolation into creative pedagogy.

Because the semester was extended and because we did not know how many students were going to be able to teach according to our pre-arranged schedule, every class, I posted a complementary video on our blog for them to write their comments and post them on Blackboard. The videos covered diverse topics that ranged from planning a dance class for children with disabilities to conceptualizing the logistics of a dance school. The videos generated vivid discussions that they also posted on Discussion Board. The videos also served to keep students engaged in case some students were not able to teach that day, as it happened sometimes. The videos

along with the lessons created consensus, stimulated communication and illustrated the possibilities of the field of Dance Education.

Finally, they were asked to find a journal article related to Dance Education and write an essay through which they could express their reaction to the topic based on their own teaching experience. This essay was published on our blog for all students to read and post their opinions of our Discussion Board. Bellow, I share some of the responses that best describe their perception of my performance as facilitator in regards to the “Care” domain.

44. Jorge provided a great example as to what it really means to be a professor; he was more like a mentor than a teacher during our DAN385 class. Despite my hesitations on the first day, I realized that our dance class was a community and I always felt *included* even though I may have not known as much about dance as my peers. S.W.
45. I would definitely recommend this class to anyone I know who is going down the same path that I am. I don't know what I would have done without the knowledge I gained from it. A.L.
46. Thus, I am so glad that I took this class. I met a great professor and experienced the area of dance education. The whole experience let me know that knowledge of education can be applied to different areas. Teachers should do their best to meet the needs of all the students. I will continue to take dance classes. Dance classes give me a feeling of *relaxation* that other classes could not give. Q.D.
47. I have loved having you as a professor for both semesters this year! I hope to take many more classes with you in the future. I hope you are staying well and happy! E.C.
48. Thank you so much for making this semester and course *memorable*! S.F.
49. Professor Jorge, thank you so much for helping me with the writing. As a second language learner, I am also trying to practice my writing skills as much as I can and I am really appreciative for absorbing corrections and suggestions. I am so glad that I can learn from you for the entire semester. Thank you so much for your *encouragements* and advices!!! Y.G.
50. Thank you for another great semester, and thank you for a great last semester! I won't be moving too far away because I'll be going to PT school at UM starting later this month, but I will really miss having a dance class mixed into my days! K.L.
51. I am okay right now. I am still in pain but looking forward to when I am able to come back to Miami, where I am sure our paths will cross again. Thank you for your *trust, support, understanding*—I am so glad that I reached out. G.M.
52. I really enjoyed this class with you and although it was cut short, I look forward to your Modern dance 2 class in the fall which I am enrolled in! It is crazy to think it will be fifth semester in one of your classes and my fifth class with you as my professor! L.S.
53. Thank you so much for the past three semesters! I honestly never thought I would have taken as many dance/education classes but you are the best! I've taken a lot from your classes and I am going to miss you! Thank you for everything, I hope all is well. O.S.
54. Thank you so much for a great semester, I am sad it got cut short. Stay healthy! C.T

TAL 324 / Education in Arts

This 3-units class takes place on the other side of campus, in the School of Education. Different from dance classes, which take place at the Wellness Center, in this class the majority of students, if not all, tend to be American. Their feedback is at times more in tune with what they plan to do with the knowledge they have acquired in class when they graduate. Many of them are seniors for whom TAL 324 is the last chance to take a class that stimulates their creativity. The class welcomes everyone as it poses no demands on students' artistic abilities.

We have no special budget for art materials and because of it, my approach to art-making is very frugal. It teaches students that the arts can become part of children's lives even when no resources are available. We create art installations with found objects and ready-mades; we make sound art with objects and body parts; we arrange music ensembles with diverse instruments; we put together picture collages with old magazine clippings, we elaborated stories, comedy sketches, dances and songs. The class is a festive display of arts related ideas; all in function, not only of exposing students to their creative capacities, but also of illustrating how the arts can be used to teach/learn other subjects. Gradually, we learn how to integrate the arts, the sciences and the humanities in order to facilitate a more inclusive learning environment.

By the time the quarantine was implemented, students were ready to teach their mini-lessons. Their 20 minutes' lessons provided us with a way to measure how much they learned throughout the semester. It also allowed students to demonstrate how to use the arts to teach any subject. Therefore, the transition from face-to-face to online learning, was a smooth process of adapting the lessons they had been planning on teaching to be taught from home. The main difficulty for some students was the recording and posting aspect of the process. However, they were all successful in completing the assignment and motivating their classmates to enrich their experience with their positive feedbacks. Below, I share some of the responses that best describe students' perception of my performance as facilitator.

55. Thank you for everything this semester, you have taught me so much and I wish we had all gotten more time in the classroom with you. You were so kind and thoughtful! I hope you have a safe and healthy summer. Hope to see you again sometime soon. R.B.
56. Thank you so much for being so open and encouraging throughout the semester! I have thoroughly enjoyed this class and am sad it is almost over. M.C.
57. I really enjoyed your class! You're a great professor. Thank you so much. A.C.
58. I thoroughly enjoyed this course- thank you for a great semester! C.D.
59. I really love the blog that you utilize for the class. I have never seen a class operate in this fashion, but it really gives every student an opportunity to shine. Keep killing it; from the bottom of my heart you are truly one of the best professors I have had at UM. The energy you put off while teaching inspires every single student in the class. L.D.
60. Thank you so much for the past two semesters. I have really enjoyed both of your classes and I honestly think everyone should be required to take one of your classes before they graduate because

you bring a beautiful perspective to how people can look at life and education. I hope you and your family are staying safe! I will really miss getting to be a part of your class. Thank you! V.F.

61. Have a great summer and again thank you for a great semester! I loved this class. Stay safe and healthy! A.F.
62. I wanted to thank you again for allowing me an extension on my teaching lesson it meant so much that you could help me out. I wasn't sure where to submit my final paper so I am emailing it to you. I wanted to thank you again for a wonderful semester and I hope I will see you around campus once this is all over :) S.F.
63. I hope you are well! I wanted to reach out and thank you so much for such an incredible class this semester. I am so bummed that it was cut short and put online because of how excited I was to take it but I really feel like this has molded both how I teach others and how I see and understand learning as a whole. I am so grateful that you were willing to bend the rules and let me in this section because it was one of the best parts of my semester this semester. E.G.
64. Thank you so much for an amazing semester! So sad it ended so soon, but happy I got to be in your classroom! You have taught me a lot and I hope to be in some of your other classes! Stay safe and again thank you for being an amazing teacher! B.J.
65. It has been a wonderful and meaningful experience taking this class despite the last few weeks' disruptions from COVID-19. As a graduating senior and soon to be working professional I will definitely use the knowledge and understanding I have gained from this course in my career. I will be working as a project coordinator for a renewable energy company and will be managing a diverse team of people ranging from engineers, electricians and accountants. That being said, the ability to approach this with the understanding of how to teach and engage a group will be crucial to the potential success of my projects and team. Thank you again for a great class and semester! Stay safe & well! K.K.
66. Thank you for such a great semester (x 2!) I learned a lot from you as a person as well as the subject material in both teaching and dance movement therapy that I'm sure I will carry with me throughout my professional career. Wish we had the opportunity to say goodbye in person. F.M.
67. I hope it isn't late, thank you for a great semester in spite of the virus. It has been a pleasure learning from you. F.M.
68. Thank you for everything this semester. I really enjoyed your class! J.H.
69. I am being completely honest when I say this, you have been a beacon of joy and perseverance throughout this semester and especially during these trying times. I have never met a professor so passionate for each and every one of his/her students. I have gotten so much more out of your class than I ever would have thought even with the online transition, mainly from the latent lessons learned from your teaching style. You truly have exemplified what it means to love what you do and do what you love, a phrase I too wish to implement in my career in the future. Thank you for an incredible experience and a challenging yet unique semester. I hope to keep in touch, and once again please stay safe. S.Q.

70. I would also like to thank you for everything you have taught me this semester and also thank you for making the switch to online classes very smooth and easy for me. I hope you are staying safe and healthy. M.R.
71. I hope you and your family are staying safe and healthy during this unfortunate time. I want to thank you for such an amazing semester. I really enjoyed and looked forward to our class meetings. Your class made my last semester very special and I will never forget that. K.R.
72. Thank you very much for teaching me this semester, I really enjoyed your class and how you taught in ways that were creative and that I had never done before. N.S.
73. Personally, I want to thank you for providing an amazing learning experience and for teaching how you teach. I truly found it to be very beneficial to my learning. Thank you again. Stay safe. J.T
74. I wanted to thank you for all the classes I was fortunate enough to take with you throughout my time at UM. I knew you'd be great when Stephanie recommended you for Orientation of Dance! But I never expected a professor to make learning such a fun and calming experience for me. For that, I will always be grateful. I hope to make it back to UM soon and to stop by and say hello! You truly made my college experience better and I hope you know how much light, comfort, and wisdom you bring to your students. Once again, thank you so much for everything. K.W.

Discussion

When reading the 74 comments, a reflection of the approximately 1/3 of all the students I taught during Spring semester, one can see that they are significantly positive. Students did not make a distinction, in terms of perception, between the way they felt “cared” for by me before Spring Recess and after. Their feedback provides a magnified look into the heart of how students feel in regards to their sense of safety, belonging, connectedness, and confidence. When reading the students’ feedback, it occurred to me that one way of analyzing the qualitative data set was to pay attention to those words and phrases that seemed to appear the most.

The one phrase students repeated throughout, across courses, was “thank you,” which they mentioned 70 times. In retrospect, I remember using “thank you” also every time I sent students an email or when I posted a message on Discussion Board. Although most people may think that saying “thank you” is just a social convention, psychology professor Sonja Lyubomirsky recommends to make gratitude a daily practice. Gratitude, in turn, brings healing properties into students’ lives. Therefore, the use of “thank you,” both by me and in return by my students, or vice versa, eased the effects of social isolation as well as online learning. By contributing to a state of camaraderie, empathy and gratitude, we were able to transcend the mere act of teaching and learning, off and online, to create a real bond. Psychology professor Robert Emmons says that when “you express a feeling, you amplify it;” which means that “when you express gratitude, you become more grateful” (Lesowitz et al., 2014). Whether verbally or in writing, I realize that my students and I were inadvertently engaged in the practice of

gratitude.” By saying “thank you,” according to Lyubomirsky and Emmons, we were lowering our risks of being depressed.

The next set of words that were also repeated many times were “joy, enjoy, enjoyed, enjoyable,” mentioned 16 times. Jonathan Halls, an author interested in cognitive psychology and neuroscience applied to adult learning, explains how exciting and enjoyable learning causes a dopamine release that stimulates memory building. He advises that we need to reduce stress and anxiety by creating an “enjoyable learning environment” (Halls, 2014). Thus, when students express that the class was enjoyable, they mean that, despite the stress caused by the pandemic, the quarantine and the sudden, online, distant learning, they felt “relaxed, calmed, supported,” which are also words mention in my students’ feedback. This means that we were able to create an “effective learning experience” online, even when it seemed almost impossible we could (Halls, 2014).

Words such as “caring” and “cares,” along with “understanding, encouraging, patient, kind and thoughtful,” in reference to how students perceived me during teaching, can be read all over the comments. Educators Dave Opalewski and Anna Unkovich say that “the students’ perceptions of teacher’s perception as to whether the student can be successful is more powerful than the student’s own perception of whether or not he/she can be successful” (Opalewski & Unkovich, 2011). Every single email message I sent to my students expressed my absolute confidence in their ability to succeed. I agree with Opalewski and Unkovich in that the role of a teacher is to put students in a position where they can experience success. During the quarantine and the sudden online teaching, reassuring students who were kept at a hotel in China, or students who were back in their home countries with intermittent access to the internet, about their certain success in the course, no matter what adaptations we needed to make, became my outmost expression of “care.”

Students’ description of our classes as “a wonderful and meaningful experience [...] despite the last few weeks’ disruptions due to COVID-19,” along with their allusion to the class as a “community,” responds to my “consensus decision-making” approach to teaching (Sartor & Young Brown, 2014). I have always used consensus decision-making as part my teaching practice. It helps students to value what we are learning beyond their most immediate and pressing concern about letter grades. It helps to raise their level of consciousness by making their education a meaningful source of life-long knowledge. Because consensus decision-making is a “dynamic and democratic approach to creating a true learning community,” challenges like COVID-19 became an opportunity to practice problem-solving skills collectively. The acceptance and validation of each one of my student’s points of view and ways of operating in the world, as they faced the pandemic, allowed us to make wiser decisions in terms of how to proceed with instruction, evaluation and assessment of the material that was still to be learned online.

Conclusion

The 7Cs survey revealed that students’ perception about how much I cared for them. For the sample group

documented here, (Dance Movement Therapy), I conclude that the social isolation caused by the quarantine, which could have caused students a certain degree of depression, and consequently, a lack of motivation to continue learning, was counteracted by our ongoing interactions via email and Discussion Board. This web of responses to each other's work and needs, created by my students themselves and facilitated by me, allowed them to feel significant to each other, connected to the group, and valued by the entire class. The daily reminder about their progress stimulated them to try harder as they also emulated each other's work. I realize that keeping the same instructional order and routine as much as possible; laying out the instructions in as many ways as possible and not making assumptions about students understanding of instructions enhanced their perception of "Care." I came to understand that although diversity of learning styles may not be served by online instruction of any kind, when educators demonstrate that they care, students not only learn better and enjoy learning, but feel more capable of being successful.

Recommendations

The following set of concrete recommendations are geared towards improving a purposeful relationship with one's own students. Expressing care by exercising the following behaviors could make a big difference in terms of the quality of student/teacher relationship that could be implemented.

- 1) Create a safe environment (e.g. learning students' names through playful exercises, circle at the beginning of class to check-in about how they feel, circle at the end of class to bring closure to the meeting) where acceptance, inclusion and interpersonal relationships make students feel they are welcomed and cared for.
- 2) Develop accessible attitudes between students and instructors (e.g. making eye contact, smiling frequently, asking how they are doing), to understand how students feel about the issues that could be affecting them in challenging ways.
- 3) Establish open communication (e.g. through texts, emails, phone calls, office hours) for students to feel able to let the instructor know if something is bothering them or for the instructor to be able to perceive if the student needs help.
- 4) Make gratitude a daily practice through expressions such as "thank you," (e.g. by modeling the behaviors students will emulate) knowing that when one expresses gratitude, one becomes more grateful as well.
- 5) Reduce stress and anxiety among the students (e.g. assessment that is playful, in an integrated manner, periodically and in different modalities such as verbal and project oriented) by creating an enjoyable learning environment in which students feel relaxed, calmed and supported.
- 6) Create an effective learning experience online (e.g. applying the theory of multiple intelligences by providing alternative opportunities to acquire knowledge) through blogging, emailing, posting on platforms and any other possible and necessary means of communication.
- 7) Let students know (e.g. make it a habit to notice when they are succeeding) verbally and in writing that they can be successful periodically and consistently based on their academic progress and behavioral achievements.

- 8) Treat the class as a community of learners (e.g. mention when the student-athletes win, celebrate when there is a birthday, notice when students are successful in extra-curricular activities, recognize their academic achievements in class) through the application of the consensus decision-making approach to teaching.
- 9) Be a reflective practitioner not only in terms of questioning your own teaching practices and methodologies (e.g. become a researcher of your own teaching practice by questioning the validity of your own methodologies), but also in terms collecting the necessary data to evaluate your own performance.
- 10) Keep the same instructional order and routine; (e.g. be organized, plan your lessons, make yourself accountable and reliable by being consistent with your teaching style) laying out the instructions in as many ways as possible both in face to face instruction and online teaching.

Such recommendations are not only possible when one is using a face-to-face, offline model of instruction, but during online teaching as well. However, more work needs to be done in terms of developing online strategies to enhance the students' perception of being cared for by the professor. In this regard, the instructor's written feedback and personal emails, could inform the ways in which online instruction could allow professors to be perceived as caring educators.

References

- Blumberg, P. (2017). *Developing learner-center teaching: A practical guide for faculty*. John Wiley & Sons
- MET Project's three-year study (2013). *MET Project. Policy and Practitioner Brief*. Bill and Melinda Gates Foundation. <https://www.edweek.org/media/17teach-met1.pdf>
- Halls, J. (2014). *Memory and cognition in learning*. ASTD Press.
- Ikpeze, C. H. (2015). *Teaching across cultures: Building pedagogical relationships in diverse contexts*. Sense Publishers.
- Kokemuller, N. (n.d.). *How to demonstrate adaptability on the job*. <https://work.chron.com/demonstrate-adaptability-job-15407.html>
- Lesowitz, N. & Sammons, M.B. (2014). *Living life as a thank you: My journal*. Viva Editions.
- Lyubomirsky, S. (2014). *The myth of happiness*. Penguin Books.
- McCain, T. (2005). *Teaching for tomorrow: Teaching content and problem solving skills*. Corwin Press.
- Murphy, P. (2015). *Adaptability: The most valued leadership skill*. <https://www.thindifference.com/2015/09/adaptability-the-most-valued-leadership-skill/>
- Opalewski, D., Unkovich, A. (2011). *Caring to Teach, Teaching to Care: The Importance of Relationship, Respect, Responsibility, Relevance and Rigor in the Classroom*. IUniverse, Inc.
- Sartor, L, Young Brown, M. (2004). *Consensus in the classroom: Fostering a lively learning community*. Psychosynthesis Press.


Student perception surveys actionable student feedback promoting excellence in teaching and learning (2013).

In Great Schools Partnership. <https://www.greatschoolspartnership.org/wp-content/uploads/2016/11/Student-Perception-Surveys-Background-Information.pdf>

Weimer, M. (2013). Students place a premium on faculty who show they care. In *Faculty Focus*. <https://www.facultyfocus.com/articles/teaching-and-learning/students-place-a-premium-on-faculty-who-show-they-care/>

Adverse Childhood Experiences (ACEs), Resiliency, and Academic Performance in Veterinary Students

Lauren Wisnieski, MS, PhD

Lincoln Memorial University, United States,  <https://orcid.org/0000-0003-2915-2529>

Kimberly Carney, DVM, MPH, DACVPM

Lincoln Memorial University, United States,  <https://orcid.org/0000-0002-9674-1967>

Gary Vroegindewey, DVM, MSS, DACVPM

Lincoln Memorial University, United States,  <https://orcid.org/0000-0001-7343-9901>

Abstract: Studies have shown Adverse Childhood Experiences (ACEs) to be associated with reduced academic performance. To the best of our knowledge, there are no studies on ACEs and academic performance in veterinary students. We conducted a survey among veterinary students to collect data on ACEs and demographics. We linked survey data to repository data (GPA and resilience data as measured by the 10-item Connor-Davidson Resilience Scale [CD-RISC]). In total, 119 students completed the ACE questionnaire. Out of these, we linked 97 records for GPA and 85 records for resilience. The prevalence of having three or more ACEs was 63.9%. We found that having one or more ACE was associated with approximately a 4% decrease in GPA (%). The mean resilience (31.2 ± 6.9 [sd]) was close to previously reported general population estimates, although it fell below the reported population median. During the didactic curriculum, resilience tended to increase over time with periodic dips in December. Resilience was not significantly associated with GPA and did not temper the negative effects of ACEs on GPA. Still, this population is likely to benefit from resilience training. Academic performance among students with high ACEs may not be improved with resilience training. However, larger studies should confirm this finding.

Keywords: Trauma, Resiliency, Academic performance, Veterinary students

Citation: Wisnieski, L., Carney, K., & Vroegindewey, G. (2023). Adverse Childhood Experiences (ACEs), Resiliency, and Academic Performance in Veterinary Students. In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023-- International Conference on Social and Education Sciences* (pp. 61-71), Las Vegas, NV, USA. ISTES Organization.

Introduction

Adverse Childhood Experiences (ACEs) are potentially traumatic events that occur during childhood (less than 18 years old), such as neglect, abuse, guardian substance use, and household instability (Felitti et al., 1998;

Cronholm et al., 2015). ACEs are associated with risk factors for morbidity and mortality, including smoking, severe obesity, lack of physical activity, depression, and suicidal behavior (Felitti et al., 1998). In the veterinary field, there is a high prevalence of burnout, depression, and anxiety (Nahar et al., 2019; Best et al., 2020). In a previous study in veterinary students, 22.7% reported having three or more ACEs. Higher ACE scores were associated with greater risk of depression and higher than average stress (Strand et al., 2017).

To the best of our knowledge, no studies have investigated the association of ACEs with academic performance in veterinary students. More ACEs have been shown to be associated with academic issues such as reduced grade point average (GPA) (Watt et al., 2021), remediation (Williams et al., 2021), and longer time to degree attainment (Otero, 2021). In recent years, resiliency and resiliency training have been a focus of veterinary student well-being research (Moffett and Bartram, 2017). Previous research has shown that resiliency moderates the association of ACEs on mental health outcomes (Logan-Greene et al., 2014; Zaw et al., 2022) and has been shown to be associated with lower stress, anxiety, depression, burnout, and secondary traumatic stress in veterinarians (Perret et al., 2020). Previous studies have demonstrated an association between resilience and academic performance (Sadoughi, 2018), so it is possible that resilience lessens the negative effect of ACEs on academic performance.

Due to the lack of research on the effect on ACEs on academic performance in veterinary students, we aim to assess the association with ACEs and GPA and investigate the potential moderating protective effect of resiliency in a sample of veterinary students.

In this study, our objectives were as follows:

- Objective 1) report the prevalence and demographic risk factors for having three or more ACEs,
- Objective 2) report the level of resilience and its associated factors, and
- Objective 3) investigate the association of ACEs and resiliency with academic performance in veterinary students.

Method

Survey Methodology

After obtaining university Institutional Review Board approval (IRB #1156), this study was conducted January 2023 among veterinary students at a private university in Central Appalachia. The survey instrument collected demographic information (see Table 1) and responses for the expanded Adverse Childhood Experiences (ACEs) scale (Cronholm et al., 2015) in Qualtrics survey software (Provo, Utah). Survey invitations were sent out via e-mail using class directories. All students in graduating classes 2024 through 2027 were invited to participate. The responses were linked to student repository data, including GPA and resiliency (as measured using the 10-item Connor-Davidson Resilience Scale [CD-RISC]) (Campbell-Sills & Stein, 2007). The resiliency data in the repository was collected from students at multiple time points (August 2021, December 2021, May 2022,

August 2022, December 2022, January 2023, and May 2023).

Statistical Analysis

Data Cleaning

Stata version 18.0 (College Station, TX) was used for all statistical analyses. Observations were dropped that were missing any of the ACE scale items. The Philadelphia Adverse Childhood Experiences (PHL ACEs) scoring method was used to categorize respondents as having 0 ACEs, 1-2 ACEs, or 3 or more ACEs (Cronholm et al., 2015).

Objective 1) Report the prevalence and demographic risk factors for high ACE scores

Associations between ACE scores (0 ACEs, 1-2 ACEs, and 3 or more ACEs) and demographic factors were tested using the Fisher's exact test.

Objective 2) Report the level of resilience and its associated factors

The association of demographic characteristics with resilience was tested in bivariable analyses using independent t-tests or Analysis of Variance (ANOVA). In addition, trends in resilience by class year and by semester were tested using a linear mixed regression model using the 'mixed' command. Random intercepts for class year and student were included in the models to account for shared variance of class year and repeated measures, respectively. Normality and heteroskedasticity of residuals were tested by visually inspecting histograms and boxplots, respectively.

Objective 3) Investigate the association of ACEs and resiliency with academic performance

The associations of ACEs and resilience with GPA were tested in bivariable and multivariable linear mixed regression models using the 'mixed' command. The most recently available resilience score per student was used. In the multivariable model, moderation of resilience on the association of ACE score and GPA was evaluated by testing an interaction term between ACE score and resilience for statistical significance. Demographic variables significant in the bivariable analyses were eligible for inclusion in the multivariable model. Final variables were selected through backwards selection at a $P \leq 0.05$.

Results

The survey was emailed to approximately 475 students and 123 students responded. After removing students that did not answer each of the ACE scale items ($n=4$), 119 observations remained for analysis. Using the repository data, we were able to link ACE scores to resilience scores for 85 students and average GPA for 97

students. The majority of respondents were white (89.9%), female (84.0%), and <31 years old (93.3%), which reflected the underlying veterinary student population.

Objective 1: Report the prevalence and demographic risk factors for high ACE scores

Most respondents (63.9%) reported having 3 or more ACEs, followed by 1-2 ACEs (25.2%), and 0 ACEs (10.9%) (see Table 1). Only marital status and income were significantly associated with ACE score. The highest prevalence of having 3 or more ACEs among those that were married (83.3%) followed by coupled (74.1%). Those that reported an income of <\$50,000 had higher prevalence of 3 or more ACEs compared to higher income groups.

Table 1: Distribution of ACE scores by demographic factors (n=119)

Demographic variable	0 ACES (n = 13)		1-2 ACES (n = 30)		3+ ACES (n = 76)		p-value
	n	% within row	n	% within row	n	% within row	
<i>Gender</i>							
Male (n=18)	3	16.7	3	16.7	12	66.7	0.5
Female (n=100)	10	10	27	27	63	63	
<i>Race</i>							
White (n=107)	0	0	26	24.3	68	63.6	0.53
Non-White or Multi-Racial (n=12)	13	12.2	4	33.3	8	66.7	
<i>Age</i>							
19-24 (n=54)	5	9.3	17	31.5	32	59.3	0.36
25-30 (n=57)	7	12.3	13	22.8	37	64.9	
31+ (n=8)	1	12.5	0	0	7	87.5	
<i>Marital Status</i>							
Married (n=24)	1	4.2	3	12.5	20	83.3	0.03
Coupled (n=27)	4	14.8	3	11.1	20	74.1	
Separated, Divorced, Widowed, or Never Married (n=68)	8	11.8	24	35.3	36	52.9	
<i>Income</i>							
\$0-24,999 (n=54)	7	10.9	16	25	41	64.1	0.02
\$25,000-49,999 (n=24)	1	4.2	2	8.3	21	87.5	
\$50,000-74,999 (n=15)	4	26.7	4	26.7	7	45.7	
\$75,000 or more (n=16)	1	6.3	8	50	7	43.8	
<i>Children</i>							
Yes (n=4)	0	0	0	0	4	100	0.73

Demographic variable	0 ACES (n = 13)		1-2 ACES (n = 30)		3+ ACES (n = 76)		p-value	
	n	% within row	n	% within row	n	% within row		
<i>Employed</i>	No (n=115)	13	11.3	30	26.1	72	62.6	-
	Yes (n=24)	0	0	8	33.3	16	66.7	-
	No (n=95)	13	13.7	22	23.2	60	63.2	-

Censored data: gender (n=1)

Objective 2: Report the level of resilience and its associated factors

The overall mean \pm sd for resilience (CD-RISC) was 31.2 ± 6.9 . White students had significantly higher resilience scores (31.8 ± 0.8) compared to non-white or multi-racial students (26.8 ± 1.6 ; see Table 2). No other demographic factors were significantly associated with resilience.

Table 2: Mean resilience (CD-RISC) by demographic factor (n=85)

	n	mean	sd	p-value
<i>Gender</i>				
Male	12	30.7	2.0	0.79
Female	73	31.3	0.8	
<i>Race</i>				
White	75	31.8	0.8	0.02
Non-White or Multi-Racial	10	26.8	1.6	
<i>Age</i>				
19-24	47	30.9	7.2	0.51
25-30	31	32.3	6.6	
31+	7	29	3	
<i>Marital Status</i>				
Married	19	32.3	8.1	0.6
Coupled	18	31.8	6.1	
Separated, Divorced, Widowed, or Never Married	48	30.5	6.7	
<i>Income</i>				
\$0-24,999	45	30.9	7.4	0.81
\$25,000-49,999	17	30.4	6	
\$50,000-74,999	11	32.9	7.9	
\$75,000 or more	12	31.6	5.6	
<i>Children</i>				
Yes	4	34.5	0.8	0.53

		n	mean	sd	p-value
<i>Employed</i>	No	81	31	4.9	
	Yes	20	31.3	1.4	0.93
	No	65	31.1	0.9	

Resilience tended to decrease in December each year (see Figure 1). Overall, the highest resilience levels were reported in May 2023. During course of the didactic curriculum, resilience levels tended to increase over time, with periodic dips in December (see Figure 3). Resilience was highest at the end of the students' last didactic year (Year 3, Semester 2 [Y3,S2,May]).

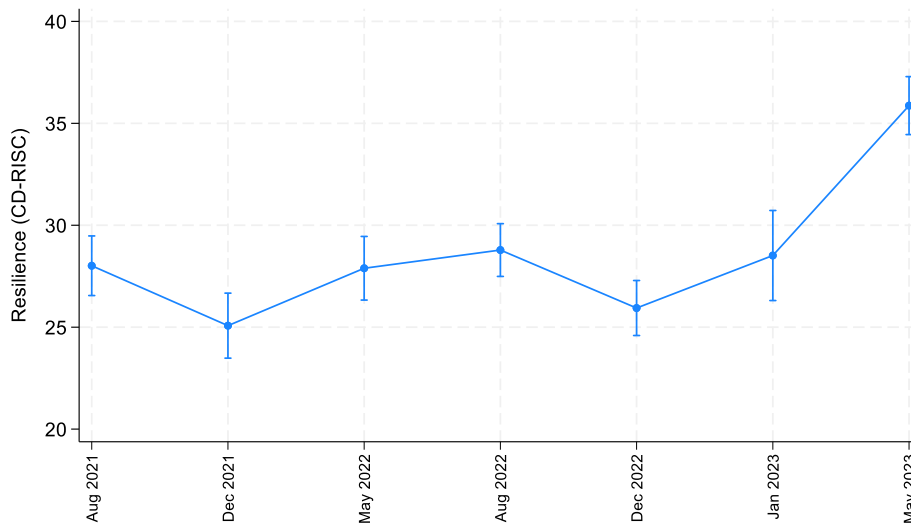


Figure 1: Veterinary student resilience (CD-RISC) over time

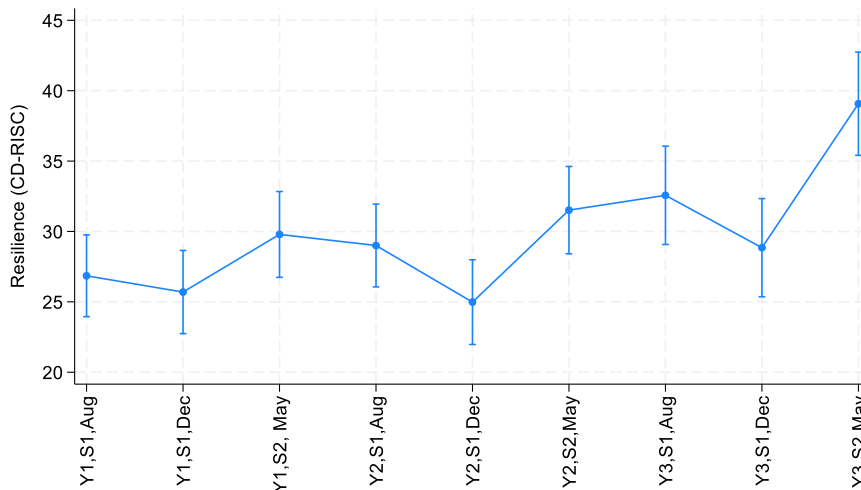


Figure 2: Veterinary student resilience by semester (Y1,S1 = Year 1, Semester 1)

Objective 3: Investigate the association of ACEs and resiliency with academic performance

GPA (% out of 100) was significantly lower among students with at least one ACE compared to no ACEs (see Figure 3). On average, those with 0 ACEs had grades that were about 4% higher compared to those with ACEs. Resilience was not significantly associated with GPA and there was no significant moderation of resilience and ACE score on GPA (data not shown). No variables except ACE score were retained in the final multivariable model predicting GPA (see Table 3).

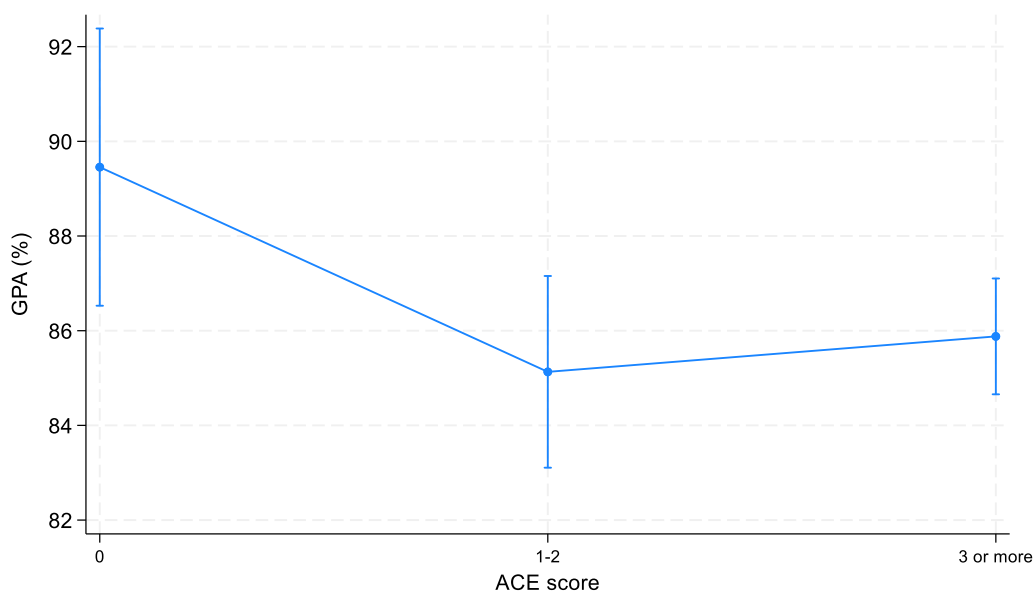


Figure 3: GPA (%) by ACE score in veterinary students

Table 3: Regression model predicting GPA (%) in veterinary students (n=97)

	Coefficient	SE	p-value	[95% conf. interval]
ACE score				
0 (reference)				
1 or 2	-4.32	1.82	0.017	(-7.88, -0.76)
3 or more	-3.58	1.62	0.027	(-6.75, -0.40)
Intercept	89.46	1.49	<0.01	(86.53, 92.38)

Discussion

In this study, we evaluated the association of resiliency and Adverse Childhood Experiences (ACEs) on GPA in veterinary students. We found that having at least one ACE was associated with lower GPA compared to having no ACEs. This is similar to previous studies in other non-veterinary student populations, which found that higher ACE scores were associated with poorer academic outcomes, including reduced grade point average

(GPA) (Watt et al., 2021), remediation (Williams et al., 2021), and longer time to degree attainment (Otero, 2021).

We did not find an association between resiliency and GPA, which contrasts with findings in previous studies which found that resilience was associated with better academic outcomes in a variety of populations, including undergraduate medical students (Pop-Velea, et al., 2021), general undergraduate students (Hartley, 2011), and teacher trainees (Karabiyik, 2020). The overall mean CD-RISC score in our study was similar to previously reported general population samples (Campbell-Sills et al., 2008). Although according to Campbell-Sills et al., 2008, our sample falls in the second quartile, below the overall population median. This provides evidence that veterinary students are in need of resilience training (Moffett & Bartram, 2017). The lowest levels of resilience during the academic year occurred in December. In addition, resilience was lower earlier on in the didactic curriculum. The increased resilience over time could be due to the resilience training that is currently implemented in the curriculum or as a natural result of the student progressing through veterinary school and gaining confidence. Either way, these findings suggest optimum times for resilience training are early in the curriculum and prior to winter break.

We did not find a moderating effect of resilience on the association of ACEs and academic performance. This is similar to a previous study that found that there were no differences in resilience or GPA among college students with different levels of developmental trauma (Arnekrans et al., 2018). This indicates that resilience training may not be an effective intervention to improve academic performance among students with high ACE scores. However, the limited sample size of ACE data linked with resilience data (n=85) could have limited power to detect a significant association. Either way, resilience training is beneficial as it has been shown to moderate the association of ACEs and mental health outcomes (Logan-Greene et al., 2014; Zaw et al., 2022).

To the best of our knowledge, this is the first study that evaluated the association of ACEs and GPA in veterinary students. In a previous study, the prevalence of having three or more ACEs was 22.7% in veterinary students (Strand et al., 2017). This is similar to another estimate of 24.6% found in a nationally representative sample of United States adults (Merrick et al., 2018). In our study, the prevalence of having three or more ACEs was much higher, at 63.9%. Many of the students in the sample were likely from Appalachia, which is greatly heterogeneous in socioeconomic status and culture, but has areas that are historically underserved that have greater poverty, lower educational attainment, and higher rates of cancer, heart disease, and mortality (Thorne et al., 2004; Behringer & Friedell, 2006). Although we did not compare Appalachian students versus non-Appalachian students in the analysis, the university's mission is to serve Appalachia and admits many students from Appalachia. However, the increased prevalence in our study could partially be an artifact of the version of the ACE questionnaire that was used. In this study, we used the expanded ACE questionnaire which included additional items on bullying, community violence, neighborhood safety, racism, and foster care (Cronholm et al., 2015). However, in a large sample of adults in Philadelphia, the prevalence of having three or more ACEs using the Expanded ACE questionnaire was only 10.1%, which is much lower than the estimate in our sample (Wade et al., 2016). Lastly, the higher prevalence reported in our study may be due to volunteer bias, which

occurs when those that volunteered to take the study were different than the underlying population. For example, those that experienced ACEs may be more likely to respond to this survey. Still, this study provides evidence that many of our students have experienced ACEs and that they may benefit from additional support.

Conclusion

We found a high prevalence (63.9%) of having three or more ACEs among veterinary students. Veterinary students with at least one ACE had significantly lower GPAs compared to students with no ACEs. Resilience was not significantly associated with GPA and did not have a moderating effect on the association of ACE score with GPA. Resilience trended upwards during the didactic curriculum with periodic dips in December, indicating optimum timepoints for intervention.

Recommendations

Veterinary students may benefit from resilience training early in the didactic curriculum and prior to winter break each year. Since resilience was not significantly associated with GPA in this study, additional interventions may be better suited to improve academic outcomes in students with high ACE scores, such as implementing policies, training, and curriculum that will support these students. However, larger studies should be conducted to confirm the lack of association of resilience with GPA. In addition, future studies should confirm the high prevalence of having three or more ACEs in veterinary students (63.9%) we found in this study.

References

- Arnekrans, A.K., Calmes, S.A., Laux, J.M., Roseman, C.P., Piazza, N.J., Reynolds, J.L., Harmening, D., & Scott, H.L. (2018). College students' experiences of childhood developmental traumatic stress: Resilience, first-year academic performance, and substance use. *Journal of College Counseling, 21*, e1-21.
- Best, C.O., Perret, J.L., Hewson, J., Khosa, D.K., Conlon, P.D., & Jones-Bitton, A. (2020). A survey of veterinarian mental health and resilience in Ontario, Canada. *Canadian Veterinary Journal, 61*, 166-172.
- Behringer, B. & Friedell, G.H. (2006). Appalachia: Where place matters in health. *Preventing chronic disease: Public health research, practice, and policy, 3*(4), 1-4.
- Campbell-Sills, L. & Stein, M.B. (2007). Psychometric analysis and refinement of the Connor Davidson resilience (CD-RISC): Validation of a 10-item measure of resilience. *Journal of Traumatic Stress, 20*(6), 1019-1028.
- Cronholm, P.E., Forke, C.M., Wade, R., Bair-Merritt, M.H., Davis, M., Harkins-Schwarz, M., Pachter, L.E., & Fein, J.A. (2015). Adverse childhood experiences: Expanding the concept of adversity. *American*

Journal of Preventative Medicine, 49(3), 354-361.

- Felitti, V.J., Anda, R.F., Nordenberg, D., Williamson, D.F., Spitz, A.M., Edwards, V., Koss, M.P., & Marks, J.S. (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults: The Adverse Childhood Experiences (ACEs) study. *American Journal of Preventive Medicine*, 14(4).
- Otero, C. (2021). Adverse Childhood Experiences (ACEs) and time bachelor's degree attainment. *Social Sciences*, 10(44).
- Hartley, M.T. (2011). Examining the relationships between resilience, mental health, and academic persistence in undergraduate college students. *Journal of American College Health*, 59(7), 596-604.
- Karabiyik, C. (2020). Interaction between academic resilience and academic achievement of teacher trainees. *International Online Journal of Education and Training (IOJET)*, 7(4), 1585-1600.
- Logan-Greene, P., Green, S., Nurius, P.S., & Longhi, D. (2014). Distinct contributions of adverse childhood experiences and resilience resources: A cohort analysis of adult physical and mental health. *Social Work in Health Care*, 53, 776-797.
- Merrick, M.T., Ford, D.C., Ports, K.A., & Guinn, A.S. (2018). Prevalence of Adverse Childhood Experiences from the 2011-2014 Behavioral Risk Factor Surveillance System in 23 states. *JAMA Pediatrics*, 172(11), 1038-1044.
- Moffett, J.E. & Bartram, D.J. (2017). Veterinary students' perspectives on resilience and resilience-building strategies. *JVME*, 41(1), 116-124.
- Nahar, V.N., Davis, R.E., Dunn, C., Layman, B., Johnson, E.C., Dascanio, J.J., Johnson, J.W., & Sharma, M. (2019). The prevalence and demographic correlates of stress, anxiety, and depression among veterinary students in the Southeastern United States. *Research in Veterinary Science*, 125, 370-373.
- Perret, J.L., Best, C.O., Coe, J.B., Greer, A.L., Khosa, D.K., & Jones-Bitton, A. (2020). Association of demographic, career, and lifestyle factors with resilience and association of resilience with mental health outcomes in veterinarians in Canada. *JAVMA*, 257(10), 1057-1068
- Popa-Velea, O., Pirvan, I., & Diaconescu L.V. (2021). The impact of self-efficacy, optimism, resilience and perceived stress on academic performance and its subjective evaluation: A cross-sectional study. *International Journal of Environmental Research and Public Health*, 18, e8711.
- Sadoughi, M. (2018). The relationship between academic self-efficacy, academic resilience, academic adjustment, and academic performance among medical students. *Scientific Journal of Educational Strategies in Medical Sciences*, 11(2), 7-14.
- Strand, E.B., Brandt, J., Rogers, K., Fonken, L., Chun, R., Conlon, P., & Lord, L. (2017). Adverse Childhood Experiences among veterinary medical students: A multi-state study. *JVME*, 44(2), 260-267.
- Thorne, D., Tickayer, A., & Thorne, M. (2004). Poverty and income in Appalachia. *Journal of Appalachian Studies*, 10(3), 341-357.
- Wade Jr., R., Cronholm, P.F., Fein, J.A., Forke, C.M., Davis, M.B., Harkins-Schwarz, M., Pachter, L.M., & Bair-Merritt, M.H. Household and community-level Adverse Childhood Experiences and adult health outcomes in a diverse urban population. *Child Abuse & Neglect*, 52, 135-145.
- Watt, T., Kim, S., & Ceballos, N.A. (2021). Adverse childhood experiences contribute to race/ethnic differences

in post-secondary academic performance among college students. *Journal of American College Health*, 71(6), 1845-1853.

Williams, B.W., Welindt, D., Hafferty, F.W., Stumps, A., Flanders, P., & Williams, M.V. (2021). Adverse childhood experiences in trainees and physicians with professionalism lapses: Implications for medical education and remediation. *Academic Medicine*, 96(5), 736-743.

Zaw, A.M.M., Win, N.Z., & Bang-on, T. 2022. Adolescents' academic achievement, mental health, and adverse behaviors: Understanding the role of resilience and adverse childhood experiences. *School Psychology International*, 43(5), 443-459.

Using Self-Evaluation Assignments to Teach 3D Coordinate Transformations in Robotics

Mingli Han

Prairie View A&M University, USA,  <https://orcid.org/0009-0009-9754-9318>

Abstract: Teaching robotics courses online is challenging due to the complexity of the interdisciplinary topics involved. One of the most challenging topics is 3D coordinate transformations. Students often struggle to grasp the concept of 3D coordinate transformations and their relevance to real-world robotic applications. This paper applies the Scholarship of Teaching and Learning methodology to address this challenge and shares the self-evaluation assignments given to students to gradually enhance their ability to solve a real-world robotic navigation problem – a crucial skill required in almost all robotic applications. Each assignment includes an informative description that explains the purpose of the task and its connection to the next assignment. Manageable MATLAB resources are provided in each assignment, allowing students to study fundamental Matlab scripts and use MATLAB Grader for self-evaluation before submission. The instructor provides feedback on incorrect answers through MATLAB Grader. The assignments focus on problem-solving and can be automatically graded, building upon prior work done by the instructor. The paper will also detail strategies for motivating students to engage with these challenging assignments and how the instructor assists distracted students in catching up with any missing assignments.

Keywords: Robotics, MATLAB, Scholarship of Teaching and Learning (SoTL)

Citation: Han, M. (2023). Using Self-Evaluation Assignments to Teach 3D Coordinate Transformations in Robotics. In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023-- International Conference on Social and Education Sciences* (pp. 72-80) Las Vegas, NV, USA. ISTES Organization.

Introduction

Driven by the increasing demand for automation in industries and continued innovative technical improvements in industrial robots, job opportunities in the field of robotics have been on the rise in recent years. Introduction to Robotics is one of the most popular technical elective courses for undergraduate students in the Mechanical Engineering Department of Prairie View A&M University since 2016. The course used to be delivered in the classroom through lectures and simulations. However, due to the Covid pandemic, the course had to be transitioned to an online format and has remained online since then. This is because students appreciate the flexibility provided by the online class, enabling them to take it at their convenience from anywhere. Technical elective courses are typically chosen by senior students whose schedules are not often tied to the campus.

3D coordinate transformation is one of the most challenging topics in Robotics. It involves calculating the position of a point relative to different references, matrix computations, and implementation. Being able to implement the 3D coordinate transformation concept in a real-life robotic application will significantly increase students' confidence and competence in the job market. This motivation drives me to explore alternative ways of teaching the subject, enabling students to learn transformation in robotics and apply their knowledge to practical problems in an online environment. A workshop focusing on teaching computation online organized by MathWorks inspired me. The MATLAB Grader platform developed by MathWorks is a tool that assists educators in designing computational and coding assignments, automatically grading them, and providing online feedback. This work aims to investigate the impact of using MATLAB Grader on students' learning outcomes in an online Robotics course. Feedback from the students and observations from the instructor will be collected, allowing improvements to be made in the teaching and learning process for future course offerings. This recursive approach aligns with the model of Scholarship of Teaching and Learning (SoTL) (Bernstein, 2010), which has been gaining more attention in recent years. According to Google Scholar, the number of hits on items including "scholarship of teaching" doubled between 2011 – 2020 (Healey, 2023 & Manarin 2021).

SoTL is a methodology used in higher education to reflect on and transform teaching and learning practices (Fanghanel, 2016). It begins with identifying a teaching problem that is linked to students' learning or misunderstanding issues, followed by adjustments to the teaching strategy, and reflections from both students and faculty. A rigorous process of SoTL is introduced in the next section.

Method

Scholarship of Teaching and Learning (SoTL)

While various forms of SoTL exist across the globe, principles of good practice for SoTL in the United States are defined in Table 1 (Felten, P, 2013). The following part of this section will present these principles in accordance with the table.

Table 1. Principles of Good Practice in SoTL

Principles of Good Practice in SoTL
1. Inquiry focused on student learning
2. Grounded in context
3. Methodologically sound
4. Conducted in partnership with students
5. Appropriately public

Robotics is a subject that requires hands-on projects to reinforce the concepts taught in the classroom. I first learned Robotics as a graduate student with access to resources, allowing me to purchase equipment such as robots, cameras, and grippers. After learning the 3D coordinate transformation topic, I could use the equipment

to practice and verify if the robot could reach the desired location through camera navigation.

Five or six years ago, I began teaching Introduction to Robotics as an undergraduate technical elective with 70 students divided into two lecture sections. Unfortunately, assigning hands-on projects was not feasible due to limited funding and space constraints. The challenges increased during the Covid pandemic when the class had to be moved online, making teaching and learning more challenging.

In 1996, ABET adopted a set of engineering program accreditation standards to assess students' learning outcomes (Huber, 2002 & Wankat, 2002). One of the learning outcomes emphasized by these standards is the ability to identify and solve complex engineering problems. As one of the most important domains in the era of Artificial Intelligent, Robotics courses should be designed to meet the accreditation standard.

3D coordinate transformation is one of the most important topics in Robotics. It involves the coordinates of the robot, camera, and object. The ability to transform these coordinates from one to another is fundamental knowledge for real-life applications. However, I have observed that many students have not encountered the material covered at this level, and they are struggling to understand the concept.

How can I design online assignments that allow students to apply their knowledge of 3D coordinate transformation to real-life robotic problems? Additionally, how can I ensure that students can work on the assignments at their own pace while receiving instant feedback from the instructor? The MATLAB workshop, which focuses on teaching computation online, introduced me to a new platform MATLAB Grader, which technically solves my question.

The assignments will be given to the students in the Department of Mechanical Engineering at Prairie View A&M University (PVAMU). PVAMU is one of the public historically black colleges and universities (HBCUs) located in Prairie View, approximately forty miles northwest of Houston, Texas. It is the second oldest public institution of higher learning in Texas, founded in 1876. Based on the statistics conducted in the Fall of 2020, 94% of PVAMU undergraduates are from underrepresented minority groups, with 86% being African-American.

To study the impact of using MATLAB Grader in an online Robotics course, this work adopts an end-of-course survey, students' actions, and the instructor's reflections (Wankat, 1999). The details will be presented in the latter section.

Self-evaluation Assignments

Three assignments are designed to gradually build students' ability to apply the 3D coordinate transformation concept to a real-life robotic navigation problem. Students can work on the assignment online at their own pace. Instant feedback will be given to students, and their work can be automatically graded, building upon the instructor's prior work.

The assignments are designed using MATLAB Grader, a browser-based environment for creating interactive course assignments, automatically grading student work, and providing feedback. The assignments can be run in any learning environment, such as Canvas. The three assignments are designed following the flow presented in Figure 1. The underlying logic of the assignments focuses on self-enhancement. Students' skills are gradually improved as they complete each assignment. According to a psychology study (Sedikides,1993), self-enhancement motivation is one of the most powerful determinants of the self-evaluation process.

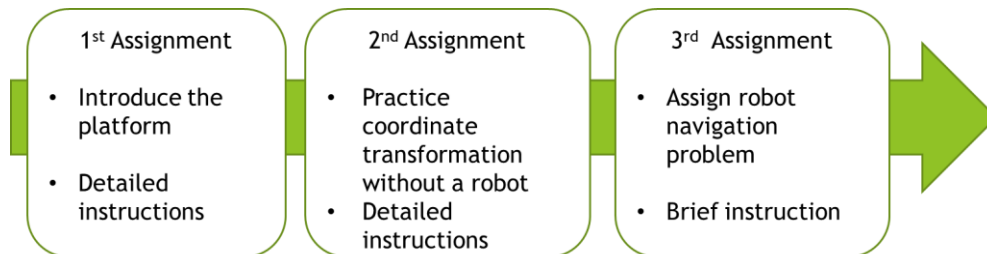


Figure 1. The three assignments are progressively designed.

The first assignment introduces the MATLAB Grader environment with a Degree of Freedom problem. The description of the first assignment is shown in Figure 2.

1. Create a MathWorks Account at www.mathworks.com.
2. Go to <https://matlabacademy.mathworks.com/>, and choose the **MATLAB Onramp** course.
 - a. Complete the "Course overview" module (5 min)
 - b. Complete the "Commands" module (20 min)

If you completed this course 3 months ago, please still go over these modules one more time. It helps you to complete this and future homework.
3. You should have received an email notification from the instructor for a course created in Mathworks Last Friday on Oct. 21. Click the **Introduction to Robotics** course link in the email notification to view the course.
4. You can also find the course by going to Matlab Grader through this link: grader.mathworks.com
5. After signing into Matlab Grader and selecting the Introduction to Robotics course, you can find the assignments for the course in the menu on the left.
6. Complete the "Assignment about DOF/Degree of Freedom" Problem.
 - a. Input the value of r and p in the Script;
 - b. Input the calculation for n in the Script;
 - c. Before you submit your solution, you have the option of running the code to check your output by click "Run Script";
 - d. Before you submit your solution, you can also click "Run Pretest" to get feedback on your answer. Your work will not be graded by clicking the "Run Pretest" button;
 - e. Click the "Submit" button, and your work will be graded.

Figure 2. The description of the first assignment.

Screenshots of the first assignment in MATLAB Grader environment are shown in Figures 3 (a) to (c).

Degree of Freedom

Calculate the degree of freedom of the following robot.

Given:

The joint between the link 0 and link 1 is a revolute joint.
 The joint between the link 1 and link 2 is a revolute joint.
 The joint between link 2 and link 3 is a prismatic joint
 The joint between the link 3 and link 4 is a revolute joint.

(a) DOF problem.

Code

Reference Solution Learner Template

```

1 % Dimension of working space
2 s = 6;
3
4 % No. of links
5 r =
6
7 % No. of joints
8 p =
9
10 % Calculate n, the degree of freedom of the given robot
    
```

(b) The script in MATLAB Grader.

Assessment

Assessment Method: Weighted Show % score to learners

Only show feedback for initial error

Test	Question	Relative Weight
Test 1	Is n correct? r = Reference Solution?	1 (34%)
Test 2	Is p correct? p = Reference Solution?	1 (33%)
Test 3	Is n correct? n = Reference Solution?	1 (33%)

(c) Feedback for common errors can be designed in the assessment window.

Figure 3. Screenshots of the first assignment in MATLAB Grader.

The second assignment requires students to demonstrate their understanding of coordinate transformation without a robot. The description of the second assignment is shown in Figure 4.

Finally, the third assignment requires the students to apply the 3D coordinate transformation knowledge to a real-life robotic navigation problem. A detailed description is not necessary for the students this time. Based on the previous assignments, they can directly access the MATLAB Grader environment to start working on the assignment. The screenshot of the third assignment is shown in Figure 5. It is modified from an existing Transformation Solution problem in the MATLAB Grader library.

1. Login to MathWorks Account at www.mathworks.com.
2. Go to <https://matlabacademy.mathworks.com/>, and choose the **MATLAB Onramp** course.
 - a. Complete the "Matlab Desktop and Editor" module (15 mins)
 - b. Complete the "Vectors and Matrices" module (15 mins)
 - c. Complete the "Indexing into and Modifying Arrays" module (15 mins)
 - d. Complete the "Array Calculations" Module (5 mins)
3. Go to grader.mathworks.com and select the Introduction to Robotics course.
4. Complete Homework 4, and take note of the following:
 - a. There are Two problems with this homework. (Rotation matrix and Coordinate transformation)
 - b. Read the problem instructions carefully;
 - c. Before you submit your solution, you have the option of running the code to check your output by clicking "Run Script";
 - d. Before you submit your solution, you can also click "Run Pretest" to check the syntax error. Your work will not be graded by clicking the "Run Pretest" button;
 - e. **For this homework, the "Run Pretest" option will only check syntax errors. It will not check all the computation errors. In other words, passing the pretest does not guarantee you get 100 points. Because the computation results will be checked after clicking the submit button.**
 - f. Your work will be graded after clicking the "Submit" button.

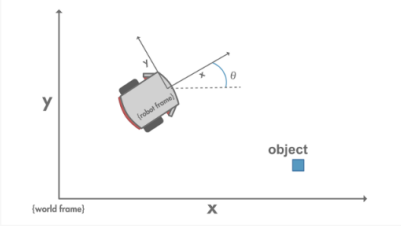
Figure 4. The description of the second assignment

Problem Description and Instructions

Transformations

Transforming from one frame (coordinate system) to another arises in many applications. Consider the situation shown in the figure below.

- A fixed camera is used to determine the position and orientation of the robot and objects in one frame, labeled the world frame. In other words, the camera is located at the origin of the world frame, which can be considered as the fixed frame.
- A robot navigating the environment uses various sensors to determine the location of objects in its own coordinate frame, labeled the robot frame, which can be considered as the moving frame. In order to successfully navigate to a desired location, we must transform coordinates in the world frame to the robot frame. So the robot knows the relative position between the object and the robot frame itself.



Three variables are defined in the script below.

- The position of the robot in the world frame, `pRobotWor1d`
- The rotation of the robot with respect to the world frame, `theta`, and
- The object coordinates in the world frame, `pObjectWor1d`

Your task is to complete the script by:

- Create a homogenous transformation matrix, `T` that represents the translation and rotation of the robot with respect to the world frame.

(Hint: Consider robot frame is the moving frame and world frame is the fixed frame. Think about how to use the given `pRobotWor1d` value to find `T`)

- Use `T` to find the object position in robot frame. Store this value in the variable `pObjectRobot`
- Take the first three elements of `pObjectRobot` as the position of the object in the robot frame and store the value in `pObjectRobot_xyz`

Figure 5. Screenshot of the third assignment in MATLAB Grader

Results

The idea for this work was developed during a MATLAB Teaching Workshop organized in the middle of the semester when the class had already started. Therefore, a control group was not formed. An anonymous end-of-course survey was given to the students, with the questions shown in Table 2.

Table 2 Questions of the end-of-course survey

Questions
My Matlab skill improves by using Matlab Grader.
Is it difficult to learn Matlab and Matlab Grader?
Matlab and Matlab Grader help me understand the course material better.
Taking it all together, how satisfied are you with the Introduction to Robotic course?

Out of 30 students, 21 took the survey. 76% of students agree that their MATLAB skills have improved, while 24% somewhat agree. Regarding the difficulty levels, 57% of students find MATLAB somewhat difficult, while 43% find it very easy. Additionally, 71% of students agree MATLAB helps them understand the course material better, while 29% somewhat agree. Overall, 76% of students are very satisfied with the course, 19% are fairly satisfied, and 5% are not very satisfied. To yield statistically significant results, more data should be collected in the future.

The biggest achievement of this work is providing students with an opportunity to apply their learning to the most common real-life robotic problem. I also noticed that the first assignment has many late submissions. This might be because MATLAB is a relatively new platform for some students, and stepping out of their comfort zone may have been challenging. Upon discovering the issue of late submissions, I had to persuade them both as a group and as individuals by discussing three points (Macdonald,2004): (1) The connection between the first assignment and the next two assignments. (2) The connection between these assignments and the final exam. (3) The benefits to their careers in the field of AI Robotics. As a result, the submission for the second and third assignments became more timely and complete.

Discussion

Evaluation of the assignments could be more rigorous if there were a secure exam proctor function in MATLAB Grader. Integrating MATLAB Grader with Canvas could potentially solve this problem, as Canvas offers a secure exam proctor function. However, I encountered difficulties in successfully integrating my Canvas account with MATLAB Grader. According to the feedback from the Canvas administrator on my campus, the issue is likely because I have both a student and an instructor account in Canvas. The student account was

created when I took a faculty development course with the university. This could be fixed in the future release of MATLAB Grader.

Apart from using surveys, I am considering using end-of-course interviews to delve more deeply into students' perspectives (Mohajan, 2018). By conducting interviews after the final grades are posted, students with different performance levels can participate, leading to more objective insights (Hutchings, 2000).

Conclusion

This paper applies the Scholarship of Teaching and Learning methodology to study the impact of using a new platform aimed at improving the teaching and learning experience in an online robotics course. Details of the assignments developed on the new platform are shared. An end-of-course survey and observations of the instructor are discussed in this paper.

Acknowledgments

This work is inspired by the MATLAB Workshop focusing on teaching computation online, which was organized in 2022. The free workshop brought educators in physics, engineering, and mathematics to share teaching strategies, tools, and materials with a particular focus on transitioning courses to partially or fully online formats.

References

- Bernstein, D. (2010). Finding your place in the scholarship of teaching and learning. *International Journal for the Scholarship of Teaching and Learning* 4(2).
- Fanghanel, J., Pritchard, J., Potter, J., & Wisker, G. (2016). Defining and supporting the Scholarship of Teaching and Learning (SoTL): A sector-wide study. *Higher Education Academy*
- Felten, P. (2013). Principles of good practice in SoTL. *Teaching & Learning Inquiry: The ISSOTL Journal*, 1(1), 121 – 125.
- Healey, M. & Healey R. L. (2023). Reviewing the literature on scholarship of teaching and learning (SoTL): an academic literacies perspective part 2. *Teaching and Learning Inquiry*, 11.
- Huber, M. T. & Morreale, S. P. (2002). Disciplinary styles in the scholarship of teaching and learning: exploring common ground. *Washington, DC: American Association for Higher Education and The Carnegie Foundation for the Advancement of Teaching*.
- Hutchings, P. (2000). Opening lines: approach to the scholarship of Teaching and Learning. *Carnegie Foundation for the Advancement of Teaching*.
- Macdonald, A. (2004). Student self-evaluation of coursework assignments: a route to better perception of quality. *Learning and Teaching in Higher Education*, 1, 102 – 107.

- Manarin, K., Adams, C., Fendler, R., Marsh H., Pohl E., Porath, S. and Thomas, A. (2021). Examining the focus of SoTL literature – teaching and learning? *Teaching and Learning Inquiry* 9.1, 349 – 364.
- Mohajan, H. (2018). Qualitative research methodology in social sciences and related subjects. *Journal of Economic Development, Environment and People*, 7(1), 23 – 48.
- Sedikides, C. (1993). Assessment, enhancement, and verification determinants of the self-evaluation process. *Journal of Personality and Social Psychology*, 65(2), 317 – 338.
- Wankat, P. C. (1999). An analysis of the articles in the Journal of engineering education. *Journal of Engineering Education*, 88(1), 37 – 42.
- Wankat, P. C. (2002). The scholarship of teaching and learning in engineering. *Disciplinary styles in the scholarship of teaching and learning: exploring common ground*. 217 – 234.

Building Competencies through Perception of Music in Early Childhood and Primary School Education

Smilena Smilkova

University "Prof. Dr. Asen Zlatarov", Bulgaria

Abstract: Music undoubtedly affects the visual and emotional sensitivity of a person. It stimulates various sensations, thoughts, images and sensations that cause a desire for free expression of the personality. Through the conscious perception of music, knowledge, skills and relationships are created that develop imagination, fantasy and creativity, especially in children of preschool and primary school age. This nurtures qualities and competences, preparing the future personal, professional and social development of the child. The proposed article examines in a theoretical aspect: categories of skills formulated by Seth Godin - self-control, productivity, wisdom, perception, impact; elements of the communicative process based on Lasswell – communicator, receiver, channel of communication between the source and receiver, means of transmitting the message, effect of transmitting the message; phases of creative development according to Desev and Brik - logical analysis, intuitive decision, verbalization of the intuitive decision, formalization of the verbalized decision. The listed theoretical justifications have been transferred and adapted to the perception of music in preschool and primary school age. The development of figurative, emotional and logical thinking through listening to music provokes and activates children's curiosity and inquisitiveness to enrich and expand not only the informational sound field, but also to search for meaningful connections between phenomena, actions, relationships, to create skills and competencies in various life and, in the future, professional situations, to cultivate emotional intelligence and activate the desire for creativity.

Keywords: Perception of music, Competencies, Skills, Preschool and primary school age

Citation: Smilkova, S. (2023). Building Competencies through Perception of Music in Early Childhood and Primary School Education. In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023--International Conference on Social and Education Sciences* (pp. 81-88), Las Vegas, NV, USA. ISTES Organization.

Introduction

In one of his lectures, Rudolf Steiner noted that "music is the most comprehensible thing for the soul, for the immediately perceptive psyche, and on the other hand, it is something difficult to understand for those who want to understand its impact. If we want to compare music with other arts, we must say: All other arts have a model in the physical world." (Steiner, 2019)

Music undoubtedly affects the visual and emotional sensitivity of a person. It stimulates various sensations, thoughts, images and sensations that cause a desire for free expression of the personality. Through the conscious perception of music, knowledge, skills and attitudes are created that develop imagination, fantasy and creativity, especially in children of preschool and primary school age. This nurtures qualities and competences, preparing the future personal, professional and social development of the child.

The main musical activities underlying music education in preschool and primary school age are: perception (listening); reproduction (performance, interpretation); creativity (improvisation). Perceiving music is a basic musical activity. It is the basis of the other two. Without receiving (listening to) a piece of music, it is not possible to perform and interpret or improvise it. The perception of music stimulates and develops the emotionality of the listener, his abstract thinking, his imagery.

The Russian musicologist Nazaikinsky (1972) defines various reasons affecting perception: age, profession, habits, environment, nationality, etc. He examines several factors that prepare the foundation for making sense of the content of the music being listened to:

- communication experience - communicative: the relationship of the musical work and its character with the life context, distinguishing various communication situations that the child encounters when listening to music;
- speech and motor experience - speech as a special tool for communication, expressed in singing through voice and text; motor experience - helps both to differentiate dance music by genre, and to differentiate and highlight individual means of expression in the musical fabric itself;
- sensory experience - spatial and visual sensations and ideas - two-way relationship of auditory and visual perception. (Nazaikinskii, 1972)

In this sense, it can be noted that listening to music in childhood and primary school age helps to create skills/competencies in the field of: native language; learning; initiative and entrepreneurship; socialization; citizenship; culture and creativity.

Competences and Skills

“Competences are basic characteristics of people, determining ways of behavior or thinking, manifested in different situations and sustainable for a relatively long period of time. These include motives (the things an individual thinks or wants that cause them to act), traits (physical characteristics and consistent responses to situations or information), self-image (attitudes, values, or self-concept), cognitions (information in certain content areas) and skills (the ability to perform certain physical or mental tasks). The last two are visible and can be developed relatively quickly. The rest, especially the motives, values and attitudes are not directly expressed, may be unconscious and, therefore, are more difficult and slow to develop.” (Pozharliev, 2022)

"Competence is a set of knowledge, skills and attitudes. It should be seen as an expression of the individual's

ability and experience to combine and integrate in his behavior various elements of professional and personal qualities that are necessary for the performance of a specific task.“ (Angelov, 2018)

Seth Godin defines 5 five large categories of skills that are closely related to competence and its development: Self-Control — Once you've decided something is important, can you keep doing it without letting distractions and bad habits stop you? The ability to do things in the long term that you may not be able to do in the short term. Productivity — Are you good at what you do? Are you able to use your knowledge, observations and dedication to move things forward? The ability to perform tasks that are not necessarily standard and measurable.

Wisdom — Have you learned things that are hard to convey in a textbook or manual? Experience makes us adults and mature people.

Perception — Do you have the necessary experience and practice to see the world and processes clearly? The ability to notice things before others point them out. Influence - Have you developed the necessary skills to persuade other people to take action? Charisma is only one manifestation of this skill. (Godin, 2017)

Formation of Competences in Children and Students through Perception of Music

The formulation of the listed above skills can be successfully and expediently adapted to the perception of music by children and students of preschool and primary school age:

Self-control - related to: the patience to listen - educates in ethics and develops emotional intelligence; understanding - desire to make sense of the musical language, carrier of content, grasping ideas.

Productivity - related to: lateral thinking - direction, tendency, striving for new and different thinking through the emotional impact of musical expressiveness; focus and attention to detail.

Wisdom - related to: empathy - towards people and situations; formation of critical thinking - towards oneself and others; sensitivity to the artistic musical impact - figurative emotionality.

Perception - related to: creative thinking - through musical images; evaluation of people and situations by gaining experience through the sound presentation of life images and events; quick and multifaceted thinking by analyzing and interpreting musical content based on expressive means.

Impact - related to: personal inspiration from listening to music, passed on to others; persuasiveness of language and speech, influencing those around; management and control over personal capabilities and skills, through resourcefulness in their use and presentation.

Music undoubtedly affects the visual and emotional sensitivity of a person. It stimulates various sensations, thoughts, images and sensations that cause a desire for free expression of the personality. Music is part of human emotions, moods, conscious or unconscious needs, hopes, fantasies. It is also the background of personal thoughts or of routine activities and actions. In its perfection, music is present in the creative processes developing inside the person and manifesting externally through its interpretation - performing or listening. The tripartite connection of music is a set of author's intention, realized by a performer and reached through their interpretation to the thought and sensibility of the listener. This type of communication is an invisible, imperceptibly realized process of a set idea (author), realized, and presented subjectively (interpreter), perceived and understood also subjectively (listener).

According to Lasswell (in Baltadzhieva, 2001), the communicative process is composed of five elements:

1. „Communicator – source of the message.“

In music, it is the composer who has expressed his thoughts, feelings and ideas through the sounding musical fabric, "materialized" by means of the musical text.

2. „Recipient - recipient of the message.“

When perceiving music, it is the listener - the one for whom the written work is intended.

3. „A communication channel between the source and the receiver.“

The performer is the one who makes the connection between the author's intention and the recipient.

4. „Means of conveying the message.“

Musical means of expression in their diversity are the path along which the "message" passes, coming from the author's concept, passing the analysis and realization of the interpreter, reaching the imagination and emotionality of the listener.

5. „Effect of delivery of the message.“

The musical "message" that reaches the audience is understood meaningfully by the recipients. In accordance with their age, life experience and knowledge, character, freedom of thought and feelings, intelligence, the significance, influence and impact of the message is determined - a subjective reflection of the author's confession, presented by the performer, interpreted by the listener.

Dessev and team note that any activity can be creative if the subject performs it in a non-stereotypical, unorthodox way and shows originality, resourcefulness, unexpectedness, inventiveness. (Dessev & al., 2011)

The same authors characterize the phases of creative development:

- logical analysis (conscious work) – preparation, active state of the subject, which is a prerequisite for a glimpse of a new original idea;
- intuitive solution (unconscious work on the problem) - maturation of an idea;
- verbalization of the intuitive decision (transition from the unconscious to consciousness) - hypothesis, idea;
- formalization of the verbalized decision (conscious work) – logical, finished form. (2011, p. 229)

Related to the perception of music in preschool and primary school age, these phases can be considered as follows:

- logical analysis – selection of appropriate figurative musical works, whose sound imagery is close to children's thinking, based on accumulated life experience; asking questions appropriate to the topic or indirectly preparing

the imagery in children's thinking, related to the content, character, emotionality and the means by which they are achieved;

- intuitive decision - when listening to the musical work, through the guidelines indicated in advance, children intuitively connect their ideas about reality with the sounding music, which affects and provokes the imagination and imagery;
- verbalization of the intuitive decision - after listening to the musical work, according to the given guidelines, the children explain, narrate, share their mental and visual impressions;
- formalization of the verbalized decision – as a result of exchanged opinions, ideas, emotions and thoughts, the imagery in the listened musical work is summarized or conclusions are drawn regarding the content, imagery, suggestion and impact of the invisible musical image.

Methods

How, through the conscious perception of music, are knowledge, skills and relationships created that develop the imagination, fantasy and creativity, especially in the listeners, through the education of qualities and competences, preparing the future personal, professional and social development of the child?

The development of the auditory apparatus through the activity of music perception increases sensibility and sensitivity to sound, revealing new possibilities for intentional expression and sound modifications to stimulate rational and irrational thinking and perception of the surrounding world. Listening to music with the setting of certain tasks is an important component not only in music education in kindergarten and primary school, but also a factor leading to the development of both musical hearing and memory, as well as practical application of the accumulated musical-auditory and musical -images.

Tracing the musical thought expressed through the melody, its character, tempo, dynamics, rhythm of the work, develop the intellect, analytical thinking, creative nature of the child, educate and exercise the correct interpretation of the logic of the individual elements of musical expressiveness, making up the musical fabric and language Understanding the essence and meaning of the means of expression in music is part of the preparation of children and students. Their sense, sensitivity, based on knowledge and understanding of the components of imagery in music, are a guideline for cultivated and intelligent interpretation of sound art. All this implies the development of: - auditory control and self-control - listening skills and focus of attention, or its allocation:

- skills for understanding/distinguishing the small (detail, motive – e.g. element of musical expression) and the big (whole – e.g. idea, content, feelings);
- speaking skills, expression – oral explanations, expressing an opinion, alternating speech and melody;
- logical thinking skills - analysis and synthesis, summary;
- time allocation.

The word is an integral part of everyday life. The musical word is not always easy to understand. For the correct

awareness and perception of the musical language, children sometimes need the concreteness and clarity of the word to direct and stimulate their imaginative thought. The role of the teacher, who not only tells the music, is extremely important and constructive. It provokes dialogue in the class, stimulates the expression of personal opinion and defense of one's thesis, supports children's opinion and imagination, expressed in pure, beautiful, accurate Bulgarian language. There are various ways of developing children's speech, based on the emotional and visual perception of music:

- description of sound pictures and natural noises;
- analyzing the musical means of expression, which are the conductor of the content;
- a narrative based on a given piece of music;
- discussion, conversation;
- description of images, feelings, moods provoked by the sounding music, etc.

Thus, over time, competences in the field of the native language are formed - mastering it as an expression, as richness and color, as a means of intelligent and/or emotional communication. Penetrating (in many cases unconsciously) into the depths of the enigmatic musical language, the child usually intuitively reaches the emotionality, the imagery of the sound mass, conditioned by the sense, memory, reflex for various feelings, images, colors, moods based on the child's experience.

Often, the perception of music leads to empathizing with the emotions, feelings and thoughts embedded in the author's intention. Empathy is the ability to sensibly understand and empathize with the implication and impact of the composer's thoughts and consciousness. This inner listening insight could provoke both the attitude towards music and the interest of children and students in the time in which it was created; the society for which it was intended; the events that led to its creation. Of course, the way to the adequate perception of a musical work relates to a long and purposeful work concerning the creation of an understanding and attitude towards the various manifestations of musical thought. Its duration depends both on the degree of sensibility, sensitivity, and intelligence of the children, and on the tireless educational, professional and awakening work of the teacher, provoking the interest, fantasy and creative thought of the future listeners. The awakening of children's interest, imagination, logic, creativity depends on its artistic interpretation.

Integration with the other arts not only enhances the emotional impact of music. It expands the imagery, visualization, color of children's imagination. The information contained in the word or the picture, in the movement of the dance, in the suggestion of the architecture, leads to the expansion of the horizon, to cultural, historical, traditional, social knowledge. And this, in turn, builds cultural, social and civic competences. Discussions, conversations, talks related to the various arts, adapted to the age of the children, are an endless window to past worlds and a touch of the immensity of cultural knowledge, which, combined with the present, draw new directions and ideas in children's thinking and imagination.

"There are two important tasks of childhood - training the hand and training the heart. Together they lay the

solid foundation for training the mind.” (Oppenheimer, 2018) The activity of perceiving music is not directly related to training the hand, but it certainly trains the heart and mind. And from this direction of impact, listening to music forms social and civic skills and competences:

- listening skill - to hear others, to hear yourself;
- tolerance - respect for foreign/group opinion, respect for traditions and culture of ethnic groups; responsibility – personal/group;
- confidence, courage - expression of personal/group opinion;
- communication - verbal/non-verbal, assessment of the group's reaction, acceptance of criticism;
- team work - with group tasks; overcoming tension;
- understanding one's own and others' emotions.

Of course, there is no well-defined boundary between the characteristics of the various skills leading to competencies. The wide range of personal or group color does not draw postulates for defining areas of competence. The most significant share in the formation of competences through the perception of music falls on cultural, as well as on the skills of expression through creativity. The development of visual thinking through listening to music, familiarization with various examples of folklore, national and world musical heritage, integration with other arts, leads to serious accumulation of knowledge, ideas, observations, conclusions. This, in turn, provokes children's curiosity and inquisitiveness to enrich and expand not only the informational sound field, but also for searches in the field of various arts. The greater the range of knowledge, interest, awareness of children, the more their desire for creativity is activated - interpreting ideas generated by imagination. The role of the teacher as a person, educator, professional is to stimulate, develop, initiate the creative beginning and spirit in each and every child. Ken Robinson notes the three main things that "great" teachers give students:

- Inspiration. With their passion, they ignite their interest in the subject being taught and inspire them to achieve the best they are capable of.
- Confidence. They help them develop skills and habits that give them confidence that they will be able to develop their expertise in the future.
- Creativity. They provide them with the opportunity to experiment, explore, ask questions and develop skills and attitudes for original thinking. (Robinson, 2017)

Conclusion

Music, as an art form with a thousand-year history, influences and affects man. It teaches, educates, ennobles. In many cases the power of music gives rise to sensations, thoughts and feelings that instill in man an understanding of himself - of the invisible threads between the sound and the vibrations of the heart, of the joy of the excitement caused by the tonal color, of the connection between our true nature and perfection of the soul.

These music-induced reflections on one's own essence and depth have an impact on a person's relationships and connections with other people and society.

Listening to music is as much a natural act of human nature as it is a serious and sometimes difficult way to make sense of the music that is listened to, to embody it in an artistic image, to cultivate taste, attitude and preferences. The immensity of sound art includes knowledge - about the content, meaning, emotionality of musical imagery and expressiveness; for the information it carries, passed through the experience, culture and knowledge of the time. "In every culture we know, arranging sound for auditory pleasure is a common way to improve the quality of life." (Csikszentmihalyi, 2021)

References

- Angelov, M. (2018). Formation of musical competence of students - future primary teachers when working with music teaching sets. *Collection: The professional training of students from pedagogical specialties. V. Tarnovo : "St. St. Cyril and Methodius", pp. 133-151*
- Baltadzhieva, J. (2001). *Psychology of communication in primary school age*. Burgas: Dimant
- Csikszentmihalyi, M. (2021). *FLOW*. Plovdiv: Hermes
- Dessev, L., Brik, S. & Dessev, N. (2011). *Psychology of creativity*. Sofia: Paradigm
- Godin, S. (2017, May 29). *Let's stop calling them soft skills*. Retrieved from: <https://medium.com/...bg/neka-sprem-da-gi-nirichame-meki-umenia-98d6d5f768cd>
- Nazaikinskii, E. (1972). *About the psychology of musical perception*. Moscow: Music
- Oppenheimer, S. (2018). *Heaven on Earth*. Sofia: Kibea
- Pozharliev, A. (2022). Competence. Retrieved from: <https://nbu-rechnik.nbu.bg/bg/obsht-spisyk-na-ponqtiq/kompetenciq>
- Robinson, K. & Aronica, L. (2017). *Creative Schools*. Sofia: Raabe
- Steiner, R. (2019). *Nature of musical and tonal experience in man*. Sofia: Ab Publishing Studio

Games as a Mode of Instruction in Object-Oriented Concepts

Krish Pillai

Lycoming College, United States,  <https://orcid.org/0000-0003-0452-4787>

Marcia Lovas

Quinnipiac University, United States,  <https://orcid.org/0009-0003-6749-2257>

Abstract: A typical first computer science course (CS1) introduces the student to coding conventions, variables, methods, control structures, conditionals, and the semantics of classes and objects. Advanced concepts of inheritance, polymorphism, abstract classes, interfaces, and their use in the design process, are covered in a second-level course (CS2). CS2 concepts are abstract, requiring reinforcement through considerable practice. It has been observed that traditional CS2 projects fail to capture the imagination and enthusiasm of students and are seldom useful past the end of the semester, yet interesting projects drawn from the natural sciences may be either too complex or too algorithmic to facilitate the required design experience. Game programming, in contrast, is purpose-driven and has great appeal. Unfortunately, popular game engines hide the engine's complexity and provide too much built-in functionality, relegating the user to writing glue logic in a scripting language. What is needed instead is a challenge that will provide transferable skills for solving generic problems using a statically typed language. The authors of this paper describe a Java game engine and lesson plan they developed for one semester of object-oriented instruction for students who have completed CS2. Early anecdotal results demonstrate that students find the approach challenging, informative, and incentivizing.

Keywords: Graphics, 2D Gaming, Object-oriented Programming, Inheritance, Polymorphism, Event-driven programming, Sprites, Animation, Java.

Citation: Pillai, K. & Lovas, M. (2023). Games as a Mode of Instruction in Object-Oriented Concepts. In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023-- International Conference on Social and Education Sciences* (pp. 89-108), Las Vegas, NV, USA. ISTES Organization

Introduction

Object-oriented decomposition is as much an art as it is a science. A decomposition paradigm is an effective strategy for organizing a program in terms of its structure and its functionality. A problem dissected the wrong way can result in an implementation that is needlessly complex and closed-ended. The abstract nature of the design process, and the lack of compiler assistance in matters of design, make it an engineering problem that is hard to learn and arguably complex to teach. The fact that there are multiple structural and behavioral solutions to the same problem makes it imperative that the student is trained on a wide range of projects with clearly

defined requirements specifications. To become an effective software engineer, not only is it important to understand and apply algorithmic decomposition of the problem, but one should also be able to carry out object-oriented decomposition to produce reusable code. Conventional curricula in software engineering have focused on structured analysis. While this is important, exposure to a wider range of challenges involving object-oriented decomposition is valuable as well.

Software Engineering has evolved in a way to encapsulate algorithmic decomposition effectively. As an example, the collections classes provided by Java effectively use overloading to present the most effective algorithm for the task at hand. The `sort()` method provided by the Arrays implementation uses quicksort when the argument is an array with a base type that is primitive but switches to mergesort when the array elements are of a reference type. The onus of choosing the correct algorithm is delegated to the compiler, and it binds the call to one that guarantees a linearithmic response versus one that does not. The algorithmic choice is automated through overloading based on the data type. On the contrary, virtually no support is provided by the compiler or the linker-loader when it comes to object-oriented decomposition. Solutions are mostly problem-specific and optimization issues are left to the programmer.

Application Domains

Software engineering course offerings have conventionally relied on projects drawn from applied mathematics and the natural sciences to provide design and developmental experience to students. In addition to reinforcing theoretical concepts, projects drawn from the natural sciences serve well to prepare students for careers in computational sciences and engineering. However, the implementations for such problems tend to be procedural and algorithmic in nature and seldom present challenges in object-oriented design. For example, the protein folding problem (FAHC, 2023) deals with how a protein's three-dimensional structure is dictated by its amino acid sequence. This engaging problem is essentially a modeling of different small interactions and does not require a hierarchical representation. Another classic problem in astronomy that is interesting to students as a software engineering project is the modeling of Lagrange points ("Lagrange point," 2023) in the vicinity of the gravitational field of two bodies. Again, as before this project presents an issue of algorithmic decomposition rather than object-oriented decomposition through inheritance and polymorphism. Engaging projects such as the ones mentioned above, generally do not lend themselves to challenging issues in the topics that the student ought to be focused on. While object-oriented projects certainly exist in the natural sciences, many require a higher level of preparation in the sciences than what a sophomore student would be expected to know. While conventional problems challenge the student on an accurate implementation of the model of computation, they inadequately expose the student to the concept of decomposition, which is an entirely independent paradigm.

Gaming Domain

The gaming domain has several advantages. Applications today are primarily meant for interactive use and involve use cases that are considerably more complex than what was traditionally the case. Game programming

likewise demands interaction, clearly defined use cases, and complex state changes to manage. In addition, developing a clear knowledge of the game engine framework and its activity lifecycle for the purpose of coding a practical solution should prepare the student to develop software using more advanced frameworks such as those used in mobile platforms. Guiding students in developing their own game engine has suggested positive results such as in Gestwicki's game development efforts (2008). Having students develop their own games utilizing a game engine framework is a natural extension of this effort and may provide even more opportunities for reuse. Additionally, developing games versus developing a game engine provides more creative opportunities and is less restrictive.

Using a game framework to teach software engineering translates the classroom into a game-based learning environment. Game-based learning is a growth area according to a recent study by Metaari (2019), formerly Ambient Insight, a market research firm that uses predictive analytics to gauge trends. Their studies predict that "the worldwide five-year compound annual growth rate (CAGR) for Game-based Learning products and services is a healthy 33.2% and revenues will more than quadruple to reach well over \$24 billion by 2024" (p. 20). It is also worth noting that many programmers cite writing games as their gateway into the field of software engineering. A game programming experience could similarly propel new students deeper into the field.

A game framework when used as a teaching tool has the potential to make learning Java fun and engaging as well as highly effective. Students may retain information longer if the code they write is captivating and useable beyond the semester. By creating games, the student is required to apply their understanding of concepts in a practical way. Games are also shareable and visual, which may be helpful for students of this generation and those who prefer a visual learning style. Sharing generates constructive feedback, helps sustain enthusiasm for the topic, and helps concretize concepts that can be abstract. It can translate classroom learning into a social experience.

Existing Game Engines

Commercial off-the-shelf (COTS) game engines such as Unreal™ (2023) or Unity™ (2023) enable the development of sophisticated games. Unfortunately, such platforms require minimal scientific or mathematical skills, or conceptual expertise from the developer. Designed primarily for artists and the entertainment industry, these engines are heavily automated and reduce developers' contribution to a few lines of glue logic written in C#, JavaScript, or Python. The focus of such engines is on rapid prototyping and development of the game narrative and management of assets. As a result, such off-the-shelf game engines that are highly specialized for game development are unsuitable for imparting software engineering principles. A strong foundation in software engineering, which goes beyond scripting, is essential to be skilled as a software engineer. There is a need for a minimal framework that supports 2D animation and is built on freely available software. A lightweight framework that can run efficiently on inexpensive hardware is what is required for classroom-wide deployment.

Robocode (2023), which was developed by IBM is one such lightweight platform and an excellent framework

for teaching code development. But the use cases it provides are restrictive and might not appeal to students with a variety of interests. In Robocode, the student overrides methods in a framework-provided robot base class to modify the functionality of battle tanks that compete against each other on a battlefield. The final product is not a stand-alone game, but a byte-code module that can operate only within the context of the battlefield. The Robocode framework, though a good demonstration of the use of Java, is limited in its scope as a software engineering teaching tool. It does provide a flexible platform to study Artificial Intelligence and other adaptive behavioral mechanisms, but in terms of inheritance and polymorphism, the scope of the platform is limited. Robocode is ideal for the study of behavioral design patterns when it comes to modeling the behavior of the robot. However, the problem domain is still the battlefield and its appeal to the student group can be limiting.

Java Engine for Teaching Design of Object-oriented Games (JETDOG)

The Jetdog 2D game framework presented in this paper produces stand-alone games and can be used to generate 2D games of a wide variety of genres. The language chosen for game development is Java, the College Board[®] recommended language of instruction for the Advanced Placement (AP[®]) Computer Science (2023) course and exam. The game engine was implemented using Java 19 and Swing/AWT, all provided as part of the Java SE distribution. It runs on all platforms, Windows, Mac, and Linux, without the requirement for any native libraries. The framework uses a combination of event detection, sound effects, and gameplay mechanics to reinforce the Java concepts being taught. The game framework is scaled so that games can be developed within a realistic timeframe of one semester. The framework does not replace the skills of the developer but serves to augment them. It is not too complex to learn or master, but at the same time does not require the developer to write extensive code that is not related to the narrative of the game itself. It does not require any expensive hardware such as advanced graphics processing units (GPUs) or specialized libraries such as OpenGL.

A series of lessons are provided that focus on creating content that teaches Java, rather than worrying about the technical details of building a game from scratch. One example of the game framework in action is a lesson where students learn about animations and collisions by creating a game where an alien seeks out a cookie and consumes it. By using principles of trigonometry, students can make the alien move toward the cookie, visually making the concept of directed movements and vectors tangible and easier to understand. Another example is a lesson on object-oriented programming where students create a game where they control a spaceship and shoot down advancing space aliens. By using object-oriented principles like inheritance and polymorphism, students can create a complex and dynamic army of aliens while also learning important programming concepts.

Game Engine Methodology

The game engine handles the rendering of entities on screen, manages their positional updates, and keeps track of various events that occur during a game. A timer clock is the heartbeat of the game engine. Each time the clock ticks, a frame is generated and displayed on the screen. This cycle decides the frame rate of the game

engine. The game engine repositions and renders entities once every frame, and all processing for a specific frame must be completed before the next frame can be processed. As a result of positional changes on the screen, entities may collide with each other, drift out of the visible area of the screen, or run into impenetrable barriers. When they occur, such events are collected and communicated to the game implementation during each cycle of the game loop. Additionally, the keyboard must be polled periodically to check for user input as well. All these actions and event processing are carried out for every clock tick of the game.

The Game Loop

In the simplest sense, all games modeled by this framework consist of a cyclic invocation of a sequence of methods until some conditions are met. The game controller instance moves the game through its various states. A game is essentially composed of a sequence of frames that are generated at a stipulated frame rate (60 frames per second), like a flip book. To enable this strict periodicity, the framework maintains a game clock that fires repeatedly at the stipulated time interval. The clock invokes various methods in the proper sequence to move the game forward. Each frame displays various entities on the screen, to which the user responds through mouse and keyboard actions. The user inputs affect the attributes of each entity on the screen.

The entities may move unobstructed within the viewable screen bounds or may go out of bounds, get blocked by barriers, or the entities may interact with each other through collisions. The way these events are resolved is implemented by the design of each specific game and is not part of the framework. The narrative of the game may even involve the inclusion or removal of entities from the next frame to be computed. As a result of their behavior and interaction with the user and other entities, entities may change their trajectories, exit the game, wrap around, or disappear beyond screen bounds. Before every frame can be computed and displayed, the game must go through all entities known to it, relocate them on the screen based on the elapsed time, and check for collisions, blockages, or out-of-bound situations as shown in Figure 1.

The invocation of various methods is the responsibility of the game clock which fires periodically at 16.667 milliseconds. The game clock invokes methods on the game controller and the entity model. Each event is collected as an array and supplied as an argument to the respective concrete method. For example, all entities are checked for out-of-bounds events during each cycle of the game loop. An out-of-bound event object containing the entity that stepped out of bounds and the edge that was crossed is created for each out-of-bound event. An array of the events is built and supplied as an argument to the `onOutOfBounds(OutOfBounds[])` method, which the implementor of the game overrides for the specific game being built. The game is designed by overriding all the event-related abstract methods that the game engine invokes during every cycle. What makes one 2D game different from another is the way events are handled. The game engine, therefore, serves to abstract out the commonality across all 2D games.

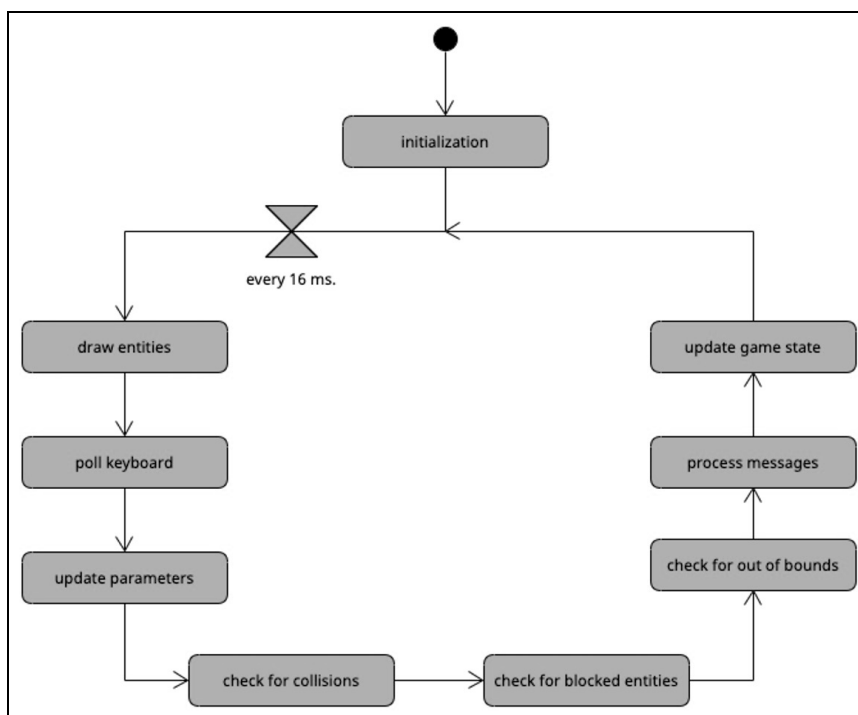


Figure 1. The game engine cycle (or game loop)

Model-View-Controller

The implementation of the framework is based on the Model-View-Controller design pattern. Each entity is represented by a base class called the EntityModel which contains the fundamental attributes that are common across various entities. The controller functionality is provided by the game engine represented by the GameController abstract class. Entities can be of different types, and each of the supported types is represented by the following abstract classes shown in Figure 2:

- Scrolling scenery or background represented by the SceneryModel class
- Animated sprite-based entities represented by the SpriteModel class
- Textual data represented by the TextModel abstract class
- Obstacles or impervious barriers represented by the BarrierModel

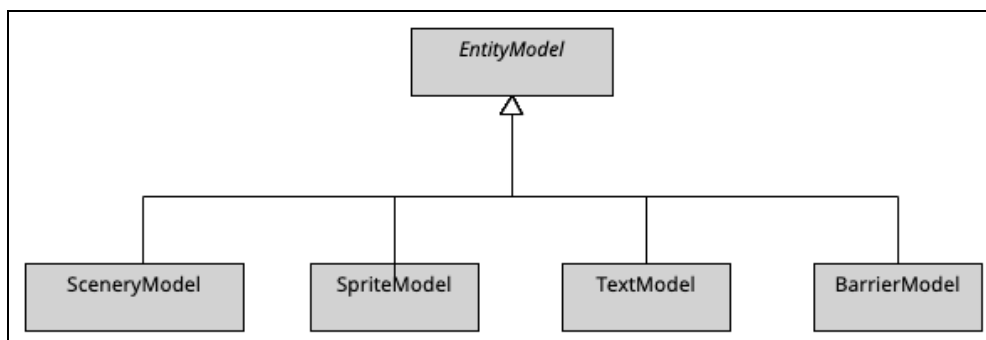


Figure 2. Model hierarchy

Each of these model types contains a reference to its view, which is rendered on screen when the controller invokes the draw() method on the entity. The draw() method is invoked on all entities during each cycle and the call is dynamically bound to the method implemented by the entity instance, which could be a sprite, text, or scenery. The view hierarchy shown in Figure 3 is supported by the base class EntityView, which is further extended into the TextView, SpriteView, and SceneryView classes. Each view type is associated with the corresponding model.

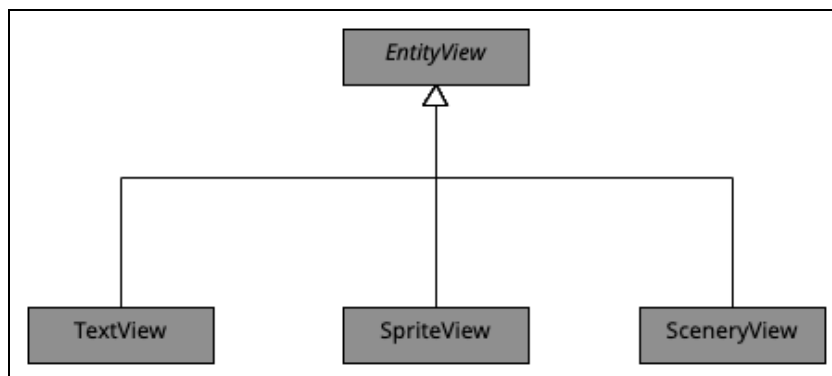


Figure 3. View hierarchy

The game controller, the entity model, and the associated view contribute to building the M-V-C pattern as shown in Figure 4. The controller interacts with the user and updates the model so that the current state of each model is rendered by the view. It serves as a listener for all user interactions. The controller then updates the parameters of each entity based on the elapsed time and user input. This function is carried out for each iteration of the loop.

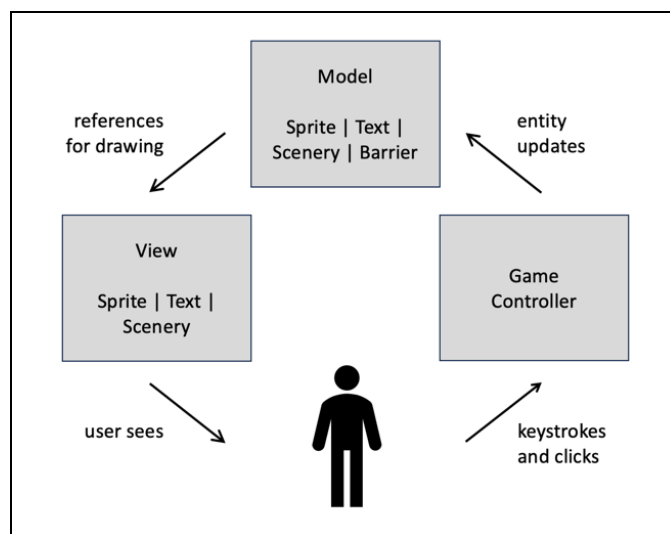


Figure 4. Implementation of the model-view-controller (M-V-C) pattern

A substantial amount of generic functionality is provided by the game controller, freeing up the developer to concentrate on the narrative of the game, which is implemented by providing the concrete implementation for

various abstract methods which are invoked every cycle of the game loop.

Event-Handling

Various events can occur during a game cycle. Entities may go off-screen, they may collide with one another, or be obstructed by a barrier placed on the screen. Entities may even signal to the controller about something that is relevant to the narrative of the game. Classes that represent and manage these events are provided in the event handling framework, which is part of the game engine. Each game handles these events in a specific way that is pertinent to the narrative of the game. The game controller checks all entities for any of these events, aggregates them into arrays of events, and passes them as arguments to the corresponding overridden method. The developer can implement each of these callbacks in the concrete game controller by providing the appropriate handler for each event.

All of the event classes extend the base class `GameEvent` as shown in Figure 5. The events supported by the framework and the handler for each of those events are as follows:

- `CollisionEvent`
 - representing two colliding entities passed as an argument to the `onCollisionEvent()` method
- `OutOfBoundEvent`
 - representing an entity and a screen edge passed as an argument to the `onOutOfBoundsEvent()` method
- `MessageEvent`
 - representing an entity (sender) and a string message (description) passed as an argument to the `onMessageEvent()` method
- `BlockedEvent`
 - representing an entity and a barrier passed as an argument to the `onBlockedEvent()` method

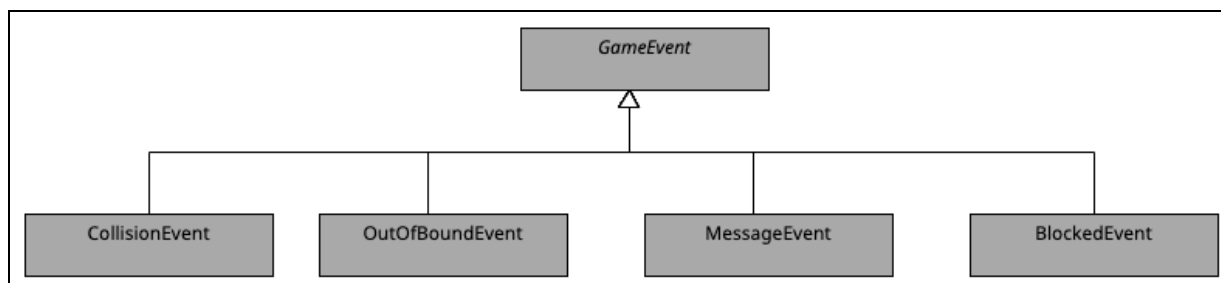


Figure 5. Event classes

Implementing a Game

Writing a game using the framework involves extending the game controller, and the required entity model types, setting the view for those entities, and writing appropriate event handlers for collisions, out-of-bounds,

blockages, and messages. Sounds can be generated by invoking the play() method on a predefined set of enumerations provided by the SoundEffects enum. Textual information, such as a scoreboard can be created by providing a concrete class extension for the TextModel. When a concrete game controller is instantiated, the game clock is started up and the game starts to run. The game clock in turn sets off a sequence of message calls for every cycle. These triggers cause the rendering on screen and various event handlers to be invoked on the game controller instance. The relationship between the various classes is shown in the consolidated class diagram in Figure 6.

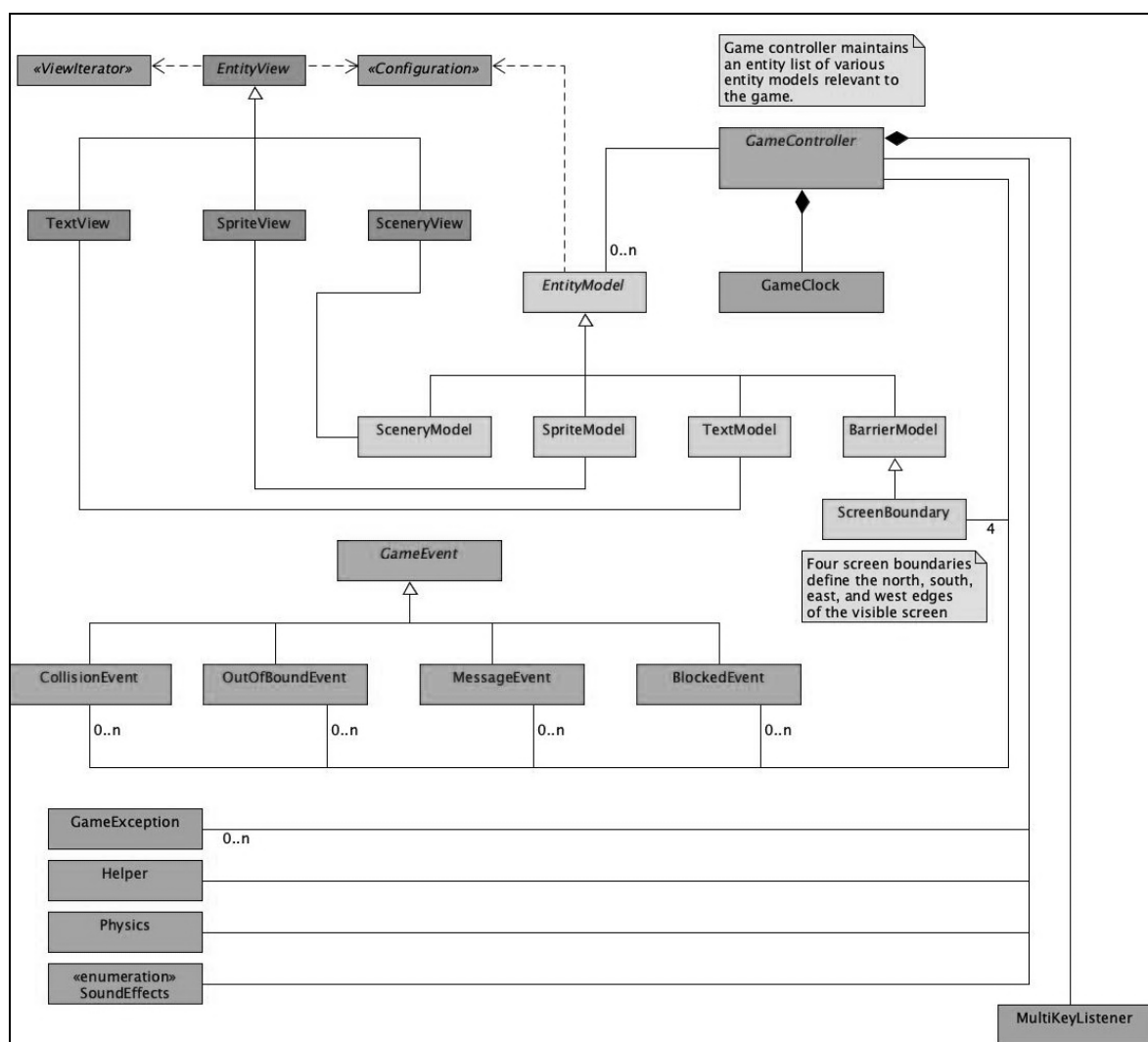


Figure 6. Class relationship diagram

Implementing a game using this framework involves writing derived classes that extend the GameController and the required subclasses of the EntityModel, which could be text, sprite, barrier, or scenery. The GameController provided by the framework is an abstract extension of the Swing JFrame. This gives unlimited access to the developer to all the functionality provided by the JFrame class. Keyboard and Mouse listeners, or any other features supported by the Swing toolkit, are available to the concrete game controller.

Example

Consider a simple 2D simulation of a pair of entities that appear on the screen. Let this class be called TwoBodySimulator as shown in Figure 7.

```

public class TwoBodySimulator extends GameController{

    @Override
    protected void enlistEntities() {
        // place red dot at (100,100) and blue dot at (200,200)
        SpriteModel a = createSpriteModel(Color.RED, 100, 100);
        SpriteModel b = createSpriteModel(Color.BLUE, 200, 200);
        // send them off in different directions
        a.setXVelocity(7);
        a.setYVelocity(8);
        b.setXVelocity(-5);
        b.setYVelocity(-7);
        a.setActive(true);
        b.setActive(true);
        // present them on the screen
        addEntity(a, b);
    }

    private SpriteModel createSpriteModel(Color color, int x, int y) {
        return new SpriteModel(x, y) {
            @Override
            protected void updateParameters(long elapsedTime) {
                // TODO Auto-generated method stub
            }

            @Override
            protected void setAppearance() {
                setView(color);
            }
        };
    }

    @Override
    protected void onCollisionsPolled(CollisionEvent[] events) {
        for (CollisionEvent event : events) {
            EntityModel a = event.getA();
            EntityModel b = event.getB();
            Physics.rebound(a, b);
        }
    }

    @Override
    protected void onOutOfBounds(OutOfBoundsEvent[] events) {
        for (OutOfBoundsEvent event : events) {
            EntityModel em = event.getEntity();
            ScreenBoundary sb = event.getBoundary();
            Physics.rebound(em, sb);
        }
    }

    public static void main(String[] args) {
        SwingUtilities.invokeLater(()->new TwoBodySimulator());
    }
}
    
```

Figure 7. Two-body simulator implementation

The objective is to simulate an inelastic collision between the two bodies when they run into each other. Let us also assume that these entities shall bounce off the edge of the screen. The first step is to extend the GameController class. The enlistEntities() method is overridden to add the two entities. Since collisions and out-of-bounds are the two events that need to be defined for this simulator, the onCollisionsPolled() and the

onOutOfBounds() methods are implemented. All other events are stubbed out, and not shown in the listing below for the sake of brevity. A simple class with three or four methods creates the basic simulation.

More elaborate games are feasible by extending classes from the framework and implementing abstract methods on the controller and models. The periodic game clock invokes a series of abstract methods, the concrete versions of which are to be supplied by the user-implemented classes. The rules of the game can be coordinated by the updateGameState() method, which is invoked by the game clock at the end of each clock tick. The sequence in which the game clock invokes various methods on the game controller each time it is fired is shown in the detailed life-line diagram beginning with Figure 8.

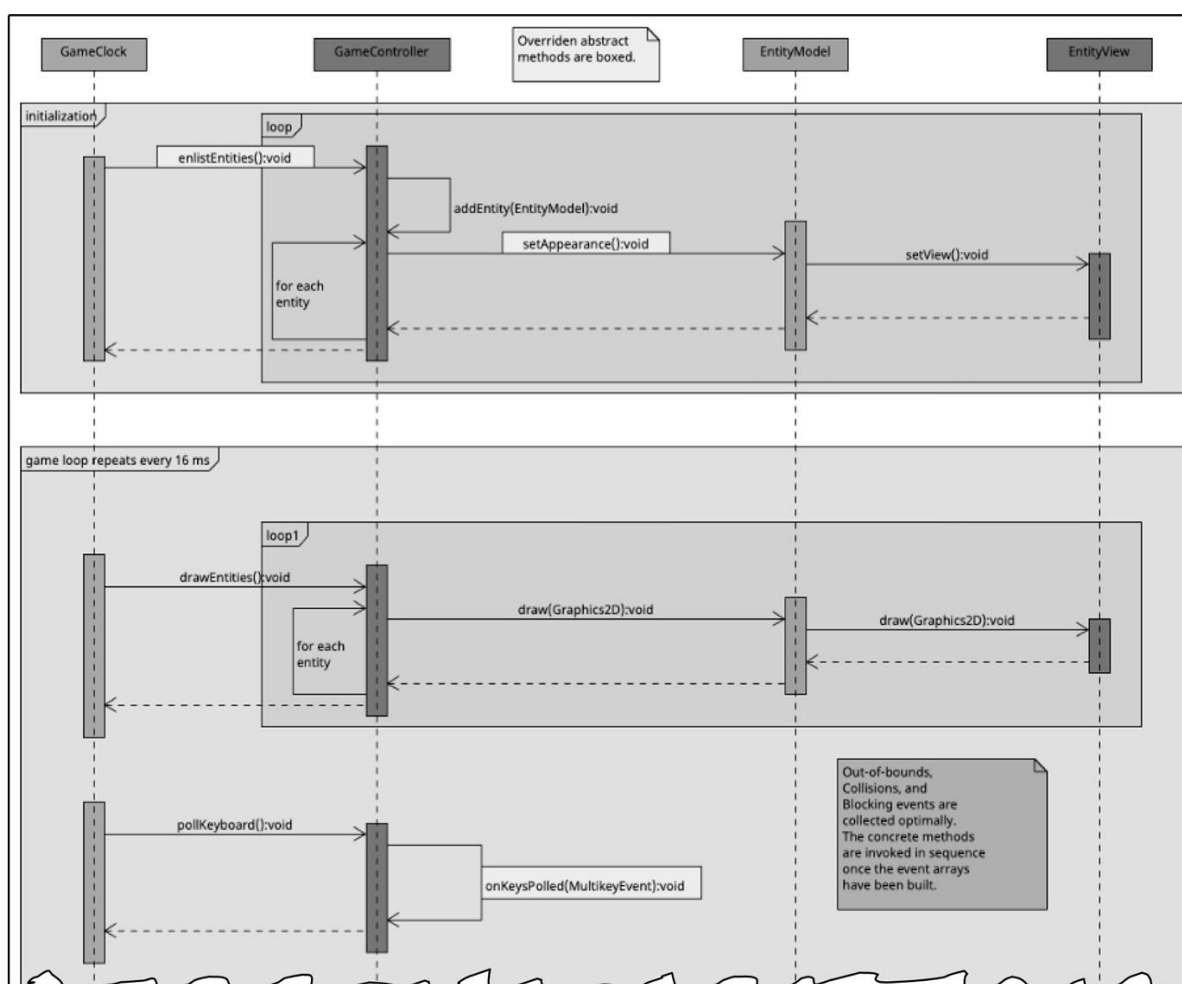


Figure 8. The game-loop sequence: initialization, drawing, and keyboard polling.

The first cycle executed by the timer activity is unique. It starts off by invoking enlistEntities(), where entities that are to be seen on the screen can be added. When each entity is added, the corresponding setView() method is invoked by the controller. This initialization does not happen subsequently. Once the game loop starts off, the timer activity repeats the sequence of calls.

The game loop executes 60 times every second. It starts off by drawing all entities participating in the game on the screen. While the user is visually processing the screen, the game engine proceeds to poll the keyboard for multiple key presses. The polled keyboard functionality is used specifically for in-game interaction. Being a software polled mechanism, a single keystroke that may last more than the cycle time of the game loop will be detected multiple times. If a single keystroke is to be detected, such as in the case of user-initiated game state changes, the recommended approach is to implement the standard KeyListener provided by Swing.

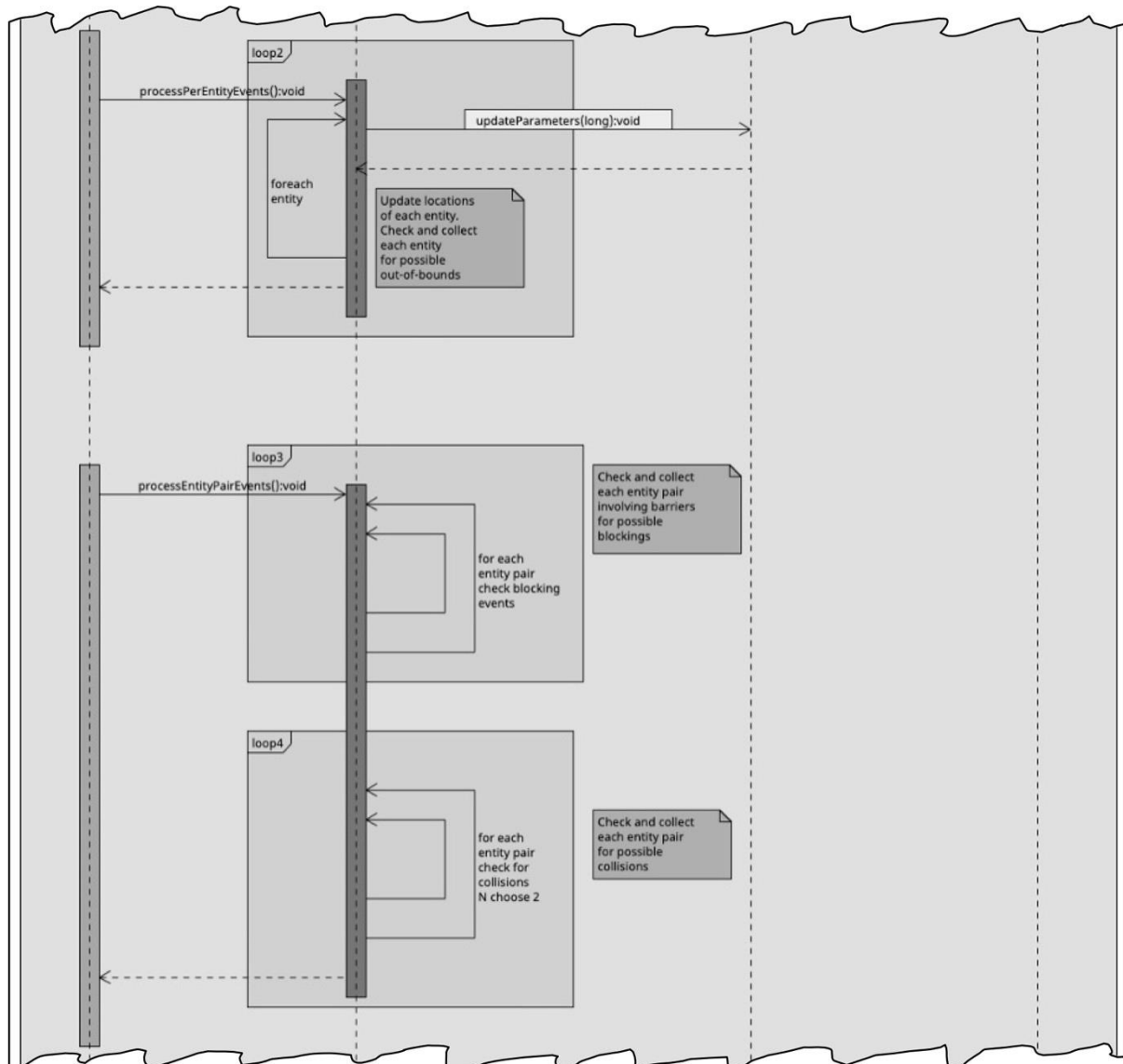


Figure 9. The game-loop sequence: parameter updates, pre-checks on collisions, blocks, and out-of-bounds events.

The next stage of the game loop involves updating the locations of all the entities participating in the frame. This is done by applying the current acceleration and velocity settings to each entity, given their initial locations on the screen. Repositioning the entities on the screen opens the possibility of entities colliding with each other, being blocked by barriers, or straying off the viewport (visual area on the screen). The next steps executed by

the game loop involve detecting these events, collecting the necessary details of each event, and invoking the appropriate overridden methods as shown in Figure 10.

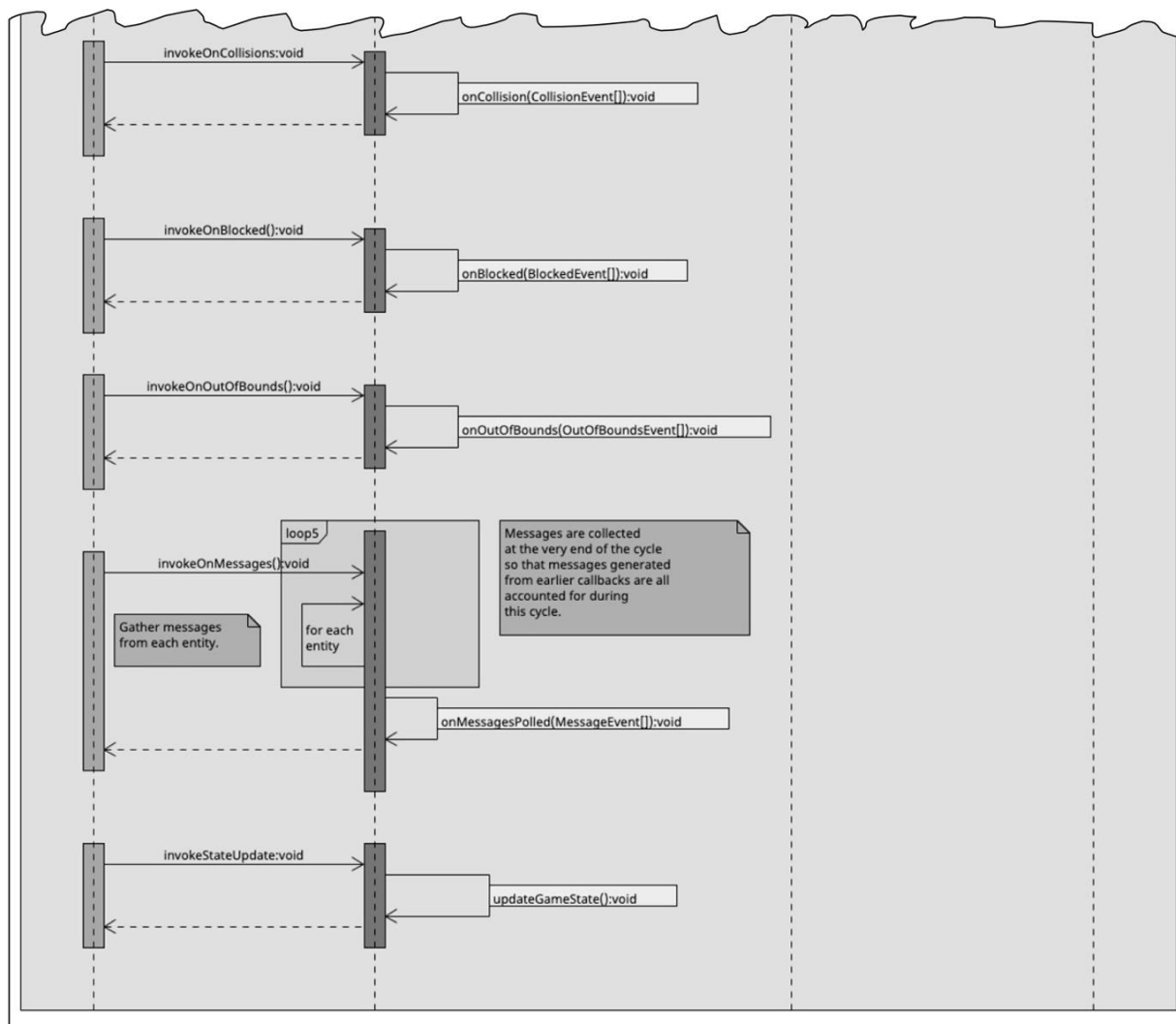


Figure 10. The game-loop sequence: the invocation of overridden methods.

Lesson Methodology

The accompanying lesson plan consisting of seven lessons as shown in Table 1 was designed to introduce the student progressively to the game engine functionality through increasingly complex exercises while requiring them to apply object-oriented concepts as they develop a full-fledged video game.

Table 1. Lesson Plan

Lesson	Game topic(s)	Object-oriented topic(s)
1 Game loop	Game engine design Model View Controller (MVC)	Inheritance, abstract classes, MVC pattern

	Game loop activities	
2 Vector dynamics	Using trigonometry and vector operations to navigate on screen	Event-handling, using an interface
3 Gravity and collisions	Using acceleration and inelastic collisions	Inheritance, abstract classes
4 Guided projectiles	Event-driven creation of entities that follow a defined trajectory	Anonymous inner types
5 Composite movements	More complex interactions	Aggregation
6 State machines	Using a state machine to model a multi-level game	State pattern
7 Executable app	Full Space Aliens game	Polymorphism

The lessons start with simple animations, then delve into simple vector dynamics, game physics, more complex movement and behavior, and state machines. The final lesson is a game that is fully functional and can be run as a stand-alone application.

Results

In an experimental offering of this course using a prototype game engine and lesson plan in the spring of 2022 at Lycoming College, the students built a Space Aliens game, shown in Figure 11, similar to Space Invaders™, that could run on any desktop.

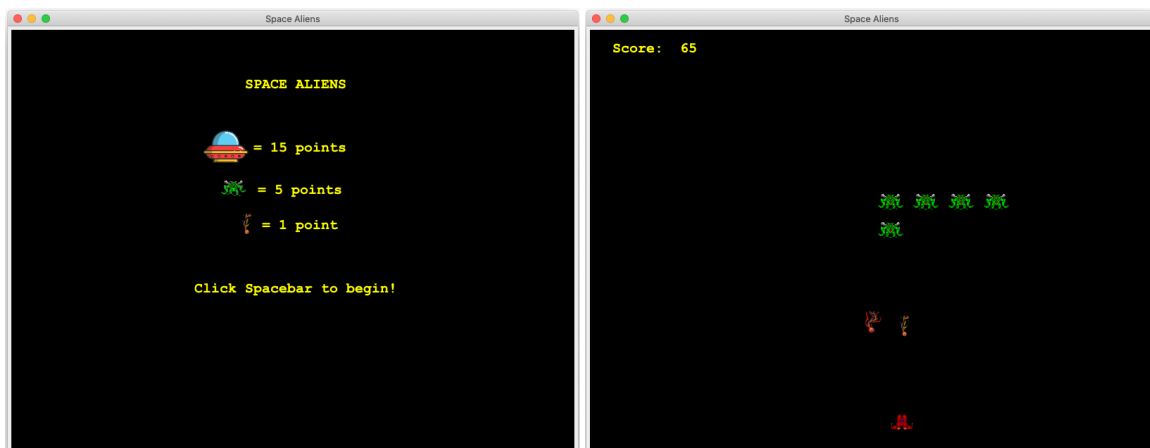


Figure 11. Student game implementation

Upon completion of the experimental course, the class of six students was provided with a questionnaire, and the results are shown in Figures 12 and 13.

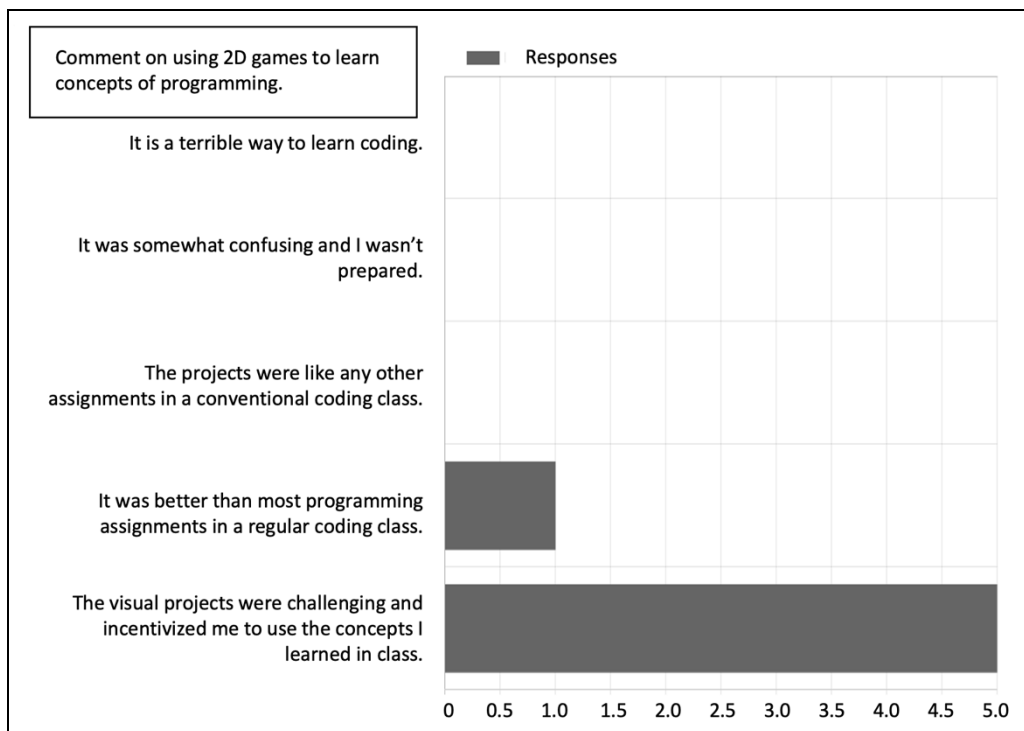


Figure 12. Student responses to 2D Game Design as a medium of learning

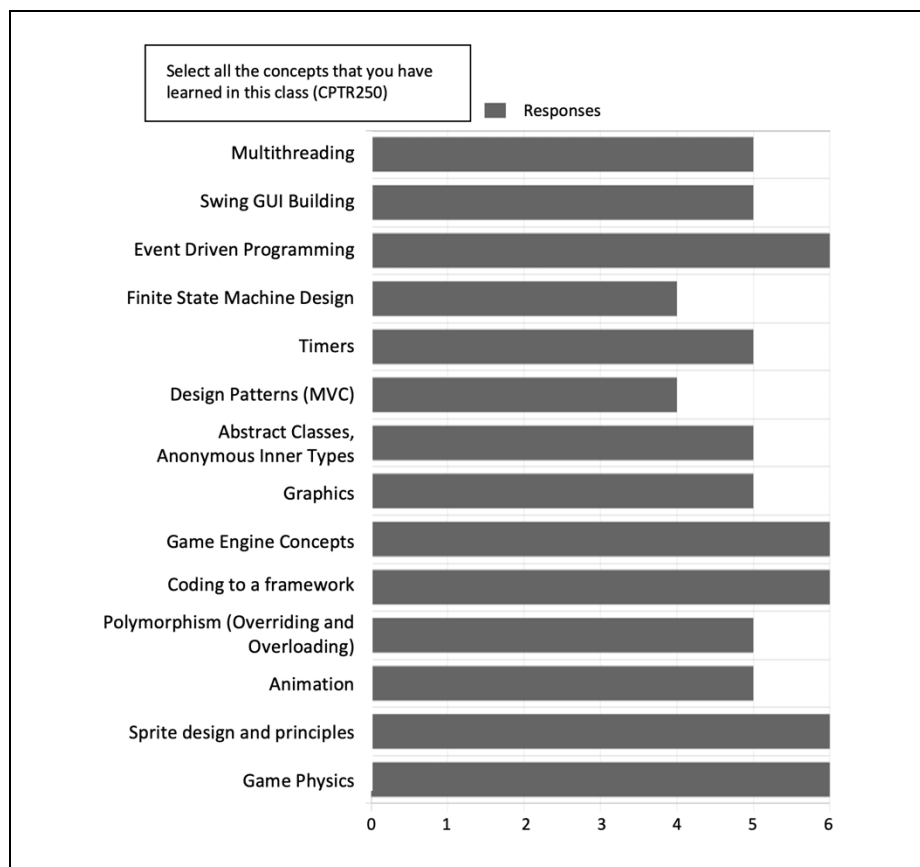


Figure 13: Student responses to concepts learned

Discussion

A majority of participating students found this game-based learning experience challenging and incentivizing. It was also apparent that the game engine-based programming class covered a wide range of topics in software engineering. A majority of participating students found the course informative on event-driven programming, coding to a framework, and the object-oriented concepts of inheritance, polymorphism, interfaces, abstract classes, and anonymous inner types.

These reviews were positive, but the sample size was not large enough for experiments beyond the small observational study. In addition, it is worth noting that the six students in the course had all taken a second-level course in computer programming (CS2). Four of the six participating students were intermediate to advanced-level programmers and as such, the feedback received from the group may not correlate to how a lesser-prepared class might fare.

Conclusion

Game programming with the JetDog engine demonstrates an accessible way to teach object-oriented design topics, perhaps more easily so than other practical problem domains. The game framework was anecdotally shown to be a motivating and effective way of teaching Java. Students were observed to be more engaged and enthusiastic than in traditional Java courses, and students found the course challenging and informative on a variety of software topics. JetDog provides a richer environment than off-the-shelf gaming solutions for practicing coding to a framework, an experience sure to benefit students as they enter the field of software engineering.

Recommendations

Going forward, there is room for augmentation and refinement of the game engine and lesson plan, as well as collaboration with instructors and their students to further evaluate the effectiveness of the JetDog framework as a teaching tool.

The lessons may be expanded to cover more than one final game project. It is observed that students become more creative when the game they are building is something with which they identify. Additional exercises for games similar to Pong™, Asteroids™, and other games would cater to the varying tastes of students as well as provide projects for different semester offerings of the course. Adding grid placement functionality to the game engine, as described in Purewal's framework (2006), would provide students the capability to practice mapped spaces and polymorphism through the implementation of games similar to Minesweeper™, Snake™, or Tetris™. The game engine and lessons may also be improved based on feedback from students and collaborating instructors.

A collaborative study assessing students' ability to apply object-oriented concepts in Java before and after this course would be the next step in the research. Collaboration is sought with instructors having access to larger classrooms (25+ students), who, in exchange for using the game engine and lessons, would administer the necessary assessment instruments required to collect data for further study on the approach's effectiveness. Collaborating instructors' students would have access to a website containing the lessons, instructional videos, schematics, and references for in-depth exploration of the topics. In addition, the game engine framework is supported by detailed hypertext documentation using Javadoc.

Delivery

Delivery of the lessons is an important part of engaging students in an active way. A visual, engaging website will be used for lesson delivery. Each lesson introduces the student to a specific topic through a video, interactive HTML, or simulation content and offers self-test exercises and laboratory challenges to develop their understanding of the concepts. The general format of a lesson is shown in Figure 14.

The screenshot shows a lesson page for "Lesson 1: Game Loop". At the top, there are navigation arrows and the lesson title. Below that is a yellow box with "Learning Objectives":

- Explain the game engine's game loop.
- Create a game controller and a model class.
- Code the callbacks: `enlistEntities`, `setAppearance`, `onCollisionsPooled`, and `onOutOfBounds`.
- Demonstrate the use of inheritance and abstract classes.

The main content area is divided into two sections. The top section, titled "Model View Controller", contains a diagram showing the relationships between Model, View, and Controller. The Model sends "draw entities" to the View. The View "sees" the user. The user provides "keystrokes, clicks" to the Controller. The Controller sends "update entities" to the Model and has a "clock" icon. The bottom section shows a flowchart of the game loop: "draw entities" leads to "poll keyboard", which leads to "update parameters", which leads to "check for collisions", which leads to "check for blocked entities", which leads to "process messages", which leads to "update game state", which loops back to "draw entities". A "The Timer" pop-up explains that the timer goes off every 16 milliseconds (16.67 ms) based on a 60 FPS refresh rate.

On the right side, there are two sections: "Exercises" and "Challenges".

Exercises:

- + Simple Sprite
- + Animated Sprite
- + Bouncing Sprite
- + Colliding Sprites

Challenges:

- + Sprite Lab

Challenge 1E_SpriteLab:

Make two randomly-moving sprites that disappear with a sound when they collide.

Below the challenge is a small video player showing two pink star-like sprites on a black background.

At the bottom right, there is a "More" section with buttons for "MVC", "Callbacks", and "Game Engine In-Depth".

Figure 14. Lesson structure: interactive elements, exercises, challenges, and resource links

Lesson 1, as an example, covers sprite creation and animation. The first exercise in this lesson involves putting a simple sprite on the screen. The next exercises introduce the student to the use of callback methods to make the sprite entity move and bounce off the edges of the screen. Once the student has learned to control the behavior of the entity, the lesson provides more advanced exercises and a challenge, requiring the modeling of two colliding sprites with sound effects.

Early exercises in each lesson are scaffolded with coding hints as shown in Figure 15. The student is provided with a cross-reference to the sequence diagram as shown in Figure 16 so that their code is introduced at the proper state of the game engine. In addition, links to pertinent areas of the Javadoc API are also supplied with each exercise as shown in Figure 17.

```

• Here's a start:

@Override
protected void onCollisionsPolled(CollisionEvent[] events) {
    for (CollisionEvent ev : events) {
        // add your code here
    }
}

@Override
protected void onOutOfBounds(OutOfBoundsEvent[] events) {
    for (OutOfBoundsEvent event : events) {
        switch (event.getEdge()) {
            case North:
            case South:
                // add your code here
                break;
            case East:
            case West:
                // add your code here
                break;
            default:
                break;
        }
    }
}

```

Figure 15. Coding hints

The website may be used in a traditional or flipped classroom mode, in which students have the opportunity to become familiar with the material outside of class and control their learning. In flipped mode, class time can be utilized for live problem-solving, targeted discussion, and interaction based on students' pre-work.

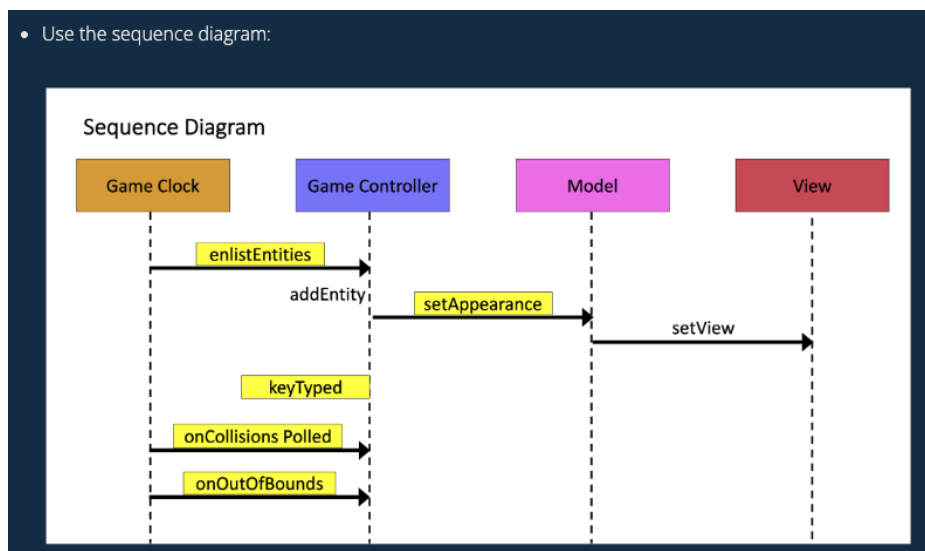


Figure 16. Reference to the applicable sequence diagram

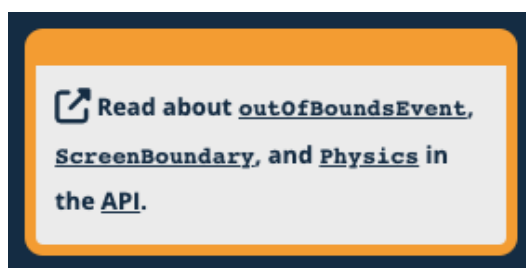


Figure 17. API links

Acknowledgments

Thank you to the students in the spring 2022 CPTR 250 course for their excellent work on the lessons, and their positive feedback. Thanks to the Mathematics Sciences Department for the opportunity to execute a trial run of this course. Thank you to Mavin James for their hard work and dedication in completing their final project and providing valuable feedback.

References

- AP Computer Science A Course – AP Central | College Board.* (2023). College Board Website. Retrieved July 23, 2023, from <https://apcentral.collegeboard.org/courses/ap-computer-science-a>
- Gestwicki, Paul, & Sun, Fu-Shing. (2008). Teaching Design Patterns Through Computer Game Development. *ACM Journal on Educational Resources in Computing*, (Vol. 8, No. 1, Article 2).
- Lagrange point. Celestial mechanics and the three-body problem (2023, July 20). In *Wikipedia*. https://en.wikipedia.org/w/index.php?title=Lagrange_point&oldid=1166264282
- Metaari. (2019). The 2019-2024 Global Game-based Learning Market: Serious Games Industry in Boom Phase.

Serious Play Conference (August 1, 2019).

Purewal, T. S., & Bennett, C. (2006). A framework for teaching polymorphism using game programming.

Consortium for Computing Sciences in Colleges: Southeastern Conference, (JCSC 2022, 2 December 2006).

Robocode. (2023, February 26). Robocode Homepage. Retrieved July 23, 2023, from <http://robocode.sourceforge.io>


The Folding@home Consortium (FAHC). (2023, July 25). *Start Folding – Folding@home*. Retrieved July 25, 2023, from <https://foldingathome.org/>

The most powerful real-time 3D creation tool- Unreal Engine. (2023). Unreal Engine Homepage. Retrieved July 23, 2023, from <https://www.unrealengine.com/>

Unity Real-Time Development Platform | 3D, 2D, VR & AR Engine. (2023). Unity Homepage. Retrieved July 23, 2023, from <https://unity.com/>

Higher Education in the 21st Century: Between Depression and the Longing for Joyle

Jesús Enrique Beltrán Virgüez

Corporación Universitaria Minuto de Dios, Colombia,  <https://orcid.org/0000-0003-3144-3720>

Abstract: This paper analyzes depression in university students as a natural reaction to a closure of the possibilities of encountering their own self. A philosophical analysis is carried out with that in mind, based on phenomenology, resorting to the notion of poverty presented by Martin Heidegger in his 1945 seminar and to the foundations of existential analysis, as well as Byung-Chul Han's proposal on the society of tiredness. A case study of university students using the Beck Depression Inventory (BDI-2) is then presented to contextualize the problem and the performed analysis. The results propose another perspective of depression from an existential point of view coming from the effect of facing the banality of contemporaneity, in which the current university, as an institution aligned with the world's technical availability, restricts man's possibility of a sublime relationship with that which surrounds him, rejecting the possibility of finding a meaning in life within an authentic relationship that is coherent with his original openness. Finally, it is concluded that universities need to focus their actions on a process aimed at individuals encountering their own being, as the most appropriate way to satisfy the yearning for joy of young vitality.

Keywords: Depression, poverty, university, phenomenology, banality

Citation: Beltrán Virgüez, J. E. (2023). Higher Education in the 21st Century: Between Depression and the Longing for Joyle. In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023-- International Conference on Social and Education Sciences* (pp. 109-124), Las Vegas, NV, USA. ISTES Organization.

Introduction

“In our time, a large part of the people lives in a state of insensitivity and apathy. Delicate spirits painfully feel the impact of our ways of life and are inhibited in the face of actuality” - Hermann Hesse.

This work found its inspiration in Hermann Hesse's text, “On Little Joys.” There is the question of whether or not using the term “inspiration” is still lawful nowadays, given the course of this society thrown into immediacy (Vázquez & Mouján, 2016), into the masses (Ladevéze et al, 2022) and into technical calculation (Miranda, 2020). Being inspired involves a double academic sin, a matter that distances itself from the modern scientific paradigm, and to be inspired in literature, which is to say in art and the so-called sciences of the spirit that Dilthey (1944) once named. However, Hesse's words on joy, in contrast to the manifest sadness and depression in university classrooms and faculty lounges, call for an analysis that considers the situation students entering

universities face and the mediation they represent regarding their future. In this order, it is necessary to understand a structural background that makes students susceptible to depression, which, although it is a health problem, is above all a natural search for meaning in young spirits.

Depression

Several authors agree on something that seems obvious at first glance: depression is a problem, whether a psychological (Baños-Chaparro 2023) or public health problem (Del Cid, 2021). It is well known that depression has become a recurrent diagnosis and been on the rise since the 1970s, when it was barely part of the inventory of mental illnesses (Obaid & Albagli, 2020), despite being considered one of the most significant and severe psychiatric disorders among the world's population (Korman & Sarudiansky, 2011). According to the World Health Organization (WHO, 2017) 5% of the world's adult population suffers from depression. However, part of the problem is the very understanding of what has been considered and called depression, as well as the difficulty and alternatives for diagnosing it in different types of populations (Sanz & García-Vera, 2020).

The WHO (2017) refers to depression in plural terms, presenting it as depressive disorders characterized by sadness, loss of interest or pleasure, feelings of guilt or low self-esteem. It also includes sleep or appetite disorders, tiredness and lack of concentration. Along a line that is not radically different, the American Psychological Association's DSM-5 Diagnostic Criteria Reference Guide (2014) focuses its points on very similar aspects. In short, depression includes, like any disorder, an abnormal process in the expected development of an individual's connection with their usual environment. According to the Eleventh revision of the International Classification of Diseases (ICD-11) of the World Health Organization (2019), a mental disorder is defined as a clinically significant disturbance that can be observed in three aspects: cognition, behavioral and emotional regulation. This opens the spectrum in many directions, converging in an alteration, as a state of abnormality.

According to Castellanos-Meza et al. (2020), depression usually begins in adolescence, which is the time in which students transition between high school and university, and the environment for the presence of the disorder is fertile. This makes these conditions much more relevant during the first years of university (Obregón-Morales et al., 2020). University students experience depression, more so than one would like to acknowledge.

In accordance with Hart (2018), depression is more present in university students than in the general population. In terms of academic programs, greater emphasis has been placed on the presence of depression in medicine. However, it is also true that there are a greater number of studies on this population. In sum, depression is considerably present in universities, which requires attention and in-depth consideration (Alpi & Bechara, 2020).

Depression and Phenomenology

Depression, as is well known, is a study and treatment subject, mainly in psychology, although it has background can be traced with similar characteristics from those of the contemporary description to those of ancient Greece. The interpretation of the phenomenon has been enriched by multiple perspectives, some of them with anthropological, sociological or political elements, expressed, for example, mundanely (Moreira, 2007), in which the concept of the world becomes fundamental in its understanding. The term has been recognized for its centrality and importance in the phenomenological tradition (Fink, 1957). However, not because they utilize the concept, the perspectives correspond to phenomenology in the traditional sense of the construction by Husserl (1900) in logical investigations.

Thus, different approaches to the phenomenon of depression are found in the literature, with important nuances related to phenomenology. Evidently, one of the authors who focused specifically on the approach to depression was Jaspers (1956), who, in his first edition of *General Psychopathology* in 1913, referred directly to the link between the phenomenological perspective and depression. In this book, Jasper focuses his efforts on characterizing the symptoms of depression, some of which are still characteristic in the understanding of the phenomenon, such as lack of interest, sadness and hopelessness. However, Jaspers makes a leap towards understanding depression as an existential reaction to the absence of meaning in life. This position defines depression as a complete loss of hope and assigns three causes: loss of meaning, loneliness and perceived worthlessness. In a strict sense, depression occurs as a negative perception of existence. Jaspers also develops indications on depression found in his correspondence with Hannah Arendt between 1926-1969 (Köhler & Saner, 1985)

at the end of the 1920s, in the field of the so-called existential phenomenology psychiatry. The studies of Professor Straus (1960) in his text “The Experience of Time in Endogenous Depression and in the Psychopathic Disorder” show an explanatory connection between time and depression as early as 1928, the date of its first publication, associating the experience of time as being particularly different in a depressed and a healthy individual. The relationship focused on the way the passing of time was experienced. The depressed individual felt incapable of perceiving the passage of time, assuming a time without present, past or future; a sort of stagnation.

Another primary reference in psychiatric phenomenology was Viktor E. von Gebattel (1952) in “Compulsive Thought Relating to Time in Melancholia,” first published also in 1928. In this position, he focuses on showing how depression is a relationship with time in which the individual falls into a condition of timelessness, very close to that which was proposed by Straus (1960). The depressed individual faces a relationship with time in which they feel imprisoned in a specific moment, freezing continuity, making them feel despair and a loss of patience and hope. For Gebattel, time is the interpretative key to depression.

Some of the most representative authors on depression with a phenomenological perspective are Binswanger (1975) and Medard Boss (1963), who particularly included a considerable influence from Martin Heidegger's phenomenology (Kahlmeyer-Mertens, 2022; Morgan, 2022), who will be one of the pillars of this work, in their positions. Binswanger and Medard Boss assumed the concept of being-in-the-world borrowed from Heidegger to contextualize depression. Binswanger (1975) defines depression as an impairment of the structure of meaning of being-in-the-world, as a person's experience of the world and others deteriorates. Deep down, it is a loss of meaning that overwhelms an individual's being. In order to develop his proposal, this author uses the concept of "vital space," understanding it as the space of an individual's existential relations with the world, which becomes narrower as the individual becomes depressed.

Along the same line, Medard Boss (1963) takes the concept of the world and the Heideggerian category of Dasein to sort the phenomenon of depression, identifying the existential character of depression with several factors in his study. The body and the notion of authenticity play a fundamental role in understanding depression. The body becomes a central element, to the extent that it displays another dimension to be considered in terms of depression, since depression manifests itself in the victim's body. This demonstrates the need to identify physiological aspects the affected individual experiences, such as tiredness, agitation, heaviness, and others. In turn, authenticity, which is considerably valuable for this work, manifests itself as a cause of depression.

In this sense, the lack of coordination between an individual's deepest feelings and the reality they experience has an impact in terms of a considerable impairment in affection. This perspective pursues a discovery of meaning and a resignification of a person's relationship with the world as an alternative way out of depression. In the phenomenological perspective, depression becomes a relation of being-in-the-world, primarily in a sense of how human beings relate to the world of life.

The Present-day University and its Characteristics

The current conditions of universities have left their past, which they have no intention of knowing, nor remembering, and let alone reflecting upon. Notions, such as Paideia, once expressed by the Greeks, as expressed by Heidegger himself (2004), are just nostalgia for a time that is already over. The same is true of Bildung, archived on the shelves of university libraries, far removed from the current animosity of "academia," which is governed by the technical needs and requirements of the productive apparatus. As Heidegger (2015) stated, "Now all possible and impossible tasks are foisted upon the university, and it is burdened by them. However, the task of education for knowledge, as the single and specific thing that belongs to this school, is only taken care of, if carried out at all, incidentally" (p. 106).

Some of the statements Heidegger makes about the German university have an intimate resonance with the reality of the Colombian university, although his sentences date back to the 1930s. The university's activity has been reduced to supplying the economic model and, thereby, the productive activities of diverse and qualified

workers, whether to perform science for production or to organize the production system more efficiently. Perhaps it is necessary, as Carbajales (2022) points out, to go back to the past for the university to still have something to say and offer. Such is the logic in which society and universities meet, in which influencers have a greater impact, are more widely recognized, and are drivers of more inspiration than those who used to be recognized as intellectuals (Cuadra, 2021).

The university is presented as a mechanism through which to achieve wealth and success, “to become someone in life.” The present day university is evidence of the abandonment of the notion of training in its traditional sense, and it has focused on instruction for economic work (De Sousa Santos, 2009), regardless of the academic program. Naturally, it has put more emphasis on some programs in the field of business, administration, economics and related fields. The criteria of wealth, success and prosperity are the driving forces of their existence. The crisis of education has been caused by this oblivion and distancing from the primary origin of education, which referred to a higher and sublime purpose, towards a primacy of immediacy (Rubio & Heredia, 2023).

Method

The study focused on two methodological stages with a qualitative approach. It began with a hermeneutic phenomenological analysis of depression in university students, and a second stage that included a survey with 75 undergraduate students in business administration and related fields, who participated voluntarily in the study, applying a form that corresponded to the Beck Depression Inventory (BDI-2). The survey was preceded by an informed consent form explaining how the information would be used, as well as the intention of the study and its management.

The phenomenological hermeneutic analysis begins from the interpretative contextualization of the phenomenon’s structure. In this order, it focuses on interpreting and understanding the meanings and underlying structures of the human experience (Fuster Guillen, D. E. 2019) of depression. In this sense, the aim is to find the fundamental structure of depression, to understand how it manifests itself in university students. With that in mind, it should facilitate an interpretation that reflects the characteristics of the phenomenon and the context in which it occurs. This interpretation is made taking into consideration the previous interpretations of the context and human reality by Heidegger and Byung-Chul Han in their proposals of analysis corresponding to the context of the phenomenon, as well as the forms assumed by the university institution and its guidelines.

The survey facilitates a preliminary contextualization of the presence of depression or some of its characteristics in the students who voluntarily agreed to participate in completing the form. The Beck Depression Inventory (BDI-2) is a diagnostic tool designed to identify the severity of symptoms of depression in the adult and adolescent population (Maldonado-Avenidaño, et al. 2021).

The BDI-2 is comprised of 21 items that assess dimensions of depression, such as sadness, self-criticism, loss of interest, fatigue, difficulty sleeping and appetite. Each section is composed of a series of assertions each person must evaluate according to the frequency with which they experience the symptoms. Responses are scored on a scale of 0 to 3, depending on the severity of reported symptoms. The total score is obtained by adding each item's scores, which provides an overall score ranging from 0 to 63. Higher scores indicate a greater severity of symptoms of depression. (Sánchez-Villena & Cedrón 2019).

Results

Wealth and Poverty

Martin Heidegger, in 1945, after experiencing a series of unfortunate and catastrophic events that affected his life, that of his students, professors and millions of people. In addition, his concern was what would happen to him and the university with the end of the war, in the midst of a small group of students and professors who accompanied him and in the context of the defeat of the National Socialist party and its intentions to rule the destiny of the world. The controversial professor gave a seminar on poverty (Armut) when the war ended, perhaps as a sign of the thought of recognizing how the banality of the technical system eventually manages to bend even the most cautious genius.

The seminar, as is well known, begins with a sentence by Holderlin, which is always worth remembering: "Among us, everything is focused on that which is spiritual; we have become poor in order to become rich" (quoted in Heidegger, 2006. p. 93). Heidegger developed his seminar based on this sentence, focusing on the fundamental concepts to understand the indication: spirit, need, wealth and poverty. However, poverty has an almost immediate connection to joy. It is therefore interesting to identify the structural links between poverty and joy according to the perspectives presented by Heidegger.

The first necessary step to understand poverty in the perspective he presented comes back against the paradigms of science. The term spirit takes on a primary role in Heidegger's interpretative intention. The spirit is framed in a relationship between man and that which surrounds him. This is not just any relationship, but a sublime relationship (Heidegger, 2006). While it is not a primarily material relationship based on the utility and necessity of man in relation to the objects that surround him, the German thinker makes a clarification, indicating that it is not a subject - object relationship. That which is spiritual, or what concerns the spirit, is centered on the opening structure: "In that which is open, this relation of Being with the essence of man, we make the experience of the 'spirit' he is that which he governs from Being and, probably, for Being." (Heidegger, 2006, p. 105).

In paragraph 9 of Being and Time, Heidegger argues that "because Dasein is in each case essentially its own possibility, it can, in its very Being, 'choose' itself and win itself; it can also lose itself and never win itself; or only 'seem' to do so" (Heidegger, 1997, p.68). This indicates that Dasein is cast in the impropriety of average

everydayness and must be win or lose itself, in its everyday perspective, in which it is ontologically cast. Winning itself implies, on the contrary, that Dasein can appropriate itself in the midst of throwing itself away, in the immediate and regular form of “impropriety.” With respect to this point, it is necessary to more precisely contextualize the debate on the conceptual pair “propriety/impropriety.”

The reference to the essence of man's being is obviously important insofar as it is manifested as openness, as entire possibility, in terms of the primary way man is being-in-the-world. This orientation will be decisive for understanding the nature of the psychological, affective and emotional ailments of the contemporary man.

Heidegger (2006), after noticing the importance of spirituality, entered into a central notion regarding the meaning of poverty, being poor, and wealth and being rich. Poverty, in its common consideration, has been related to the absence of goods and things. In the end, a poor person is by definition one who lacks goods and wealth, and poverty includes the ownership of things in its definition (Trawny, 1999). Heidegger (2006) indicates that “In the usual sense (...) poverty is a not-having, or a lack of what is necessary. Wealth is a non-lacking of what is necessary, or a having beyond what is necessary” (p. 107). Poverty, then, is expressed in a privative, negative sense. However, the analysis requires another, more in-depth stage. It is clear that the center of poverty and wealth revolves around what is necessary and unnecessary. Therefore, as has been said, poverty refers to the sphere of that which is unnecessary and poor in its usual understanding is one who lacks that which is superfluous (Trawny, 1999).

Poverty, as expressed above, involves a way of being that does not pertain to what is complete, full and always available; in its structural sense, it has to do with what is possible and open - with finding. In wealth, there is an excess and abundance of that which is unnecessary and superficial. Everything is generally defined; the being-there as an unfolding of possibility. Availability is found in wealth. Therefore, the relationship with the world is defined, there is no discovery, no appropriation, and there is a certain resistance to its original structure of openness. In this sense, poverty corresponds to an existential dimension of discovery based on dwelling in non-necessity; he who is not filled with abundance still has space for himself.

In Spanish, the Spanish Royal Academy (2023) defines poor under six meanings, 1. adj. Needy, of not having what is necessary to live. 2. adj. Scarce, insufficient. 3. adj. Humble, of little value or entity. 4. adj. Unhappy, miserable and sad. 5. adj. Peaceful, quiet and of a good temper and intention. 6. adj. Short of morale and spirit. Only the end of the last definition includes an orientation towards the spirit. In this sense, as has been pointed out, poverty has an evident connotation towards a lack of objects. However, the definition of poor also speaks of unhappiness, misery and sadness, in natural consonance with the absence of belongings.

In short, poverty has two dimensions of analysis: on one hand is poverty in its usual understanding of the material order, which represents a serious economic problem in which people have minimal material difficulties to survive. On the other hand is another form of poverty that has to do with the existential sense. It becomes a virtue to the extent it remains outside the full occupation of the abundance that generates a complete

consummation of man in the possibility of having a more sublime relationship that highlights his ownership and appropriation of that which is fundamental (Sanchez Hernandez, 2019).

Wealth and the Burnout Society

The burnout society described by Han (2022) is the product of a tendency stemming from performance, which leads, as is only natural, to an “overabundance of positivity.” The abundance of activity, always beyond what is necessary and in excess; a society with a wealth of activities, where there is always something to do and always a goal to accomplish. Burnout has a characteristic that Marx (1967) had already observed in, for example, the 1870 letter addressed to Siegfried Meyer and Augustus Vogt, indicating how one of the mechanisms for maintaining bourgeois power is to make sure workers see each other as competition, which ends in loneliness. “The fatigue of the performance society is a fatigue you bear alone (Alleinmüdigkeit), which isolates and divides” (Han, 2022).

This fatigue is a reflection of the insatiable search for efficiency under the promise of a prosperous life and greater wealth, in order to achieve non-necessity. The burnout society is a society of the promise of value, which has been extended in business terms and transferred intravenously to individuals in contemporary societies, fed by the University. This burnout has a particular structure. It is not a fatigue of negativity, but of positivity (Han, 2022), a fatigue that is full. Far from the fundamental fatigue that would somehow lead to the fundamental boredom described by Heidegger (2007), to a possibility of openness in light of the propriety of man's being in view of his calling. Burnout in contemporary society is positively articulated to a complex management system, as one more gear that includes amusements, hobbies, and vacations, all keeping the being trapped within inauthenticity (Baltar, 2020).

Wealth is the basis that sustains the burnout society, as abundance, as a fullness of activities and occupations, as a promise that motivates availability as an occupation. The university plays a very important role here, to the extent, in most cases, it represents the transit towards an immersion with no return into work life and the role of a productive individual, fully entering performance and the race for fortune that never ends (Han, 2018). In this context, poverty becomes an individual's greatest fear: in the described distance, there is something that deeply unites human beings in today's society - the struggle against poverty, in which they detach themselves from any possibility of achieving their own relationship with the world around them.

The Surveyed Panorama

The situation surveyed with a group of 75 students yielded results worth compiling and considering. In that sense, the consolidated responses obtained from the instrument are presented to understand the degree of concern the collected elements may raise.

One of the first elements worth highlighting is that 22.7% of the students who completed the form identified

with the statement of being sad most of the time, followed by an equal percentage of 2.7% for the statements of feeling sad all the time and feeling so unhappy and sad that they cannot stand it. Overall, the percentage of students in the group approached shows that 28% of the students feel some degree of sadness.

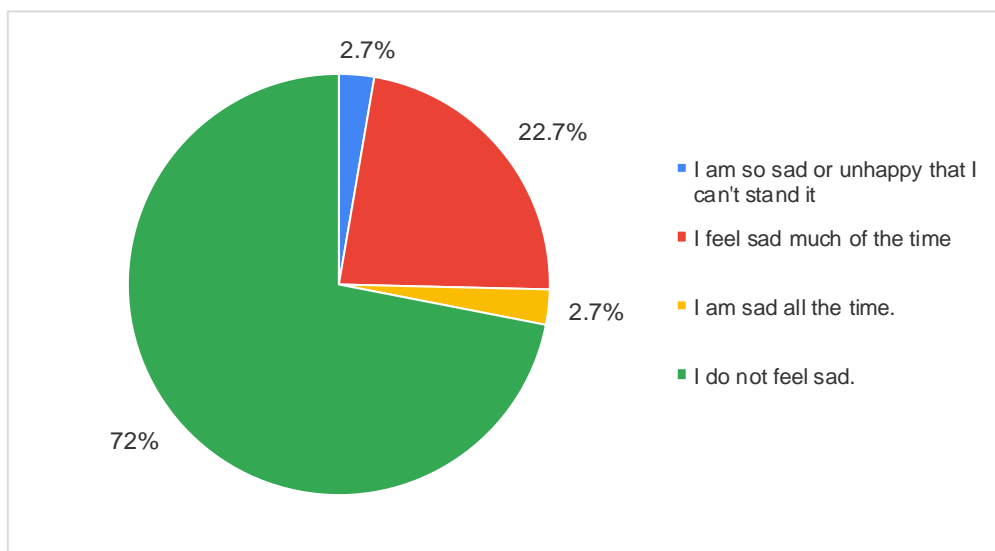


Figure 1. Answers on the scope of sadness

With respect to the other dimensions, there are some disturbing values. With respect to pessimism, another interesting element to analyze is that 37.3% of the students stated they feel more discouraged than they used to feel about their future. Additionally, 6.7% identified with the statement “I don't expect things to work out for me,” while only 1.3% indicated that “there is no hope.” It is worth noting that almost 45% expressed some degree of pessimism.

On the other hand, the trend is maintained with respect to the third item, failure, in which 66.7% of the students stated they do not feel like failures. On the other hand, the following value is represented by 17.3% of those who consider they have failed more than they should have, followed by 13.3%, who identify themselves with the expression “when I look back, I see many failures.” Again, a considerable percentage of students have disturbing feelings regarding failure.

Continuing with the order of the items, the statements on pleasure had even more worrying figures, since the responses that show some kind of decrease in obtained pleasure exceeded 50%. 37.3% stated they do not enjoy things as much as they used to. 16% indicated they get very little pleasure from the things they used to enjoy. This evidently shows that a significant part of the consulted population does not enjoy what they do.

With respect to the feeling of guilt, the collected information indicates that 56% of those consulted said they feel guilty about various things they have done or should have done. This is a considerable figure added to the fact that 6.7% feel quite guilty most of the time.

Another element to highlight is associated with dissatisfaction with oneself, which demonstrates a considerable loss of confidence from the students in themselves. 32% identify with having lost confidence in themselves, and 6.7% feel disappointed with themselves. The above can be connected with self-criticism, which reflects some interesting figures once again. 46.7% indicate being more critical of themselves than they used to be, followed by 17% who stated they criticize themselves for all their mistakes.

When it comes to suicidal desires, the figures fall off somewhat. Only 28% of them have thought about killing themselves, but would not do so, and only 2% indicated they wanted to kill themselves. With respect to crying, the findings reveal a more worrisome picture in that 35% of the students stated they cry more than they used to, followed by a worrying 15% who stated they want to cry but are unable to do so, and another 9% who stated they cry for any little thing.

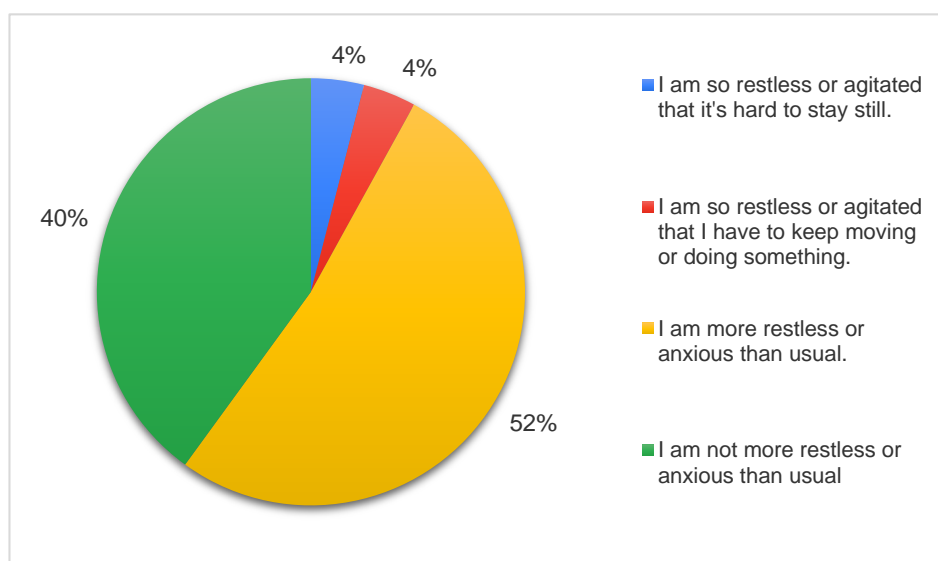


Figure 2. Answers on the scope of agitation

As shown in Figure 2, students perceive themselves as being more restless, tense and agitated. Regarding loss of interest, which had similar figures, 48% of students indicated they are less interested than before in other people or things, followed by 16% who consider they have lost almost all interest in other people or things.

Another element worth highlighting is associated with energy loss. 55% of students reported having less energy than they used to, and 23% reported not having enough energy to do very much. This element is of considerable value in performance analysis, which requires more and more energy consumption every day. This is evidently confirmed by the responses on burnout and fatigue, in which 56% of students stated they get tired and fatigued much more than usual, followed by 11% who stated they are too tired or fatigued to do things they used to do.

As observed, irritability is another significant issue worth paying attention to in terms of what should be considered a factor that can generate multiple behaviors inside and outside of the classroom.

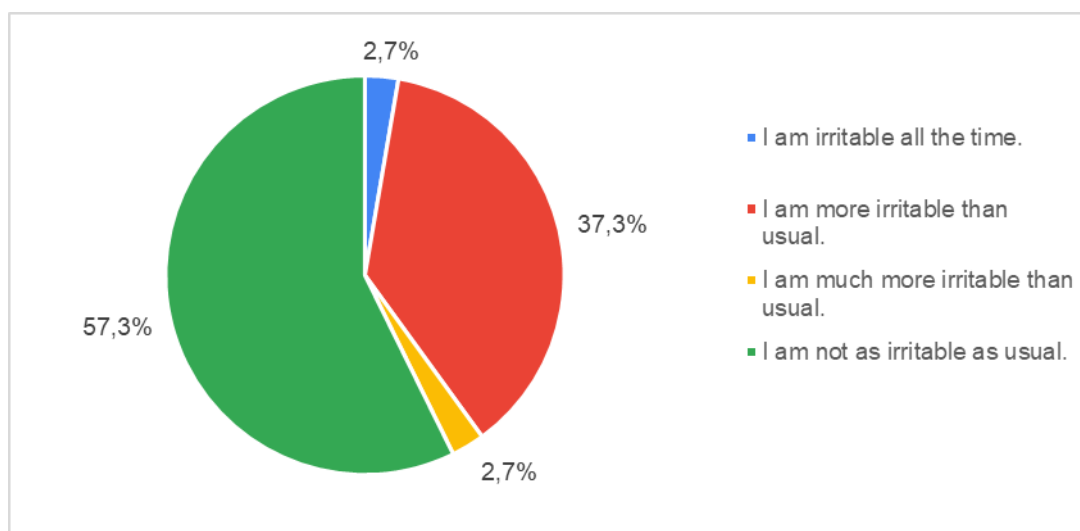


Figure 3. Answers on the scope of irritability

From this core of results, it is worth highlighting the item corresponding to difficulty focusing. 44% of the consulted students showed difficulties focusing. This was followed by 25%, who indicated they find it difficult to keep their mind on something for a long time. The findings in the consulted students lead to identifying various concerns to which universities should pay attention.

Finally, to close this presentation of results, the Beck Depression Inventory (BDI-2) assessment scale establishes 4 levels of depression: minimal, mild, moderate and severe. These were determined according to the count of each one of the 21 responses on the form. Figure 4 shows the consolidation of the levels of depression found in the analyzed students in percentages.

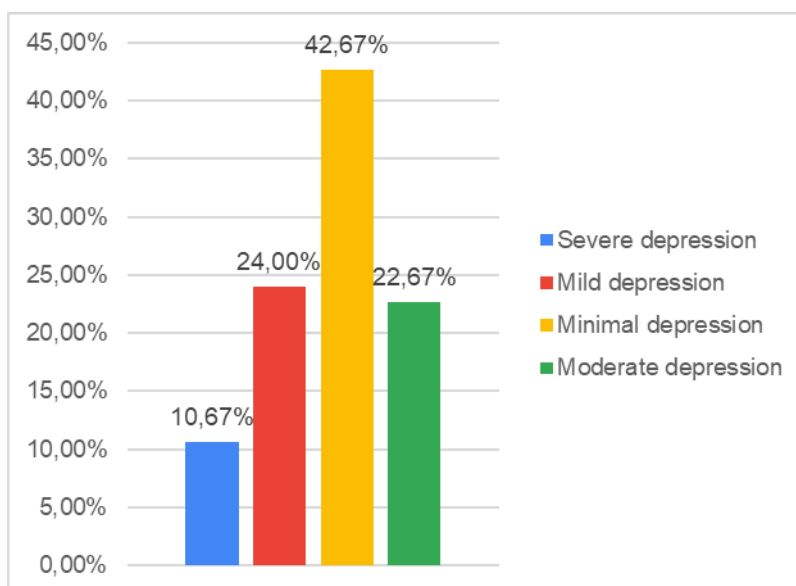


Figure 4: Answers on the scope of irritability.

In sum, 42.6% had minimal depression, 24% had mild depression, 22.6% had moderate depression and 10.6% had severe depression. As can be seen, although it is true that almost half of the studied population does not show concerning symptoms, there are some figures distributed with different symptoms that are worthy of more attention and development.

Discussion

Depression, as is only natural, has been understood in a purely pathological context and according to its content within the framework of its usefulness, or rather its obstruction to usefulness, which is determined in terms of a human being's capacity to remain anchored in normality. It is mainly understood as being accustomed to the present way of life in each historical moment. It is a psychological disorder that gets treated as a disease and primarily prevents people from behaving normally according to the standards, acting irritable, isolated, anxious, pessimistic, among other behaviors (Del Cid, 2021). With that in mind, depression is understood as something negative, since it represents a factor that stops individuals from being linked within the gears of what is available, on an occupational, social and affective level, as pointed out by Ozkan et al. (2015).

According to the conducted analysis, in addition to the negative effect depression has on the social and occupational development of individuals, it is necessary to understand what can cause the onset of symptoms and depression in young people who are beginning to discover their future. Along this line, depression results in a resistance mechanism that manifests itself in a structural way, as a reaction to the loss of meaning and distancing from one's own self. Depression is framed in the sense expressed by Heidegger (2006) as poverty, in the sense that students, due to their degree of original sensitivity, have a greater capacity to resist the current that submerges their existence in a pre-determined world.

The banality expressed in the different dimensions of the contemporary world can be understood in the scope presented by the phenomenological tradition of depression as a reaction to the loss of meaning in one's relationship with the world (Jasper, 1956; Straus, 1960; Binswanger, 1975). However, the fundamental key to understand this rupture in the contemporary world is expressed in the banality of the burnout society, as it is presented as a constituent of loss of meaning. In this way, what is understood as depression in a negative sense can be interpreted as a reaction, which, if overcome as a state of reactive openness to the contemporary outlook on life, can generate greater possibilities of those who can traverse this original state of the search for meaning achieving genuine joy. This reaction, with the nuance expressed in this paper, presents a return to phenomenology in its more ontological than psychological sense, which is interpretation.

The general conceptions of the state of depression are recurrent in several authors, which shows that depression and its proximity to stress and anxiety are phenomena that are negative for people's health, since they can disrupt individuals' development, as expressed by Ali Ahmed and Çerkez (2020). Overall, approaching depression with a phenomenological view on the existential structure of human beings includes a complement to

the developed views in terms of understanding depression in an educational context from a perspective that questions the work and responsibility of education in this phenomenon.

Conclusion

Depression is a very important phenomenon in the world's reality - much more so when it comes to young people. Depression should be considered not exclusively as the negative result of an illness, but as a structural existential reaction that guides an individual towards a sublime and original encounter with the world. In this understanding, a depressed young person is not primarily sick, but existentially sensitive. In that order, they are closer to finding authentic joy than those who find themselves lost in the transitory comfort provided by banality.

Depression in the burnout society can be understood in light of the concept of poverty expressed by Martin Heidegger, alternatively considering abundance, success and wealth as elements that consume an individual and remove them from a genuine relationship with their most proper being. This leads them to agitation and fatigue in depression.

According to the surveyed scenario, the levels of emotional deterioration in students indicate that the problem of depression should at least be considered as a need for continuous characterization, in order to prevent reaching critical states that could lead to situations, such as suicide. Naturally, this responsibility falls on educational institutions.

Finally, establishing a new way of relating to depression in terms of its ontological understanding will make it possible to explore new forms of treatment that involve elements more akin to training in its traditional sense than to instructional intervention, anchored in the burnout society and making the yearning for joy more visible.

Recommendations

The formative environments of higher education need to be continuously enriched with multidisciplinary perspectives that favor understanding the reality of the academic community from various nuances. It is necessary to encourage developing research perspectives that delve deeper into the psychological and psychosocial aspects of students and the general academic community in terms of higher education.

More qualitative research is required to delve deeper into the reality of the different university programs, in order to contribute to understanding the population's needs and universities to be able to aim their activities at addressing their particular reality. In this way, it is necessary for universities to establish surveys and mechanisms to identify depression in their institutions and, according to their particular findings, establish strategies to take advantage of the conditions expressed by the students and give a direction to the discovery of

meaning that helps them find joy.

References


- Ali, S., & Çerkez, Y. (2020). The Impact of Anxiety, Depression, and Stress on Emotional Stability among the University Students from the view of educational aspects *Propósitos y Representaciones*, 8 (3). <http://dx.doi.org/10.20511/pyr2020.v8n3.520>.
- Alpi, S. V., & Bechara, A. O. (2020). Variables asociadas a la ansiedad-depresión en estudiantes universitarios. *Universitas Psychologica*, 19. <https://doi.org/10.11144/Javeriana.upsy19.vaad>
- Baltar, E. (2020). Nothingness, boredom and technology: Heidegger's reflections on nihilism *Diferenz*, (6), 11-30. <https://doi.org/10.12795/Diferenz.2020.i06.01>
- Baños-Chaparro, J. (2023). Explorando los factores de riesgo de la depresión: un análisis de red. *Revista Colombiana de Psiquiatría*. <https://doi.org/10.1016/j.rcp.2023.01.005>
- Binswanger, L. (1975). Being-in-the-world. Selected papers (J. Needleman, Trans.).
- Boss, M. (1963). *Psychoanalysis and daseinsanalysis* (L. B. Lefebvre, Trans.). New York: Basic Books.
- Boss, M. (1979). *Existential foundations of medicine and psychology* (S. Conway, & A. Cleaves, Trans.). New York: Jason Aronson.
- Carbajales, M. (2022). The university of the 21st century. back to the past. [la universidad del siglo xxi volver al pasado] *Human Review. International Humanities Review / Revista Internacional De Humanidades*, 11 [doi:10.37467/revhuman.v11.3817](https://doi.org/10.37467/revhuman.v11.3817) <https://doi.org/10.37467/revhuman.v11.3817>
- Castellanos, R. M., & Peña, D. N. (2007). El desarrollo de las organizaciones del siglo XXI: ética, responsabilidad social, gestión de la diversidad y gestión del cambio. *Especial directivos*.
- Castellanos-Meza, F. A., Rodríguez-Carrillo, M. A., & Rodríguez-Ramírez, M. E. (2020). Depresión y rendimiento académico: propuesta del Perfil Institucional de Riesgo Académico por Depresión. *Revista de Educación y Desarrollo*, 54, 53-61.
- Cuadra, Á. (2021). Universidad y pensamiento crítico: intelectuales e influencers. *Re-presentaciones. Periodismo, Comunicación y Sociedad*, 5(15), 83-101. <https://doi.org/10.35588/rp.v1i15.5094>
- De Sousa Santos, B. (2009). La universidad en el siglo XXI. Para una reforma democrática y emancipadora de la universidad. *Mientras Tanto*, (110/111), 27-51.
- Del Cid, M. T. C. (2021). La depresión y su impacto en la salud pública. *Revista médica hondureña*, 89 (Supl. 1), 46-52. <https://doi.org/10.5377/rmh.v89iSupl.1.12047>
- Dilthey, G. (1944). *Introducción a las ciencias del espíritu*. Tran. Eugenio Imaz. Mexico: Economic Culture Fund.
- Fink, E. (1957). *Curso sobre los conceptos filosóficos fundamentales: ser-verdad-mundo*. Anuario de Filosofía. Faculty of Humanities and Education. Univ. Central de Venezuela.
- Fuster Guillen, D. E. (2019). Qualitative Research: Hermeneutical Phenomenological Method *Propósitos y representaciones*, 7(1), 201-229. <https://doi.org/10.20511/pyr2019.v7n1.267>

- Gebsattel, V. E. (1954). *Prolegomena einer medizinischen Anthropologie: Ausgewählte Aufsätze*. Springer.
- Han, B. C. (2018). *The Agony of Eros* (2nd edition): Prologue by Alain Badiou Herder Editorial.
- Han, B. C. (2022). *The Burnout Society*. Herder Editorial.
- Hart, B., Lusk, P., Hovermale, R., & Melnvk, B. (2018). Decreasing depression and anxiety in college youth using the creating opportunities for personal empowerment program (COPE). *Journal Psychiatry Nurses Association*, 25(2), 89-98. <https://doi.org/10.1177/1078390318779205>
- Heidegger, M. (1997) *Ser y tiempo*. (Rivera, Jorge Trad.) Chile: Editorial Universitaria. (Original work published 1927).
- Heidegger, M. (2004). *¿Qué es filosofía?* (Tran. J. A. Escudero). Barcelona: Herder
- Heidegger, M. (2007). *The Fundamental Concepts of Metaphysics: World, Finitude, Solitude*; [Freiburg course, winter semester 1929-1930]. Alianza.
- Heidegger, M. (2006). *La pobreza*. Tran. Agoff, I Madrid: Amorrortu.
- Hesse, H. (2021). *On Little Joys*. Alianza Editorial.
- Jaspers, K. (1993). *Psicopatología General*, 3rd. Edition, Ed. Beta, Buenos Aires.
- Kahlmeyer-Mertens, R. S. (2022). Dos interpretaciones de la angustia: Heidegger & Boss. *Aoristo-International Journal of Phenomenology, Hermeneutics and Metaphysics*, 5(2), 199-209. <https://doi.org/10.48075/aoristo.v5i2.29838>
- Köhler, L., & Saner, H. (1985). *Hannah Arendt–Karl Jaspers. Briefwechsel*. München: Piper.
- Korman, G. P., & Sarudiansky, M. (2011). Theoretical And Clinical Models For The Conceptualization And Treatment Of Depression. *Subjetividad y procesos cognitivos*, 15(1), 119-145.
- Ladevéze, L. N., Barrio, T. V., & Canal, M. N. (2020). The Transition to Global Liquid Modernity: The Revolt of The Masses in The Undefined Neighborhood Arbor, 196(797), a568-a568. <https://doi.org/10.3989/arbor.2020.797n3005>
- Maldonado-Avenidaño, N., Castro-Osorio, R., & Cardona-Gómez, P. (2021). Propiedades psicométricas del Inventario de Depresión de Beck-II (BDI-II) en población universitaria colombiana. *Revista Colombiana de Psiquiatría*. <https://doi.org/10.1016/j.rcp.2021.08.007>
- Marx, C; Engels, F. (1967), *On Colonialism*. Moscou, Editorial Progreso.
- Miranda, A. L. (2020). O cálculo e o risco: Heidegger e Beck. *Kriterion: Revista de Filosofia*, 61, 73-97. <https://doi.org/10.1590/0100-512X2020n14504alm>
- Moreira, V. (2007). Significados posibles de la depresión en el mundo contemporáneo: Una lectura fenomenológica mundana. *Psyche*, 16(2), 129-137
- Morgan, A. (2022). *Being-in-the-World*. In *Continental Philosophy of Psychiatry: The Lure of Madness* (pp. 131-162). Cham: Springer International Publishing.
- Obaid, F. P., & Albagli, R. D. L. F. (2020). A critical analysis of debates on grief and depressive disorder in the age of the Diagnostic and Statistical Manual of Mental Disorders. *Salud colectiva*, 15, e2319. <https://doi.org/10.18294/sc.2019.2319>
- Obregón-Morales, B., Montalván-Romero, J. C., Segama-Fabian, E., Dámaso-Mata, B., Panduro-Correa, V., & Arteaga-Livias, K. (2020). Factores asociados a la depresión en estudiantes de medicina de una universidad peruana. *Educación Médica Superior*, 34(2).


- World Health Organization. (2018). ICD-11. International Classification of Diseases (11th revision). Retrieved from <https://icd.who.int/es>
- Ozkan, A., Ozdevecioglu, M., Kaya, Y., & Koc, F. Ö. (2015). Effects of mental workloads on depression-anger symptoms and interpersonal sensitivities of accounting professionals/Efectos de la carga mental del trabajo en los síntomas de depresión-ira y en la sensibilidad interpersonal de los profesionales de la contabilidad. *Revista De Contabilidad*, 18(2), 194-199. Retrieved from <https://www.proquest.com/scholarly-journals/effects-mental-workloads-on-depression-anger/docview/1746922362/se-2>
- Real Academia Española: Diccionario de la lengua española, 23rd ed., [version 23.6 online]. <<https://dle.rae.es>> [April 27, 2023].
- Rubio, D., & Heredia, M. (2023). ¿En qué consiste la crisis de la educación? *Praxis & Saber*, 14(38), e15105. <https://doi.org/10.19053/22160159.v14.n38.2023.15105>
- Sánchez Hernández, F. X. (2019). De la pobreza como problema a la pobreza como virtud. *Veritas*, (44), 69-88.
- Sánchez-Villena, A. R., & Cedrón, E. F. (2019). Análisis factorial exploratorio del Inventario de Depresión de Beck (BDI-II) en universitarios cajamarquinos. *Interacciones. Revista de Avances en Psicología*, 5(3). <https://doi.org/10.24016/2019.v5n3.177>
- Straus, E., & Straus, E. (1960). Das Zeiterlebnis in der endogenen Depression und in der psychopathischen Verstimmung. *Psychologie Der Menschlichen Welt: Gesammelte Schriften*, 126-140.
- Trawny, P. (1999). Die Armut der Geschichte. Zur Frage nach der Vollendung und Verwandlung der Philosophie bei Heidegger. Friedrich-Wilhelm von Herrmann zum 65. Geburtstag. *Zeitschrift für philosophische Forschung*, (H. 3), 407-427.
- Vázquez, C., & Mouján, J. F. (2016). Adolescencia y Sociedad-La construcción de identidad en tiempos de inmediatez. *PSOCIAL*, 2(1), 38-55.
- World Health Organization. (2017). Depression and other common mental disorders: global health estimates (No. WHO/MSD/MER/2017.2). World Health Organization.
- World Health Organization. (2019). International Classification of Diseases, (ICD-11).

Standing in Responsibility: Lessons Learned in Developing a Gamified Simulation on the Indian Child Welfare Act (ICWA)

Pamela H. Bowers, PhD, MSW

California State Polytechnic University, Humboldt, USA,  <https://orcid.org/0000-0001-7425-5864>

Debbie Gonzalez, DSW, MSW

California State Polytechnic University, Humboldt, USA,  <https://orcid.org/0009-0006-4421-9073>

Teresa Georgopoulos, MS, MA

California State University, Monterey Bay,  <https://orcid.org/0009-0005-4212-5260>

Abstract: What does it take to develop an asynchronous curriculum for social work students, with attention to precision, policy accuracy, and community accountability? We attempt to answer the question by documenting our process of community collaboration and partnership to develop a gamified case study on the Indian Child Welfare Act. The curriculum was developed in one year and is currently being evaluated for efficacy. Lessons learned in the process are consistent with the literature including honoring community timeframes, responsibility, transparency, and openness to change. Future development of similar curricula that incorporates tribal partnerships requires relational accountability with attention to respect and reciprocity.

Keywords: ICWA, Simulation, Community Partnerships, Child Welfare

Citation: Bowers, P.H., Gonzalez, D., & Georgopoulos, T. (2023). Standing in Responsibility: Lessons Learned in Developing a Gamified Simulation on the Indian Child Welfare Act (ICWA). In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023-- International Conference on Social and Education Sciences* (pp.125-134), Las Vegas, NV, USA. ISTES Organization.

Introduction

What does it take to develop an asynchronous virtual simulation curriculum for social work students, with attention to precision, policy accuracy, and community accountability? We attempt to answer the question by documenting our process of community collaboration and partnership to develop a gamified case study regarding the Indian Child Welfare Act (ICWA). We begin our manuscript with a brief review of the literature about ICWA, simulation, and community collaboration, followed by a case study of our experience, and conclude with a discussion of lessons learned and reflection.

Literature Review

Social Work and ICWA

There is a long history of the social work profession causing harm to communities of Black, Indigenous, and other Persons of Color (BIPOC) (e.g. Beck, 2019; Halvorsen et al., 2022), including participating in the widespread forced removal of Indigenous children from their homes (Esquao & Strega, 2015). Due to the egregious removal practices specifically targeting Native children, the Indian Child Welfare Act (ICWA), a federal law, was passed in 1978 to keep Native children with Native families. ICWA is a vital piece of Indigenous peoples sovereignty and imperative to the survival of Indigenous families (Brown, 2020), and for these reasons it is important social workers are familiar and child welfare social workers are skilled in understanding and applying its policies and procedures.

ICWA sets forth a number of requirements that must be met in child custody proceedings involving American Indian and Alaska Native children including: a) Tribes must be given notice of all child custody proceedings involving a child who is a member or eligible for membership in a tribe; b) Tribes must be given the opportunity to intervene in these proceedings; c) Tribes must be given preference in placement of Indian children; and d) States must make active efforts to prevent the removal of Indian children from their families and tribes (The Indian Child Welfare Act of 1978). Even today, over four decades later, American Indian and Alaska Native children are four times more likely to be removed by state child welfare systems compared to their non-Native counterparts (NICWA, 2022). Thus, in spite of advances achieved since 1978, widespread non-compliance with ICWA has persisted due to inadequate training, misinterpretations of the law, and lack of data (California ICWA Compliance Task Force, 2016). The state of California is at the epicenter of ICWA appeals, with more cases than any other state (California ICWA Compliance Task Force, 2017). In 2019, over 43% of appeals involving ICWA were due to missteps with inquiry and notice (California Department of Social Services, 2019). The California Dependency Online Guide (2015) reported that in the last six months of 2015, ICWA cases accounted for roughly 30% of all juvenile dependency appeals with approximately 85% of those being related to inquiry and notice. Consequently, California is also a state at the cutting edge of innovation and reform (California ICWA Compliance Task Force, 2017) due to the many lessons learned in the appeals process. For example, California has a vested interest in ensuring that ICWA is implemented effectively as it has the largest Native American population of any state in the country (U.S. Census, 2020).

In spite of some of the darker history of social work with relation to child welfare, there are myriad examples of attempts to ameliorate the harms caused through policy advocacy, practice and education reform. Social work faculty are at the cutting edge of innovation for developing curriculum (Washburn & Zhou, 2018) and other interventions that respond to community gaps and needs. Community collaboration, specifically with tribes/tribal partners, is immeasurably important when developing curriculum (e.g. Shegog et al., 2017) for policy compliance such as with the ICWA.

Simulation

The ongoing impact of the global pandemic has demonstrated that now more than ever there is an urgent and salient need to provide empirically and practice-driven virtual learning opportunities. The use of virtual reality and computer simulations are gaining ground and popularity in social work as viable teaching methods, particularly in preparation for internship and/or work experiences (Wilson et al., 2013). While virtual simulations are becoming increasingly common in the social sciences, a dearth of opportunities have been developed specifically tailored to rural practice (Hutter, & BrintzenhofeSzoc, 2019). Integrating this level of technology into the education of our future rural social work workforce has the potential of enhancing learning outcomes and most importantly, the potential for improving client and community organization care (NASW, 2017). This form of education requires participants to engage and draw on intellectual, social and emotional knowledge to navigate this learning tool. Thus, gamified training amplifies real experiences by exposing students to unexpected and realistic situations. Whether education is offered online, Hy-flex, or in person, the one thing that is certain is the need to offer a variety of learning opportunities which simultaneously and proactively prevent any harm from occurring with our clients (Dodds et. al, 2018; Papouli, 2014).

Technology

H5P is a user-friendly online authoring tool for creating interactive learning activities. It is an open-source software already available at our University and is easily integrated into the learning management system and classrooms. H5P software is also mobile device friendly, allowing access to content and feedback on smartphones and tablets. The branching scenario content type within the H5P software enables users to choose their own adventure by answering a series of questions and making choices about the next step. By providing H5P virtual simulation learning opportunities, students have the opportunity to engage in real life scenarios which impact rural and Indigenous populations, as well as engage in the use of technology. Integrating technology with case scenarios into social work education has the potential to create safe, insightful, and engaging opportunities for students to explore possible mistakes in the field, and to test best practice principles.

The instructional strategies and activities utilized in this learning module are designed to promote engagement, active learning, and skill development. Stolovitch and Keeps' (2020) Five-Step Model was used to guide the planning and design of this lesson. The lesson is introduced with a description of the learning objectives and the rationale for successfully completing the objectives. The activities are designed to support the learning objectives, while the learning assessments provide students with confirming or corrective feedback. The branching scenario concludes with a summary of key concepts and common mistakes to reinforce the appropriate scenario responses. Within the gamified simulation reflective prompts are integrated. The debriefing process is critical to social work education. Students participate in a synchronous debriefing discussion with their instructor and peers as well as submit an individual summative reflection journal for the final assessment.

This gamified scenario is designed to help students experience the realities of field work while decreasing potential harm to actual clients. Virtual simulation can also enhance learning outcomes, and most importantly augment the potential for improving client and community care when the student is in the field. Finally, while virtual simulations are becoming increasingly common in the social sciences, a dearth of opportunities have been developed specifically tailored to rural practice (Hutter & BrintzenhofeSzoc, 2019). This project sought to address this gap.

Community Collaboration

Collaboration with Indigenous and Tribal communities is a necessary element to preserving Indigenous families, offers a strengths-based approach to decision making and reform, and honors tribal sovereignty and autonomy (Haight et al., 2020). Through collaborative efforts with tribes on projects and training, organizations have the opportunity to ensure needs are met while reducing racial disparities in a way that honors their tribes sovereign rights, culture, and the needs of those they represent. Therefore, when creating gamified simulation trainings pertaining to child welfare in relation to indigenous children, it is imperative to “make strategic decisions to achieve Indian Child Welfare Act (ICWA) compliance and address AI/AN dis-proportionality through collaboration with tribes and urban Indian communities” (Lidot et al., 2012). Continued collaboration and evaluation with tribes in regard to curriculum fabrication can produce a sense of balance and facilitate the alleviation of bias in training tools. Through collaborative teaming we step away from Western only thinking to explore more relational solutions to bridging the disparity gap that continues to separate indigenous children from their families.

Case Study

Context

Cal Poly Humboldt, located in northern California, enrolls a diverse student population with just under 200 BASW and MSW students combined, who are studying to be social workers with rural and Indigenous communities. With a robust state-wide internship program in social service agencies, our Department has continued to see growth in enrollment in spite of the tumultuous economic and pandemic climate. The Department collaborates with local tribal social service directors and with the county Department of Health and Human Services (DHHS) on a regular basis. Our Native Wellness Council, which meets every semester, consists of Department faculty/staff, tribal social service directors, Department alumni, and other rural/tribal service providers. The council regularly expresses the importance of our students being capable of working through the multiple nuances of rural practice, including how to work with and improve the lives of Native American families, children, and communities. This feedback loop offers our Department an opportunity to continue to revitalize our curriculum and community relations, and be held accountable for strengths and concerns related to students in internships and their competency acquisition following graduation.

In 2018, the county DHHS stipulated to a judgment agreeing to corrective actions aimed at reforming the County's handling of reports of child abuse and/or neglect citing the disproportionate number of Native American Children represented in foster care and other child welfare services (Argomaniz & Jones, 2019). While there are several entities addressing ICWA and the Indian Child Protection and Family Violence Prevention Act (25 U.S.C. Sec 201 et seq.), the Department's Native Wellness Council has continually expressed a need for graduates of our program to expand their knowledge around compliance, sovereignty, and family preservation rights. Thus, the goals for our project were to increase and improve social work student rural practice skills, specific to ICWA and the multiple nuances of working and serving in a community with a large population of Native American children in the child welfare system. Through implementation of the virtual simulation, students can continue to learn and practice relational approaches to their work including navigating difficult conversations with Indigenous families and relevant service providers without potentially causing harm. Specifically, we intended to address a relevant application of discussing ICWA with families in practice, facilitate problem-solving around common misunderstanding around ICWA ("I do not want the tribe involved" or "their father is a tribal member but they are not connected to the tribe"), and to reinforce learning around the important legal elements of ICWA. In the long term, we anticipate a positive impact for our Native American families and communities, particularly those involved in the child welfare system.

Credibility Statements

Acknowledging the credibility of the named authors is a form of triangulation and enhancing rigor in the research, and is a responsible and valuable first step for researchers to set aside previous experiences through the use of epoche (bracketing) (Moustakas, 1994) in order to uncover and examine new phenomenon.

Author 1

I have been working for social justice since the early 2000s when I began my first social work endeavor advocating for policy reform in school systems. I earned my BASW, MSW, and PhD in social work and have been committed to high impact teaching practices in the social work curriculum. As a queer identified woman of settler ancestry, advocacy for vulnerable populations is at the forefront of my work. This curriculum and gamified simulation project was an honor and privilege to work on and I continue to be humbled by our community partnerships, local tribal social service providers, and students who are at the front of it all, doing the hard work to improve the health and lives of our community. I stand in responsibility and relationship with my tribal partnerships and to this work. I acknowledge my place of privilege, and recognize this project as an opportunity to expand social work education from a gold standard perspective (i.e. ICWA being the gold standard of child welfare).

Author 2

Author 2 has a diverse social work experience working in rural communities including working as a social worker in the child welfare system. I have been teaching at the University for 15 years and developing a child welfare curriculum for over a decade. A doctorate in social work was earned in 2019 with an emphasis in

teaching social work practice. As a cis-gendered woman with European ancestral history, I am humbled by the collaboration and support local tribes have provided to me and the department in improving our curriculum and professional relationships and opportunities for our students. As a faculty member I have been an active member of the Native Wellness Council. This collaborative relationship, along with the department's commitment to decolonizing social work education and practice, has informed my curriculum. I remain committed to improving my tribal relationships and my knowledge of how to better serve Indigenous students, local Indigenous communities, and social work practice with Indigenous nations.

Author 3

Author 3 has 20 years of professional experience working in the field of higher education, providing services to a diverse population. Author 3 holds a Master of Arts in Education with a concentration in US Education in a Global Context, a Master of Science in Higher Education Administration, and is currently completing a Master of Science in Instructional Science and Technology. For the past nine years, Author 3 has worked as an instructional designer, utilizing technology to develop curriculum across a wide-range of academic disciplines. I understand the importance of creating a classroom that is respectful of learning preferences and inspiring to all students, but I also know that mentorship with faculty is a crucial component in promoting pedagogical diversity and equity in education. I acknowledge that I am a white, cis-gendered woman contributing to the development of curriculum that may impact local Indigenous communities. I am honored and humbled by the privilege extended to me in working on this project.

Process

Through a community-engaged approach, we began our journey by receiving an internal grant in the amount of \$21,225 that allowed us to compensate our community and tribal partners and contractors for their time and shared knowledge. As with any community-based project, engaging with the community from start to finish is an iterative process and will continue as we work to improve our curriculum. In our process, we recognized our responsibility to work to dismantle oppression and educate our students to improve their anti-racist, abolitionist, and anti-oppressive practice, particularly in child welfare. With the knowledge that child welfare continues to be a system that has an overrepresentation of Indigenous and BIPOC children who enter protective custody, we intended to begin our process by first seeking guidance from our Tribal social service providers and ICWA case managers. After receiving IRB approval, we held listening circles with local Tribal social service providers and a state-wide tribal families coalition to identify what is working and what is not within ICWA cases in the county. During our meetings, it was important for us to establish our credibility and intentions, particularly as white settler ancestry educators with graduate degrees working to promote Native American family preservation rights. We were very clear that this work could not be done without our collaborative partnerships, particularly the knowledge shared from Tribal partners who are doing the groundwork on behalf of Tribes and Indigenous families and communities.

Following the listening circles, we developed a case study that addressed the needs specifically identified by the participants including directly addressing *Tribal Sovereignty*, demonstrating various forms of *Inquiry* in child welfare cases, and addressing the concept of *Noticing* in a home visit. Additionally there was an emphasis on partnership with the county and the Tribes, policy interpretation and compliance concerns, and addressing the nuances of rural social work practice.

After our case study was developed, we drafted a screenplay using the branching scenario concept where a student could “choose their own adventure” within the simulation. The screenplay was then shared with the same community partners who helped identify the concerns and strengths, and they provided additional feedback. Following this process, we worked with a local casting director and hired actors alongside a cinematographer, sound engineer, and an instructional designer. In the model, there are pathways that are more “ideal” and then others that are less ideal or incorrect and lead the student back to make another/better choice in order to move forward in the simulation. We specifically asked permission to utilize the Native American Student resource center on campus as the filming location so that we could, in part, honor the Indigenous student experience in a unique tribute to the dedicated resources on campus. To be in the space, where there were photos of Indigenous graduates on the wall from decades and more recent past, provided valuable context for the actors and guests who entered the space during our filming process.

Following sound and film edits, the instructional designer placed film clips into the H5P software and developed the branching scenario. We worked collaboratively to identify issues and gaps with the acting (i.e. missing lines, inappropriate body language inconsistent with social work practice). To remedy any potential issues we developed learning pop-ups for students to write down and reflect how they might address specific questions and issues differently than the social worker did on film.

Feedback loop

Our feedback loop offered multiple opportunities from the start to the current form of the curriculum. In these regularly scheduled collaborative meetings we gathered information and then responded to everything from identifying key partners, hiring actors and training them briefly on child welfare practice, ensuring good video sound quality with a professional sound engineer, adjusting specific content within the filmed segments, adding in relevant resources, and piloting the curriculum with expert panel reviews.

Partway through the project, following the filming, we realized that while we included the name of a local tribe due to their best practice model for collaborating with child welfare, we failed to ask their permission to use their name. This became clear to us after bringing an initial draft of the simulation to our tribal partners (not the specific tribe). We immediately moved into action and reached out to the tribe in question and met with a director who both expressed concern for our misstep in this process and also appreciated our attempt to increase compliance with ICWA through this curriculum. This misstep was by far the most valuable lesson learned in our

process. All the while attempting to seek feedback and guidance from tribal partners, we still made mistakes. Of utmost importance for us was and is to stand in responsibility for our actions. To respect the proper process in seeking approval meant that our project timeline needed to shift until the appropriate permissions were obtained. Additional lessons learned in the process included opportunities for university researchers to further promote the development of future university-community collaborations. With these lessons in mind we identified accountability, respect, reciprocity, and adherence to community (not university) timelines.

Implications/Next Steps

Consistent with the literature on collaboration with tribal partners, it is imperative to honor community time-frames (see for example, Straits et al., 2012) while balancing accountability to grant funding. For example, university researchers stayed flexible with dates and availability to meet with tribal partners, particularly during traditional ceremonial times (such as summer). They also met with funding partners to outline the missteps and sought a no-cost extension to allow time for the support and approval of the work. Partnerships with the local tribes and tribal partners helped to ensure that the curriculum was accurate and up-to-date, ensured that the curriculum was relevant to the needs of local Native American children and families, and helped to build trust and relationships between social work faculty and tribes.

We believe the ICWA simulation will offer a safe space to practice and gain proficiency in leading social work conversations in the field with a local context in mind. The initial virtual scenario is intended to help students experience the realities of child welfare work while decreasing potential harm to actual clients.

Partnerships with the local tribes and tribal partners helped to ensure that the curriculum was accurate and up-to-date, ensured that the curriculum was relevant to the needs of local Native American children and families, and helped to build trust and relationships between social work faculty and tribes.

References

- Argomaniz, A.F. & Jones, O.C. (2019). *Hoopa Valley Tribe, Humboldt County Sign Historic Child Welfare MOU/Protocol*. Center for the Study of Social Policy.
- Beck, E. (2019). Naming white supremacy in the social work curriculum. *Affilia*, 34(3). doi.org/10.1177/0886109919837918
- California Courts (2015). Dependency quick guide. Retrieved from: <https://www.courts.ca.gov/dogbook.htm>
- California Department of Social Services (2019). Indian child welfare act (ICWA) report. Sacramento, CA: Author: <https://www.cdss.ca.gov/inforesources/tribal-affairs/icwa>
- California ICWA Compliance Task Force (2017). Report to the California Attorney General's Bureau of Children's Justice. Sacramento, CA: Author.

- California ICWA Compliance Task Force. (2016). *Preliminary Final- California ICWA Compliance Task Force Report to the Bureau of Children's Justice*.
- Dodds, C., Heslop, P., & Meredith, C. (2018). *Using simulation-based education to help social work students prepare for practice*. *Social Work Education*, 37(5), 597–602. DOI: 10.1080/02615479.2018.1433158.
- Esquao S.A., & Strega, S. (2015). *Walking this path together: Anti-racist and anti-oppressive child welfare practice*. Blackpoint, Nova Scotia: Fernwood Publishing.
- Haight, W., Waubanascum, C., Glesener, D., Day, P., Bussey, B., & Nichols, K. (2020). The Center for Regional and Tribal Child Welfare Studies: Systems change through a relational Anishinaabe worldview. *Children & Youth Services Review*, 119. <https://doi-org.ezproxy.humboldt.edu/10.1016/j.childyouth.2020.105601>
- Halvorsen, J., King, R., Lorenzetti, L., Wolfleg, A., & Haile, Lm. (2022). White entitlement in antiracism and anticolonialism. In A. Gebhard, S. Mclean, & V. St. Denis (Eds.), *White benevolence: Racism and colonial violence in the helping professions*. Fernwood Publishing.
- Hutter, C.M., & BrintzenhofeSzoc, K. (2019). Virtual reality and computer simulation in social work education: A systematic review. *Journal of Social Work Education*, 56 (1); 131-141.
- Lidot, T., Orrantia, R.-M., & Choca, M. J. (2012). Continuum of Readiness for Collaboration, ICWA Compliance, and Reducing Disproportionality. *Child Welfare*, 91(3), 65–87.
- Moustakas, C. (1994). *Phenomenological research methods*. Thousand Oaks, CA: Sage
- National Association of Social Workers. (2017). NASW, ASWB, CSWE, & CSWA Standards for technology in social work practice. Retrieved: <https://www.socialworkers.org/>
- National Indian Child Welfare Association. (2022). NICWA National Indian Child Welfare Association (<http://nicwa.org>).
- Papouli, E. (2014). Field Learning in Social Work Education: Implications for Educators and Instructors. *Field Educator*, 4.2 (Fall). <https://fielddeducator.simmons.edu/article/field-learning-in-social-work-education-implications-for-educators-and-instructors/>
- Shegog, R. , Rushing, S.C., Gorman, G., Jessen, C., Torres, J., Gaston, A., ...Markham, C. (2017). NATIVE-It's your game: Adapting a technology-based sexual health curriculum for American Indian and Alaska Native youth. *The Journal of Primary Prevention*, 38, 27-48. Doi: 10.1007/s10935-016-0440-9
- Stolovitch, H.D. & Keeps, E.J. (2011). *Telling ain't training*. ASTD Press.
- Straits, K.J.E., Bird, D.M., Tsinajinnie, E., Espinoza, J., Goodkind, J., Spencer, O., Tafoya, N., Willging, C., & the Guiding Principles Workgroup (2012). Guiding principles for engaging in research with native american communities, version 1. UNM Center for Rural and Community Behavioral Health & Albuquerque Area Southwest Tribal Epidemiology Center.
- The Indian Child Welfare Act of 1978, Pub. L. No. 95-608, 92 Stat. 3069 (codified as amended at 25 U.S.C. 1901-1963).
- U.S. Census Bureau (n.d.). *California: 2020 Census*. U.S. Department of Commerce. Retrieved April 25, 2023 from <https://www.census.gov/library/stories/state-by-state/california-population-change-between-census-decade.html>

Washburn, M. & Zhou, S. (2018). Teaching note-technology-enhanced clinical simulations: Tools for practicing clinical skills in online social work programs. *Journal of Social Work Education*. Doi: 10.1080/10437797.2017.1404519

Wilson, A.B., Brown, S., Wood, Z.B., & Farkas, K.J. (2013). Teaching direct practice skills using web-based simulations: Home visiting in the virtual world. *Journal of Teaching in Social Work*, 33, 421-437.

Can A Teacher's Mental Health Impact Teaching Pedagogies in The New Normal?

Parin Somani

London Organisation of Skills Development, England

Abstract: Teacher's globally have been required to adapt to immense change providing students within higher educational institutions (HEI) with the best teaching pedagogies, through which they can progress. The coronavirus (covid-19) pandemic has accelerated the use of technologies to facilitate learning due to remote learning regulations imposed upon HEI. Within the new normal world teachers have been required to re-skill ensuring appropriate teaching pedagogies are implemented to help students reach their educational endeavours. This study aims to understand the impacts on HEI teacher mental health within the new normal world and the implications on teaching pedagogies. A systematic review of published and grey literature is conducted. Results have revealed the following: Teachers within HEI have experienced negative mental health impacts including, stress, anxiety, depression, and loneliness. They have adapted teaching pedagogies to facilitate changing social circumstances leading to re-skill and up-skill ensuring student educational progression. Modes of communication altered to include social media platforms. Teaching pedagogies have included interactive video conferencing and software utilising artificial intelligence. Both students and teachers became accustomed to remote learning during the covid-19 pandemic, however post-pandemic hybrid learning has become more dominant. This study has deduced that teacher mental health does impact the quality of teaching pedagogies in the new normal world, affecting innovation and authenticity impacting student results. Teachers require flexibility and appropriate skills to ensure sustainable teaching pedagogies to support student learning. Recommendations are provided to facilitate teacher mental health and improve teaching pedagogies.

Keywords: Mental health, New normal, Pedagogies, Student, Teacher

Citation: Somani, P. (2023). Can A Teacher's Mental Health Impact Teaching Pedagogies in The New Normal? In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023-- International Conference on Social and Education Sciences* (pp. 135-145), Las Vegas, NV, USA. ISTES Organization.

Introduction

Teacher's globally have been required to adapt to immense change providing students within higher educational institutions (HEI) with the best teaching pedagogies, through which they can progress. Teaching pedagogies are important as they provide educators with the insight into best teaching practices to educate students. They acquire a better understanding of the student learning diversity, facilitating them towards creating bespoke lesson plans suiting student requirements. Consequently, there will be an improvement in the quality of teaching

that students receive. To ensure effective learning takes place and building upon knowledge, students are required to cultivate meaningful relationships with their educators and their peers. In addition, there is a need to foster a relationship between learning techniques and culture that is relayed through theory or practice by an educator to help progress student knowledge with the most meaningful information. Educators have an immense responsibility to impart students with the correct information through an approach that is most suitable for them despite different styles of teaching. It is the prerogative of an educator to provide an effective model to help their students to learn and build upon previous knowledge. It is a foundation through which learners can develop the appropriate skills and attitude to apply within their daily lives and obtain a clear understanding of the subject area to gain success in their examinations.

Before the coronavirus (covid-19) pandemic, teaching pedagogies were implemented within the physical settings involving educators and students. Educators employed various pedagogies and instructed their students appropriately to reach learning outcomes. Dominantly this process involved students taking instructions from their educators, and learning the content which would be sufficient to pass examinations. Some HEI's offered part-time time online courses for individuals to complete, they were especially designed for those individuals who required flexible hours to complete educating themselves alongside other commitments.

The covid-19 pandemic caused havoc with the entire educational system, particularly due to the implementation of social distancing regulations and the closure of non-essential businesses imposed by international governing bodies (Somani, *Our World Before, During and After the COVID-19 Pandemic*, 2020). This affected 1.2 billion learners from 186 countries around the world causing several challenges (UNESCO, *COVID-19 Impact on Education*, 2020). All HEI's were required to cease physical operation and students stayed at home, while international students returned to their countries. The traditional method of educating students within a face-to-face environment was no longer possible, instead HEI's were required to find innovative methods to help educate their students (Somani, 2021). This was made possible through the use of various technologies that were available.

The coronavirus (covid-19) pandemic has accelerated the use of technologies to facilitate learning due to remote learning regulations imposed upon HEI. Within the new normal world teachers have been required to re-skill ensuring appropriate teaching pedagogies are implemented to help students reach their educational endeavours. This impinged upon educator mental health as additional pressure was exerted onto them and immense uncertainty regarding the educational process was prevalent. According to the World Health Organization "Mental health is a state of mental wellbeing that enables people to cope with the stresses of life, realize their abilities, learn well and work well, and contribute to their community" (WHO, 2022). Furthermore, mental health can be divided into three components including emotional health, cognitive health, and behavioural health which are important in ensuring the overall well-being of an individual. However, the covid-19 pandemic facilitated negative mental health impacts on both students and educators.

Objectives

This study aims to understand the impacts on HEI teacher mental health within the new normal world and the implications on teaching pedagogies. A review of published and grey literature is conducted via electronic and manual databases.

Results and Discussion

Negative Mental Health Impacts

It is the role of an educator to appear strong and in control of all situations when imparting knowledge to their students. However, within periods of uncertainty even educators are confronted with challenges particularly during the covid-19 pandemic, when all educational sessions were transitioned to online platforms. It was reported that educators suffered with increased anxiety, isolation and depression during the covid-19 pandemic in comparison the health care workers (Kush, Badillo-Goicoechea, Musci, & Stuart, 2022). As HEI's re-opened to students after social isolation measures were lifted, results indicated that 50.6% of educators suffered with stress, out of which 14.1% was severe stress and 4.5% was extremely severe stress. Anxiety was experienced by 49.5% of educators out of which 7.6% was severe and 8.1% was extremely severe symptoms. Depression was experienced by 32.2% of educators out of which 4.3% was severe and 3.2% was extremely severe (Ozamiz-Etxebarria, Berasategi, Idoiaga, & Dosil, 2021). Educators were faced with changing their teaching methods to ensure efficient online learning was being adopted, creating additional pressure and stress on educators to learn novel methodologies to keep learners engaged. Educators were not alone in experiencing mental health challenges, students also faced heightened negative mental health implications during and post-covid-19. Several students were required to make decisions pertaining to continuing education due to restricted financial means or access to inappropriate hardware and software (Somani, 2021). Digital inequalities have been highlighted between students resulting from the covid-19 pandemic and students have endured negative mental health implications (Somani, The Impact of COVID-19 on Human Psychology, 2020). Amongst the mental health challenges faced, anxiety and depression have been prevalent (NHS, 2020) due to global uncertainty, costs of living and the use of unfamiliar technology, constant changes in rules and regulations from governing bodies and HEI's (Brooks, et al., 2020). Studies have suggested that within England, one in six people are affected with mental health challenges like depression and anxiety per week (McManus, Bebbington, Jenkins, & Brugha, 2016). It has been revealed that in comparison to January 2023, 51% of students experience heightened stress and anxiety, while 88% of students believe a mental health crisis is being experienced by their HEI (Meal, 2022).

Teaching Pedagogies

Educators have adapted teaching pedagogies to facilitate changing social circumstances leading to re-skilling and up-skilling ensuring student educational progression.

Five approaches of pedagogy learning have been identified in Figure 1.



Figure 1 (Shirke, 2021)

Constructivist relates to students not receiving information passively from the educator, instead it allows students to participate in the process of knowledge acquisition where they understand and gain appropriate knowledge. This approach promotes students' critical thinking skills and provides a learning environment allowing them to connect with the information imparted by the educator.

The collaborative approach provides a platform for students to amalgamate into groups and work together in collaboration. Students can problem solve, generate new ideas, complete tasks to reach goals, and generate strategies to implement. Students can collaborate themselves or educators can facilitate this process.

The integrative approach provides a specific learning environment for students that is designed to facilitate them to cultivate a deeper connection to the learnings within the syllabus they are being taught by the educator. The integrative approach requires students to understand the learning process, differentiate relevant issues, utilising learnings from sessions within practical situations and finally associating the concepts in daily life.

The reflective approach requires students to complete a self- evaluation of the scenarios through understanding what the educator has taught through observation of both educators and students. Through carrying out a thorough analysis and reasoning behind the actions they will take.

Within the inquiry-based learning approach, there is an expectation that educators cultivate a culture within which students understand teachings, simultaneously have the desire to explore ideas further. Students should feel challenged through which they can improve and refine their knowledge. In addition, students should feel motivated to question ideas, understand the answers and feel inspired to embark upon further questioning.

However, approaches such as these will only be successful when educators are positive and confident in their chosen approach. Thus, the need for good mental health to ensure effective reaching pedagogies is important. The quality of education can be improved via a pedagogy that has been well thought out. Students will

understand learning objectives better and reaching the learning outcomes is easier. Good pedagogies create an environment that promotes students to collaborate and help each other to complete tasks and learn. There is an increase in student learning perceptions and learning from each other, towards a cooperative learning environment which cultivates leadership qualities. Through the implementation of appropriate pedagogical methods students deviate from traditional methods of simply memorising information imparted by the educator. Instead, it stimulates creative thinking and facilitates them to analyse information, resulting in evaluating scenarios and reaching a strong conclusion, thereby creating a further awareness and receptiveness towards educator teachings. When an educator adopts the pedagogical approach, they cultivate a unified method of teaching. It utilises either constructivism, liberationism or behaviourism and uses it within their teaching approaches. The educator may deem that social pedagogy is their desired approach as this aims to create awareness, enhance social development and student well-being amalgamating moral education and teaching good values. Critical pedagogies encourage students to delve deeper into concepts aiming to understand personal thoughts on the topic being taught. Simultaneously within a diverse world, educators should expose their students to cultural diversity which will enable them to understand different mindsets associated with topics discussed. Alternatively, if an educator employs Socratic pedagogies, students are provided with knowledge while being facilitated to seek knowledge from different sources to solve challenges through alternative means. The educator requires good mental health to ensure students are provided with the right teaching pedagogical methods to achieve their goals. This will encourage educators to connect with their students and build a strengthened relationship which will result in a more positive learning experience.

Communication

The covid-19 pandemic altered methods of communication between educators and students. Pre-pandemic, face-to-face interaction was the dominant form of communication which utilised both verbal and non-verbal communication methods. The covid-19 pandemic required educators to utilise technological methods to ensure effective communication. The live interactive video conferencing dominantly used verbal communication particularly if students did not switch their video cameras on, unlike in a physical setting. Figure 2 highlights non-verbal communication and body language that is important for educators to use. However, during the pandemic it was difficult for educators to illustrate all non-verbal communication cues effectively, however limited communication was still possible through videoconferencing software like Microsoft Teams, Zoom, Google Meet, Skype etc. In addition, modes of communication altered to include social media platforms as educators encouraged group chats on platforms like WhatsApp and educational forums. Teaching pedagogies have included interactive video conferencing and software, utilising artificial intelligence. Within the new normal world, communication through these methods has been minimised within full-time physical education. Although social media is still widely used for students and educators to stay connected, share knowledge and attempt to find solutions through open discussions.

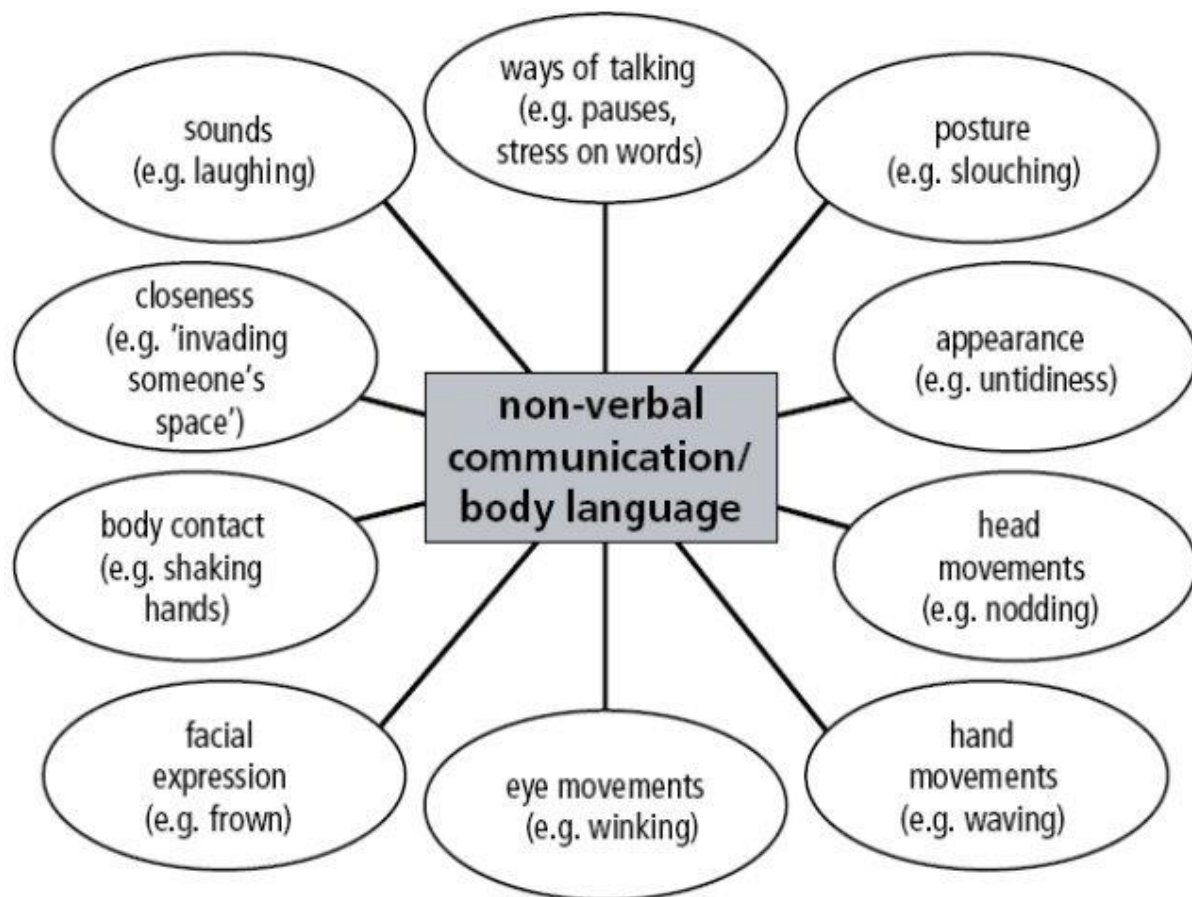


Figure 2. Non-verbal Communication (Curtis, 2018)

Communication is a vital element that can strengthen or deter relationships between educators and students. When the educator uses effective communication strategies, they become sensitive to student needs and can identify student weaknesses through which strategies can be implemented to guide students further to reach their goals.

Many HEI's utilised artificial intelligence to provide adequate support for their students including chatbots to assist students at all times and hours, in addition to cryptocurrency to financially assist students to continue their educational endeavours (Somani, Information Technology Challenges Faced during the Covid-19 Pandemic in Higher Education, 2021). During the covid-19 pandemic, students required addition support from their educators to ensure academic engagement (Rapanta, Botturi, Goodyear, Guàrdia, & Koole, 2020). However, when educators were challenged with mental health issues, they were unable to engage with their students in an effective manner. This is still the case in the new normal world, consequently, over a prolonged period student anxiety levels are deemed to have increased. In turn this lowers academic achievement levels and future employment prospects. Good communication in contemporary life is vital to ensure optimum mental health and wellbeing is cultivated. This is deemed to contribute towards minimum misunderstandings and it provides the bases for good instructions to ensure that outcomes and goals are met.

Remote Learning Vs Hybrid Learning

Pre-pandemic the vast majority of students acquired knowledge via physical learning environments, however both students and teachers became accustomed to remote learning during the covid-19 pandemic. As students have returned to physical settings within HEI's, reacclimatising to a full seminar room, lecture theatre or laboratory has revealed social anxiety and fear of the unknown (Chen & Lucock, 2022). Thus, it is not surprising that post-pandemic, hybrid learning has been adopted. The circumstantial changes experienced have led students to adopt flexible working hours and seek education from remote locations. Therefore, within the new normal as educators continue to teach their students, hybrid learning can be adopted. Learnings from the pandemic can be amalgamated within remote education and simultaneously continue with face-to-face sessions enabling the support of physical interaction (Somani, 2021).

Students and educators both share the flexibility and independence to attain knowledge through personal pedagogical preferences. Students can still take advantage of HEI's software with installed artificial intelligence to alert educators to fill student knowledge gaps and devise the appropriate teaching pedagogies to help them. The remote learning pedagogies allowed students to participate in interactive videoconferencing software, live chat sessions, completing long and short answer assessments, in addition to viewing pre-recorded sessions to help better understand academic concepts. Educators are implementing these strategies within teaching pedagogies to engage students and develop innovative methods. This is believed to help them towards achieving their learning outcomes and reach their educational endeavours, while maintaining a community spirit.

Figure 3 illustrates potential causes and challenges that educators have faced during the transition period from face-to-face teaching to remote methods of instruction and back again. It is evident that the same challenges are continuing within the new normal world. The challenge is documented on the right-hand side, and possible reasons contributing to the challenges faced by educators and their potential solutions are illustrated. The mental health of educators can be affected by a fear of losing employment positions or changes within current roles, personal challenges affecting educator behaviour, and concerns on the effects of the covid-19 pandemic. The feelings of anxiety when delivering lessons despite preparing online or offline instruction.

Educators may have a fear stemming from new technology that they have not used before or software they do not know about. Negative mental health impacts may also be triggered if educators do not have access to the necessary resources and are unable to plan for logistics. In addition, inaccessibility to sufficient internet bandwidth and the necessary digital literacy skills. Sudden change and transition can affect teaching pedagogies and create mental health instability particularly if educators find the adaptation process challenging. This is demonstrated through machine learning and unfamiliarity associated with digital learning or limited knowledge pertaining to the technological software used or technical features.

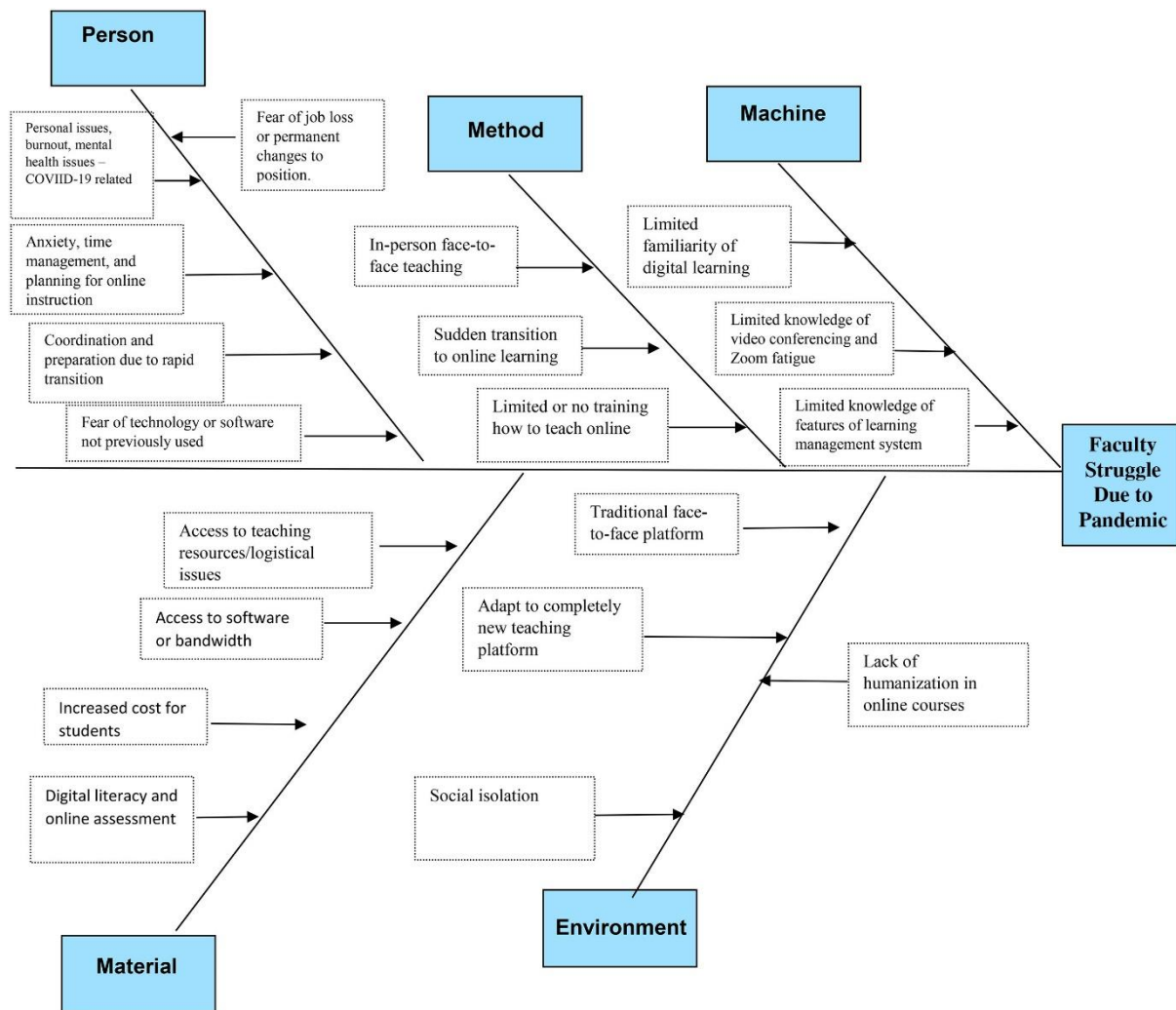


Figure 3 (Singh, Steele, & Singh, 2021)

Conclusion

Educators have endured mental health impacts during and post- pandemic including stress, anxiety and depression. However, it cannot be constituted only to lockdown because research has not revealed significant differences in mental health challenges between educators that were isolating and those that were not (Ozamiz-Etxebarria, Berasategi, Idoiaga, & Dosil, 2021). Educators experienced high stress levels during the pandemic due to a variety of reasons including uncertainty, virus transmission and possible infection as educational institutions had been believed to be a hub for spreading infection. In addition, educators faced heightened mental health challenges due to a combination of personal or professional reasons including balancing the two, increased burnout levels, and employment instability impacting financial . As students and educators have entered a new normal world, an amalgamation of techniques is being utilised to ensure efficient student learning. Educators are more experienced with remote learning utilising technological hardware and software to provide students with the best learning outcomes.

This study has deduced that the mental health of an educator does have an impact on the quality of teaching pedagogies in the new normal world. It affects innovation and authenticity, consequently creating an impact on student results. Teachers require flexibility and appropriate skills to ensure sustainable teaching pedagogies to support student learning. Educators should have access to the appropriate support in order to address all mental health concerns. They require a safe environment through which educators can build trust, strengthen communication and critical thinking skills post pandemic.

Approximately seventy percent of educators suffering with mental health challenges are unaware of resources that will facilitate them towards reaching their mental health requirements. Thus, mental health stigma and fear should be eradicated, and the appropriate mental health support should be provided to all educators within their HEI's. In addition, educators are usually the first point of contact for their students, hence appropriate training should be imparted to educators to help students cope with their mental health challenges. There is a need to build a strengthened culture to recognise mental health challenges, offer support and provide access to support systems to help implement appropriate strategies and effective communication styles. Educators can participate in virtual support groups in addition to social media outreach groups. HEI's should also revise health policies and review the current strategies to support educators and students through mental health challenges.

Recommendations

It is vital to safeguard the mental health of educators within HEI's, this will ensure student well-being and provide them with a higher quality of teaching. HEI's should ensure that good psychological care and attention is provided to educators who are vulnerable and have been impacted by the covid-19 pandemic the most. Strategies should be shared and developed to impart valuable knowledge to educators through which they can better cope with crisis situations. This will constitute towards better performance in their capacity as an educator, which ultimately is a benefit to the HEI. The youth are leaders of tomorrow and are instrumental in shaping the world, hence the education provided to them must be of a high standard, thus protecting the psychological well-being of educators imparting knowledge is vital. In addition, educators should cultivate a daily routine that incorporates the recommended hours of sleep and consuming a balanced diet. HEI's have a legal duty of care towards their educators and students in line with the national equality acts within which all individuals with mental health challenges should be treated equally. It is important for all well-being policies to be understood, accessible and transparent. Educators will continue to utilise the skills they have learnt through the pandemic and apply them to teaching pedagogies in the new normal, particularly as hybrid learning continues and a multitude of new short-term and long-term online courses have been developed to educate societies.

As technology progresses, educators should continue to implement teaching pedagogies that utilise technological means to educate their students. In addition, they should be well educated on cybersecurity

threats and possible challenges. HEI's should implement strong cybersecurity systems so that student learning is not further challenged and novel teaching pedagogies can be implemented.

References

- Brooks S.K, W. R., Smith, L., Woodland, L., Wessely, S., Greenburg, N., & Rubin, G. J. (2020). The psychological impact of quarantine and how to reduce it: rapid review of the evidence. *The Lancet*, 912-920.
- Chen, T., & Lucock, M. (2022). The mental health of university students during the COVID-19 pandemic: An online survey in the UK. *PLOS ONE*.
- Curtis, K. (2018). *Utilization of Multimodal Interaction Signals for Automatic Summarisation of Academic Presentations*. Dublin: Dublin City University.
- Kush, J. M., Badillo-Goicoechea, E., Musci, R. J., & Stuart, E. A. (2022). Teacher mental health during the COVID-19 pandemic. *Educ Res*.
- McManus, S., Bebbington, P. E., Jenkins, R., & Brugha, T. (2016). Mental health and wellbeing in England: The adult psychiatric morbidity survey 2014. *NHS Digital*.
- Meal, K. (2022, 01 12). *College Students More Concerned About COVID-19 Than Ever, New Survey by TimelyMD Finds*. Retrieved from TimelyMD: <https://timely.md/college-students-more-concerned-about-covid-19-than-ever/>
- NHS. (2020, 01 23). *Counselling for student mental health problems*. Retrieved from National Health Service: <https://www.nhs.uk/conditions/stress-anxiety-depression/student-mental-health/>
- Ozamiz-Etxebarria, N., Berasategi, S. N., Idoiaga, N. M., & Dosil, S. (2021). The Psychological State of Teachers During the COVID-19 Crisis: The Challenge of Returning to Face-to-Face Teaching. *Front. Psychol*.
- Rapanta, C., Botturi, L., Goodyear, P., Guàrdia, L., & Koole, M. (2020). Online university teaching during and after the Covid-19 crisis: Refocusing teacher presence and learning activity. *Postdigital Science and Education*, 923–945.
- Shirke, A. (2021, 10 07). *What Is Pedagogy? Importance Of Pedagogy In Teaching And Learning Process*. Retrieved from Master soft: <https://www.iitms.co.in/blog/importance-of-pedagogy-in-teaching-and-learning-process.html>
- Somani, P. (2020). Our World Before, During and After the COVID-19 Pandemic. *LangLit*, 29-35.
- Somani, P. (2020). The Impact of COVID-19 on Human Psychology. In B. S. Lal, & N. Patel, *Economics of Covid-19 Digital Health Education & Psychology* (pp. 328-357). New Delhi: Adhyayan Publishers & Distributors.
- Somani, P. (2021). COVID-19 Lockdown Impact On Education. In P. Somani, P. Sisodia, & L. N. Jayanthi, *Lockdown Impacts* (pp. 1-10). Tamilnadu: ESN Publications.
- Somani, P. (2021). From Face-To-Face To Remote Learning: Effect On Students. *International Conference of Education, Research and Innovation* (pp. 10491-10498). Seville (Spain): ICERI 2021.

Somani, P. (2021). Information Technology Challenges Faced during the Covid-19 Pandemic in Higher Education. *International Journal of Latest Research in Engineering and Technology*, 106.


Somani, P. (2021). Traditional Learning V's Blended Learning. *International Conference of Education, Research and Innovation* (pp. 8641-8647). Seville: ICERI 2021.

UNESCO. (2020). *COVID-19 Impact on Education*. France: UNESCO.

WHO. (2022). *Mental health*. Geneva: World Health Organization.

Online Exam Proctoring Services: Students' Perceptions of Privacy and Equity

Derar Serhan

Arizona State University, USA,  <https://orcid.org/0000-0003-3767-1046>

Natalie Welcome

Arizona State University, USA,  <https://orcid.org/0000-0002-7519-9136>

Abstract: Recently, institutions have increased their online course offerings as well as their online degrees. With this significant growth in online offerings, assessment integrity becomes a concern. In response to this concern, many institutions have adopted the use of online proctoring services. The aim of using these online proctoring services is to provide a fair testing environment as well as to protect academic integrity of online assessments. In addition, they provide flexibility to students who are able to take the exam any time during the exam opening period. With all their benefits, the use of these systems brings out issues regarding student privacy and equity. This study aims at investigating students' perceptions of privacy and equity while using the online proctoring service, Honorlock. The results of this study indicated that the participants were aware of privacy issues and that the majority were concerned about their privacy while taking online proctored exams.

Keywords: Online proctoring, Artificial intelligence, Privacy, Equity, Student perception

Citation: Serhan, D. & Welcome, N. (2023). Online Exam Proctoring Services: Students' Perceptions of Privacy and Equity. In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023-- International Conference on Social and Education Sciences* (pp. 146-155), Las Vegas, NV, USA. ISTES Organization.

Introduction

With the growth in online course offerings, and the increasing demand for online proctoring services, it becomes important to investigate student perceptions of the privacy and equity of online testing using online proctoring services.

Many recent studies have focused on investigating student perceptions of online exams (Afacan Adanır, İsmailova, Omuraliev & Muhametjanova, 2020; Böhmer, Feldmann & Ibsen, 2018; Elmehdi & Ibrahim, 2019; Hillier, 2014). Some focused on the benefits of online testing (Al-Mashaqbeh & Al Hamad, 2010; Angus & Watson, 2009; Sarrayrih & Ilyas, 2013), while others focused on the disadvantages and challenges of online exams (Alsadoon, 2017).

Afacan Adanır, İsmailova, Omuraliev & Muhametjanova (2020) investigated student perceptions of online exams at two state universities; one in Turkey, the other in Kyrgyzstan. They compared between student perceptions in the two universities. Data were collected using a survey with open-ended questions. The survey was conducted during the 2018-2019 fall term. The participants were 370 undergraduate first-year students enrolled in online courses. The researchers found that student perceptions differed according to gender, major, and prior online course experience. The results indicated that Turkish female students felt more stressed out than male students about online testing but Kyrgyz female participants felt more disadvantaged in comparison to male participants. In addition, Turkish participants felt that online exams were less stressful, more reliable and more fair than traditional paper-based exams in comparison with Kyrgyz participants.

A few articles addressed privacy and ethical concerns of the use of online proctoring services (Balash et al., 2021; Barrett, 2023; Burgess et al., 2022; Coghlan et al., 2020; Cohny et al., 2020; Henry & Oliver, 2021; Kharbat & Daabes, 2021; Swauger, 2020). Balash et al. (2021) conducted an online survey of 102 students and found out that students were concerned about the nature and amount and of the personal information that they shared with the exam proctoring companies.

Han et al. (2022) conducted a literature review of 115 publications that focused on digital proctoring in higher education. Their results indicated that these publications focused for the most part on the following: systems' development; adoption of the systems; the impact of proctored online exams on student achievement; and the legal, ethical, security, and privacy issues of digital proctoring.

Mutumukwe et al. (2022) analyzed 17 peer-reviewed articles between 2018-2022 that focused on privacy of online proctoring systems (OPS). They relied on the theory of privacy as contextual integrity to conduct the review of these articles. They looked for answers for the following research questions: 1. What are the information types that are collected through the use of OPS in higher education? 2. What are the roles of actors involved in the process of information flow in OPS in higher education? 3. What are the principles to govern the information flows in OPS in higher education? According to their review, only four articles explicitly investigated privacy issues and the remaining 13 articles only implicitly investigated privacy.

Barrett (2023) emphasized that the harms of the use of proctoring software systems surpasses the benefits. Barrett posited that these systems can be harmful to students; they pose a risk to student privacy, and intellectual freedom. They can cause heightened anxiety among students in regards to data collection and use. In addition, Barrett indicated that these systems are especially harmful to students of color and students with disabilities who go through discriminatory flagging. For example, students of color have complained about getting the systems to recognize their faces. Students with disabilities were questioned by proctors over approved accommodations. In addition, low-income students have reported feelings of discomfort and shame at having to show a 360-degree view of their bedrooms. They were concerned about being accused of cheating due to the unavoidable presence of family members in the same space. Barret concluded that any software that violates the privacy of

students and harms marginalized people can create more worrisome problems than the ones it solves. Barrett recommended that colleges and universities abandon remote proctoring software systems.

What is Honorlock?

Honorlock is an online proctoring service which monitors online assessments using a blended online proctoring approach that combines AI software with live test proctors. The goal of this approach is to “protect academic integrity and prevent cheating, reduce test anxiety, and provide more options to assess knowledge” (Honorlock a, 2022). Honorlock’s online proctoring AI monitors the exam session and alerts a live proctor if it detects any potential suspicious behavior. The live proctor can then review the situation in an analysis window before deciding to intervene. This blend of AI and human review provides students with a noninvasive and less intimidating experience without feeling constantly monitored.

The main features of Honorlock include the following: There is no scheduling needed; students can take proctored exams any time; live support is available on demand; it provides intelligent voice detection; it can detect cell phones; it gives instructors easy-to-read, time-stamped reports and recordings; it can find leaked test content and can provide steps to take action; it secures and protects student data (Honorlock b, 2022).

Honorlock’s proctoring platform integrates directly with the LMS as follows:

- After the instructors create their exams, they select remote proctoring tools and set the setting according to their preferences.
- Learners can log into the LMS without extra logins, they verify their ID and launch the proctored exam.
- The proctoring system monitors the exam and sends an alert to a proctor if it detects any problematic behavior.
- The proctor is able to respond to the alert by opening an analysis window and examining the situation. The proctor can then determine whether to intervene or not.
- Once the students complete their exams, instructors are able to access reports and timestamped recordings from within the LMS.

Addressing Equity and Inclusion in Honorlock

In addition to academic integrity of exams, institutions are also invested in providing fair and equitable testing. Honorlock allows students to take the exam at their convenience. Instructors are able to ask for special proctoring accommodations according to student needs. These accommodations include providing a) extended

exam time limits and due dates, b) bathroom breaks as needed and 3) assistive technology and devices (Honorlock c, 2022).

Research Questions

This study aims at answering the following question: What are student perceptions of privacy and equity while using online proctoring services?

Method

The participants in this study were 22 undergraduate students enrolled in a math class at Arizona State University in the US in fall 2022. The participants were enrolled in a Business Mathematics online class that used Honorlock as an online proctoring system. The students were informed that the study was anonymous and voluntary. They were also informed that no private data will be collected and that confidentiality is granted. The participants filled an online survey on Canvas. The survey consisted of a 5-point Likert-type questionnaire that included 11 items as well as three open-ended questions. The survey was developed based on the literature review and the aim of the study. The scale of the 5-point Likert-type survey responses ranged from Strongly Disagree (1) to Strongly Agree (5). The first seven items of the survey focused on student perceptions of privacy of the online proctoring system, while the other four focused on student perceptions of equity. In addition, the survey included the following three free response items: Please explain your views on the privacy of online exam proctoring; please describe your overall experience being monitored during your online proctored exam; and if you requested exam accommodations, please mention the accommodations that were provided for you and the accommodations that were not provided for you despite your request. You may indicate N/A if you prefer not to answer.

Results and Discussion

The responses collected from the 5-point Likert-type survey items were grouped into two categories: student perceptions of the privacy of the online proctoring system and student perceptions of equity. In addition, students' responses to the three open-ended questions were tabulated. In the following discussion, the designation of "agree" includes all "agree" and "strongly agree" responses while the "disagree" designation includes all "disagree" and "strongly disagree" survey responses.

In regards to student perceptions of the privacy of the online proctoring system, 54% agreed that they were concerned about sharing information with the online exam proctoring companies while 9% disagreed. In addition, 72% indicated that online exam proctoring is an invasion of their privacy, while 10% disagreed. Moreover, 54% of the participants indicated that they were concerned about the amount of information that the online proctoring services collected during the exam, while 18% were not concerned about that. This indicates

that the participants were aware of privacy issues while taking their proctored exams, and that the majority were concerned about their privacy (see Table 1).

Table 1. Students' perceptions of privacy the online proctoring system

Item	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
I am concerned about sharing information with online exam proctoring companies.	27	27	36	9	0
I think online exam proctoring is an invasion of my privacy.	36	36	27	5	5
I think online exam proctoring is an appropriate option that maintains academic integrity and respects my privacy.	0	32	45	14	9
I am concerned about the amount of information that online proctoring services collect during the exam.	27	27	27	18	0
I am concerned about installing online exam proctoring software on my computer.	18	41	27	14	0
I am aware of the methods used by online exam proctoring services to monitor exam takers.	18	32	23	23	5
I am comfortable with the methods used to proctor the online exam.	0	14	50	23	14

Regarding student perceptions of equity while using online proctoring systems, only 23% agreed that the online proctoring service made the necessary exam accommodations based on their needs, while 36% disagreed. On the other hand, 54% agreed that they had access to all resources that were needed to complete the exam, while 10% disagreed. All the participants either agreed (36%) that they were provided with the exam accommodations that they had requested or were neutral (64%). None of them indicated not receiving the requested accommodations (see Table 2). This indicates that the students were provided with the requested necessary accommodations while taking the exam using the online proctoring system Honorlock.

Table 2. Student perceptions of equity

Item	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
The online proctoring service made the necessary exam accommodations based on my needs.	9	14	41	18	18
I had access to all resources that were needed to	18	36	36	5	5

complete the exam.

I was provided with the exam accommodations that I requested.	9	27	64	0	0
I was not provided with the exam accommodations that I requested.	0	0	59	32	9

Student views of the online proctoring systems can be categorized into two main categories: concerned and not concerned. Participants who were concerned about the use of online proctoring systems indicated that it was an invasion of their privacy. They felt unconfident about being watched while taking the exam and some felt anxious. The concerns they shared included the following: concern about sharing a photo of their license, concern about showing their rooms and homes, and concern about future stalking based on the information that was gathered for online testing (see Table 3) for a sample of student comments.

Table 3. Students' views of the online proctoring systems

Concerned	Not-concerned
I feel some invasion of my privacy by having to show my room.	Not my biggest concern.
My only concerns are sharing a photo of my license, hopefully nobody else is able to access the information I have provided.	It was reasonable and I didn't feel invaded
I believe that it is necessary, however there is flaws with the program. I am often anxious to look away for a second or adjust myself in the chair because i may be accused of cheating etc. Also, i believe the room scan is a little invasive because people can sometimes leave things out that are personal or inappropriate.	Online exam proctoring is a way to keep kids from cheating. Although, I may think it collects information, especially honorlock, I think it is a good way to keep academic integrity.
I do not like that proctoring services can view my room/personal space and logging all websites I visit.	I understand the need for it and have confidence that those who lack integrity are receiving appropriate and fair repercussions.
We do not know who is proctoring our exams. But, some random person will get to watch us in our homes to be able to gather information about us. This could lead to a home invasion or someone stalking us with the information gathered. You cannot guarantee that there will not be someone who is willing to exploit this system to cause harm to others. Total invasion of privacy and it opens the door for	

more harm than good.

I believe online exam proctoring is an invasion of privacy as it requires all individuals to scan their environment and ID. The online proctoring has webcam and microphone access and it is very unclear as to what other controls they have such as access to web history, files, and screen recording. I think in the future if using online proctoring it is VERY clear and transparent as to what the program can access and view.

I feel like it is just a little too much. It gives me anxiety knowing that im being watched

Students' responses in regards to their perceptions of being monitored during the proctored exam were divided into three categories: positive (ok, fine...etc), negative (hate it, complex...etc) and neutral; (see Table 4) for a sample of student comments.

Table 4. Students' overall experience with online proctored exams

Positive	Negative	Neutral
I thought it was just fine, got my work done, submitted it, and deleted it off my computer right away.	gave me more anxiety and stress worrying more about the proctoring than my exam	Overall, I haven't had much technical issue with online proctoring, but it has been a bit uncomfortable. So overall it's been a neutral experience.
I didn't enjoy it but It was fine.	It is very complex, there is a lot of things that are needed to be done for the proctored exam. it could be very overwhelming	I'm feel ok with it. Not positive or negative
I feel as if I am in a classroom environment. The experience was very positive. I did not feel rushed or pressured. I felt very well prepared for my exam and would definitely recommend the service to others.	I have found myself looking at myself in the camera, which takes away my time for the exam.	Very standard, I just took the test.
My overall experience being monitored during my online proctored exam was very positive.	I find it a little creepy that I can see what the software is recording and gives a little window of the other viewpoint.	Since my main focus is on the problem, I don't care about the camera

	I would much rather you don't record my face at all but I believe that this personal opinion of mine will not be accepted.
Overall experience has been fair except for the amounts of information they collect.	I hate it. Most of the time I get notified of some violation that is under review because I took a drink of water, or sneezed. Proctoring exams should not feel like an interrogation. I have had someone walk into the room not knowing that I am taking a test and my whole test was under review because of this. It is a completely awful system, and one that I do not feel comfortable downloading onto my personal computer. How do I know that it isn't collecting data from me? I do not trust anything about it.
Not bad at all.	
I have not had any issues so far.	

In regards to the third open ended question: "If you requested exam accommodations, please mention the accommodations that were provided for you and the accommodations that were not provided for you despite your request. You may indicate N/A if you prefer not to answer". Only 9% of the participants indicated that they had not requested any accommodations; 14% of the participants did not provide any answer and 77% preferred not to provide any information by answering N/A. None of the participants had indicated requesting any accommodations.

Conclusion

The Covid-19 pandemic has left a strong impact on teaching and learning at many institutions all over the world. As a result, many institutions increased their online course offerings as well as their online degrees. With this shift to remote learning, the need for online proctoring services increased (Flaherty, 2020). The purpose of this study was to investigate student perceptions of privacy and equity while using online proctoring services.

The findings of this study indicated that students were not fully satisfied with their online proctoring experience. Many participants indicated that they were concerned about their privacy. Participants who were concerned about the use of online proctoring systems indicated that it was an invasion of their privacy, that they felt unconfident while being monitored while taking the exam and some reported feeling anxious. Some expressed their concern about sharing a photo of their license, concern about showing their room and home and concern about someone stalking them based on the information that was gathered. On the other hand, students indicated that they were provided with the requested necessary accommodations while taking the exam using the online proctoring system Honorlock.

References

- Afacan Adanır, G., İsmailova, R., Omuraliev, A., & Muhametjanova, G. (2020). Learners' Perceptions of Online Exams: A Comparative Study in Turkey and Kyrgyzstan. *The International Review of Research in Open and Distributed Learning*, 21(3), 1-17. <https://doi.org/10.19173/irrodl.v21i3.4679>
- Al-Mashaqbeh, I.F., & Al Hamad, A. (2010). Student's Perception of an Online Exam within the Decision Support System Course at Al al Bayt University. *2010 Second International Conference on Computer Research and Development*, 131-135.
- Alsadoon, H. (2017). Students' Perceptions of E-Assessment at Saudi Electronic University. *Turkish Online Journal of Educational Technology*, 16, 147-153.
- Angus, S., & Watson, J. (2009). Does regular online testing enhance student learning in the numerical sciences? Robust evidence from a large data set. *Br. J. Educ. Technol.*, 40, 255-272.
- Balash, D. G., Kim, D., Shaibekova, D., Fainchtein, R. A., Sherr, M., & Aviv, A. J. (2021). Examining the examiners: Students' privacy and security perceptions of online proctoring services. ArXiv Preprint ArXiv:2106.05917.
- Barrett, L. (2023). Rejecting Test Surveillance in Higher Education (February 1, 2023). 2022 Michigan State Law Review 675, Available at SSRN: <https://ssrn.com/abstract=3871423> or <http://dx.doi.org/10.2139/ssrn.3871423>
- Böhmer, C., Feldmann, N., & Ibsen, M. (2018). E-exams in engineering education — online testing of engineering competencies: Experiences and lessons learned. *2018 IEEE Global Engineering Education Conference (EDUCON)*, 571-576.
- Burgess, B., Ginsberg, A., Felten, E. W., & Cohny, S. (2022). Watching the watchers: bias and vulnerability in remote proctoring software. *arXiv preprint arXiv:2205.03009*.
- Coghlan, S., Miller, T., & Paterson, J.M. (2020). Good proctor or "Big Brother"? AI Ethics and Online Exam Supervision Technologies. *ArXiv*, *abs/2011.07647*. <https://arxiv.org/abs/2011.07647>
- Cohny, S., Teixeira, R., Kohlbrenner, A., Narayanan, A., Kshirsagar, M., Shvartzshnaider, Y., & Sanfilippo, M. (2020). Virtual Classrooms and Real Harms. *ArXiv*, *abs/2012.05867*. Retrieved Sep. 27/2022 <https://arxiv.org/abs/2012.05867>

- Elmehdi, H.M., & Ibrahim, A.M. (2019). Online Summative Assessment and Its Impact on Students' Academic Performance, Perception and Attitude Towards Online Exams: University of Sharjah Study Case. *Creative Business and Social Innovations for a Sustainable Future*.
- Flaherty, C. (2020) Big proctor. Inside Higher Ed. Retrieved Sep. 27/2022 <https://www.insidehighered.com/news/2020/05/11/online-proctoring-surgin-during-covid-19>
- Han, Shengnan; Nikou, Shahrokh; Ayele, Workneh Yilma; Balasuriya, Balasuriya Lekamalage Prasanna; & Svee, Eric-Oluf. (2022). DIGITAL PROCTORING IN HIGHER EDUCATION: A SYSTEMATIC LITERATURE REVIEW. *ECIS 2022 Research Papers*. 57. https://aisel.aisnet.org/ecis2022_rp/57
- Henry, J.V., & Oliver, M. (2021). Who Will Watch the Watchmen? The Ethico-political Arrangements of Algorithmic Proctoring for Academic Integrity. *Postdigital Science and Education*, 4, 330 - 353.
- Hillier, M. (2014). The very idea of e-Exams: student (pre)conceptions. In B. Hegarty, J. McDonald, & S.-K. Loke (Eds.), *Rhetoric and Reality: Critical perspectives on educational technology*. Proceedings ascilite Dunedin 2014 (pp. 77-88)
- Honorlock a (2022). Reference: <https://honorlock.com/blog/blended-online-proctoring/> viewed Nov. 12, 2022.
- Honorlock b (2022). Reference: <https://honorlock.com/blog/improving-online-proctoring-by-combining-ai-with-humans/#1654018346940-771d58d5-4277> Nov 22, 2022
- Honorlock c (2022). Reference: <https://honorlock.com/blog/create-a-fair-test-environment-using-educational-technology/> viewed Nov. 12, 2022.
- Kharbat, F.F., & Daabes, A.S. (2021). E-proctored exams during the COVID-19 pandemic: A close understanding. *Education and Information Technologies*, 26, 6589 - 6605.
- Mutumukwe, C., Han, S., Viberg, O., & Cerratto-Pargman, T. (2023). Privacy as Contextual Integrity in Online Proctoring Systems in Higher Education: A scoping review. The 56th Hawaii International Conference on System Sciences.
- Sarrayih, M.A., & Ilyas, M. (2013). Challenges of Online Exam, Performances and problems for Online University Exam.
- Swauger, S. (2020). Software that Monitors Students During Tests Perpetuates Inequality and Violates their Privacy. MIT Technology Review, August 2020. <https://www.technologyreview.com/2020/08/07/1006132/software-algorithms-proctoring-online-tests-ai-ethics/>

Core Competencies Critical to Create Communications Required in Construction Discipline: Perception of the Global Academia

Fatemeh Pariafsai

Bowling Green State University, USA,  <https://orcid.org/0000-0002-1984-7004>

Manish K. Dixit

Texas A&M University, USA

Sadjad Pariafsai

Islamic Azad University, Iran

Stephen Mark Caffey

Texas A&M University, USA

Edelmiro F. Escamilla

Texas A&M University, USA

Sherecce Fields

Texas A&M University, USA

Abstract: Construction is a critical player in the U.S. economy. Construction contributed \$884 billion to the nation's GDP in 2019, employing more than 7.5 million people in the United States. Despite its prominent role in the national economy, the construction industry still deals with long-standing problems. Construction project managers (CPMs) are critical to resolving many of these problems. Identifying training gaps in construction project management requires a deep awareness of the necessary competencies. The authors identified 21 skills required for CPMs and revealed essential knowledge areas and personality characteristics critical to each skill. A survey including 672 ranking questions was developed to explore the global construction academics' perception of the importance of each knowledge area/personality characteristic to each skill. Each participant ranked the importance of two universal knowledge areas, two domain-specific knowledge areas, and three personality characteristics to three skills. The data was collected from 2,016 construction academics worldwide. This paper focuses on the ability to create written and oral communications appropriate to the construction discipline. The findings can assist the construction academia in directing their efforts toward key competency development areas, and scaffolding courses and planning curricula to the real needs of the worldwide workforce.

Keywords: Communication, Construction project management, Knowledge, Personality characteristic, Skill

Citation: Pariafsai, F., Dixit, M. K., Pariafsai, S., Caffey, S. M., Escamilla, E. F., & Fields, S. (2023). Core

Competencies Critical to Create Communications Required in Construction Discipline: Perception of the Global Academia. In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023-- International Conference on Social and Education Sciences* (pp. 156-167), Las Vegas, NV, USA. ISTES Organization.

Introduction

The construction industry plays a crucial role in the global economy. Approximately 7% of the global labor force is employed in the construction sector, contributing to approximately 13% of the world's Gross Domestic Product (MGI, 2017). The construction sector plays a vital role in the economy of the United States and substantially impacts the lives of a significant portion of the population. In 2019, the construction industry made a significant contribution of \$884 billion to the GDP of the United States (BEA, 2019) while providing employment opportunities for over 7.5 million individuals in the country (BLS, 2019). The construction industry in the United States faces a range of new realities and challenges due to various factors, such as global market competition, disruptive technologies, environmental restrictions, an aging workforce, and evolving regulatory requirements. These factors, combined with the industry's extensive scope and complex nature, cause ongoing challenges for the construction sector in the United States (Ahn et al., 2012; WEF, 2016). Many construction jobs and processes are transforming as a result of advancements in automation and robotics, big data and predictive analysis, industrialized construction, the Internet of Things (IoT), digital transformation, new project delivery methods, and additive manufacturing, etc. (Aghion et al., 2019; Debra & Anil, 2019; MGI, 2017; Salehi et al., 2023a; Salehi et al., 2023b). Based on the 2013 construction workforce survey conducted by the Associated General Contractors of America, 74% of construction firms experienced difficulties in finding an adequate labor force (AGC, 2018).

According to Debra and Anil (2019), the future of construction work brings challenges and opportunities that require collaboration between the industry and academia. By working together, they can focus on educating and preparing the future workforce to address the evolving needs and demands of the construction industry (Boroughani, Behshad, et al., 2023; Boroughani, Xodabande, et al., 2023; Rezaei et al., 2013). For effective collaboration between the construction industry and academia, it is essential to assess how the competencies developed by educational institutions align with the demands of the future built environment. Specifically, examining how these competencies can adapt to the transformative changes brought about by industrialized construction is crucial (Pariafsai & Behzadan, 2021; Pariafsai & Pariafsai, 2021). The performance of construction projects greatly relies on the workforce, particularly the role of construction project managers, as they are instrumental in achieving improved project outcomes (Ahn et al., 2012). Given their critical role, construction project managers should possess various competencies to enhance team performance and attain desired project outcomes.

The objective of this study is to identify the importance of ten universal knowledge areas, ten domain-specific knowledge areas, and twelve personality characteristics to the ability to create written and oral communications

appropriate to the construction discipline. Determining the importance of construction project management (CPM) competency components provides options for addressing the training of the future CPM workforce. In addition, this work contributes to establishing strategies for management development policies that construction organizations may adopt.

Literature Review

Conceptual Model for CPM Competencies

According to McClelland, competencies are best described as an iceberg (Vazirani, 2010). Knowledge and skills represent the iceberg's visible tip, while the underlying and enduring personal characteristics represent the large portion of the iceberg hidden below the waterline (Juneja, 2019; Sanghi, 2007; Vazirani, 2010). In addition, the paths for developing the two levels of competencies are distinct. Training and skill-building exercises can quickly improve knowledge and skills. On the other hand, behavioral competencies are difficult to assess and enhance (Juneja, 2019; Sanghi, 2007).

Literature includes different competency models. Generally, a competency model consists of innate and acquired aspects (Sanghi, 2007). Personal and professional competencies are essential components of the quality of human capital (Bogoviz et al., 2020). Applications of the concept of competencies for education and training assume competencies as a cluster of trainable skills, knowledge, and attitudes (van Klink & Boon, 2003). A competency model developed for effective management considers that the qualities of an effective manager fall into three levels: basic knowledge and information, skills and attributes, and meta-qualities. Meta-qualities help develop the situation-specific skills needed in particular contexts (Pedler et al., 2013). Competencies have also been classified into the categories of input and personal competencies. Input competencies are limited to the information, comprehension, skills, and capabilities an individual brings to a job. Personal competencies are the essential characteristics that distinguish a person's job capacity (Chai, 2016). Competencies have also been clustered into essential professional skills/talents, personal skills/talents, and behavioral patterns (Blašková et al., 2014). In another model, competencies have been grouped into interrelated knowledge, skills, and personal attributes required to perform a job properly. This model also divides knowledge and skills into soft and hard subcategories (Alroomi et al., 2012). Soft skills indicate who people are, and hard skills reflect what they know (Jena & Satpathy, 2017). Soft skills and knowledge are challenging to develop, whereas hard skills and knowledge can be developed easily (Alroomi et al., 2012). The other conceptual model divides competencies into two levels: behavioral and technical. Behavioral competencies include abilities and soft skills, while technical competencies are categorized into knowledge and hard skills in this model (Mohammad et al., 2016). The other competency model developed for crisis management clusters competencies into two levels: functional and personal. Functional competencies are a set of abilities focused on tasks. Personal competencies denote the ability of managers to keep themselves professionally ready to do the tasks effectively (Lovecek et al., 2015). In the standard International Project Management Association (IPMA) Competence Baseline 3.0, competency elements are defined under three ranges: technical, behavioral, and contextual competencies (Association, 2006;

Omidvar et al., 2011). Technical competencies are required for project deliverables. Behavioral competencies are needed for the personal relationships among all parties involved in a project, and contextual competencies are necessary for the interrelation of the project team within the context of a project (Omidvar et al., 2011).

Figure 1 presents the competency model used in this study for CPM into personal and input competencies. This model divides the competencies required for CPM into personal and input competencies. Personal competencies encompass core personality characteristics that are difficult to assess and enhance. Input competencies, on the other hand, include skills required for CPM. The skills are grouped into hard and soft skills. This model considers hard skills as a function of knowledge and soft skills as a function of core personality characteristics and knowledge. In addition, this conceptual model groups knowledge into two categories: universal and domain-specific. Universal knowledge areas are those required of all project managers. Domain-specific knowledge areas, on the other hand, are needed for project managers in the field of construction. This model considers skills as a function of knowledge and personality characteristics.

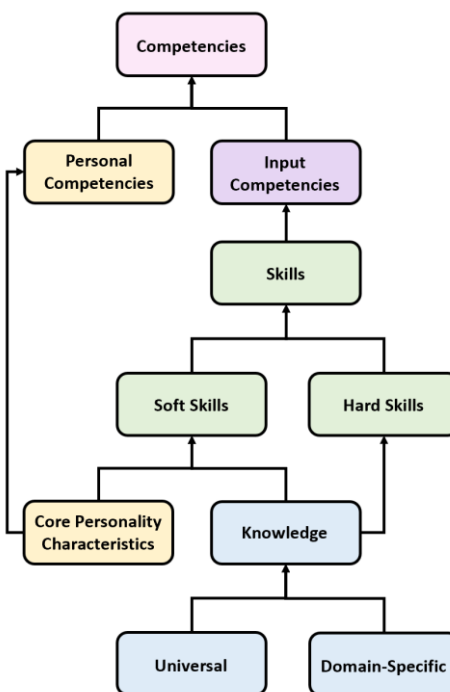


Figure 1. Conceptual competency model for CPM education and training

Identification of Skills, Knowledge Areas, and Personality Characteristics

The literature uses different terms to refer to a specific skill. The skills identified from the literature could be grouped into 21 categories based on their nature. This study focuses on the skill defined as the ability to create written and oral communications appropriate to the construction discipline.

Moreover, the Project Management Institute (PMI) has developed a list of ten knowledge areas as the body of

knowledge required in project management (PMI, 2007). This study used these ten elements as the universal knowledge areas (UKAs) required in CPM. They are as follows: project communications management (UKA1), project cost management (UKA2), project integration management (UKA3), project procurement management (UKA4), project quality management (UKA5), project resource management (UKA6), project risk management (UKA7), project schedule management (UKA8), project scope management (UKA9), and project stakeholder management (UKA10) (PMI, 2007).

To provide the list of knowledge areas required for CPM, PMI has added the following elements to the previous list: (a) Project health, safety, security, and environmental management and (b) Project financial management (PMI, 2016). The literature utilizes various phrases to mention a specific knowledge area needed in CPM. The identified domain-specific knowledge areas (DKAs) were grouped into ten categories based on their similarities: construction operation (DKA1), culture and ethics management (DKA2), legal and contractual management (project claims, conflicts, and dispute management) (DKA3), project change management (DKA4), project environmental management (DKA5), project financial management (DKA6), project health and safety management (DKA7), project leadership management (DKA8), project security management (DKA9), and project value management (DKA10).

The literature uses different terms to refer to a specific personality characteristic. The personality characteristic identified from the literature were grouped into 12 categories based on their nature to avoid redundancy: ambition, charisma, creativity, curiosity, determination, leadership, maturity, organization, patience, reasoning, team player, and trustworthiness.

Methodology

Survey Design

A design framework was used to divide the lengthy questionnaire to investigate the importance of the knowledge areas and personality characteristics to the skills. The survey includes 672 ranking questions:

- 210 ranking questions regarding the importance of 10 universal knowledge areas to 21 skills
- 210 ranking questions regarding the importance of 10 domain-specific knowledge areas to the 21 skills
- 252 ranking questions regarding the importance of 12 personality characteristics to the 21 skills

The aim was to randomly and evenly present 21 ranking questions to each participant. Each participant ranked the importance of two universal knowledge areas, two domain-specific knowledge areas, and three personality characteristics to three skills. Qualtrics, a popular web-based survey tool, was used to design the survey.

Data Collection

The website <https://www.topuniversities.com/universities> was used to find top Civil and Structural Engineering

departments in different countries worldwide. Next, 35,928 professors, post-docs, and students from 86 countries whose email were available on their department’s website were invited to participate. Among the invited people, 2,016 individuals tried the survey.

Analysis

Statistical Test

The one-sample sign test compares values to a given default value for ordinal data. The null hypothesis is that the population median from which the sample was drawn equals the default value. In addition to descriptive analysis, the one-sample sign test was used to investigate whether the corresponding five-point Likert scores were statistically significantly different from the default score of 3, representing the important option.

Required Sample Size

G * Power has been used to compute the required sample size based on the given α , power, and effect size. For the sign test, G * Power uses the following effect size conventions defined by Cohen in 1969: small $g = 0.05$, medium $g = 0.15$, and large $g = 0.25$ (Buchner et al., 2017). In addition, it is generally accepted that power should be 0.8 or greater (Zint, 2021). For $\alpha = 0.05$, power = 0.8, and effect size = 0.25, G * Power computed 30 for the sample size of each ranking question.

Results

Using the split questionnaire design, at least 36 participants identified the importance of each universal knowledge area, domain-specific knowledge area, and personality characteristic to the ability to create written and oral communications appropriate to the construction discipline. Based on the descriptive analysis, all ten universal knowledge areas are either very important or important to this skill (see Table 1). In addition, most participants perceived project communications management, project cost management, project procurement management, project resource management, project risk management, and project scope management as the universal knowledge areas very important to the skill. However, the one-sample sign test results revealed that, unsurprisingly, the participants perceived Project Communications Management as the only universal knowledge area more than important for this skill and the rest as important (see Table 2).

Table 1. Descriptive Analysis: Importance of Universal Knowledge Areas

UKA	Importance					Total
	Very Important	Important	Moderately Important	Of Little Importance	Not Important	
UKA1	22	12	5	1	0	40
UKA2	19	8	6	5	1	39
UKA3	11	20	9	3	0	43

	www.iconses.net	October 19-22, 2023	Las Vegas, NV, USA		www.istes.org	
UKA4	15	11	9	6	0	41
UKA5	10	17	10	3	0	40
UKA6	14	12	7	4	0	37
UKA7	15	12	4	5	1	37
UKA8	9	22	5	1	1	38
UKA9	13	12	10	3	0	38
UKA10	13	18	6	2	0	39

Table 2. One-Sample Sign Test Results for Universal Knowledge Areas

UKA	p-value	Median - Score			Total
		Negative Differences (Median < Score)	Positive Differences (Median > Score)	Ties (Median = Score)	
UKA1	.007	19	5	17	41
UKA2	.832	12	10	19	41
UKA3	.824	9	11	20	40
UKA4	1.000	11	10	18	39
UKA5	.584	17	13	10	40
UKA6	.115	14	6	19	39
UKA7	.000	22	3	14	39
UKA8	.210	15	8	18	41
UKA9	.238	12	6	21	39
UKA10	.839	11	13	15	39

Based on the descriptive analysis, except for culture and ethics management and project security management, all other ten domain-specific knowledge areas are either very important or important to the ability to create written and oral communications (e.g., presentation, report, negotiation, marketing) appropriate to the construction discipline (see Table 3). However, the one-sample sign test results revealed that the participants perceived project security management as the only domain-specific knowledge area less than important for this skill and the rest as important (see Table 4).

Table 3. Descriptive Analysis: Importance of Domain-Specific Knowledge Areas

DKA	Importance					Total
	Very Important	Important	Moderately Important	Of Little Importance	Not Important	
DKA1	10	18	4	4	1	37
DKA2	11	11	12	5	0	39
DKA3	15	14	5	4	1	39
DKA4	11	17	7	4	0	39
DKA5	9	16	8	3	1	37

	www.iconses.net	October 19-22, 2023	Las Vegas, NV, USA		www.istes.org	
DKA6	17	10	6	3	1	37
DKA7	9	14	10	5	0	38
DKA8	14	13	9	3	0	39
DKA9	7	10	12	6	1	36
DKA10	12	15	10	2	0	39

Table 4. One-Sample Sign Test Results for Domain-Specific Knowledge Areas

DKA	p-value	Median - Score			Total
		Negative Differences (Median < Score)	Positive Differences (Median > Score)	Ties (Median = Score)	
DKA1	.006	23	7	8	38
DKA2	1.000	10	11	18	39
DKA3	.307	15	9	13	37
DKA4	.541	14	10	14	38
DKA5	.441	16	11	12	39
DKA6	.678	13	10	16	39
DKA7	.000	22	3	13	38
DKA8	.124	18	9	13	40
DKA9	.571	16	12	11	39
DKA10	.541	14	10	14	38

Based on the descriptive analysis, curiosity and leadership were very important personality characteristics for the skill. In addition, ambition was the only personality characteristic moderately important for the skill, and the rest were important (see Table 5). However, the one-sample sign test results revealed that reasoning was the only personality characteristic the participants perceived as more than important for this skill. The one-sample sign test results also indicate that the participants perceived ambition and charisma as less than important for this skill. Based on the one-sample sign test results, the participants perceived the rest of the personality characteristics as important for the skill (see Table 6).

Table 5. Descriptive Analysis: Importance of Personality Characteristics

Personality Characteristic	Importance				Total
	Very Important	Important	Moderately Important	Of Little Importance	
Ambition	8	13	15	9	48
Charisma	9	18	17	2	48
Creativity	13	21	9	5	48
Curiosity	14	13	12	5	47
Determination	12	16	12	6	48

	www.iconses.net	October 19-22, 2023	Las Vegas, NV, USA		www.istes.org	
Leadership	21	16	7	2	2	48
Maturity	17	19	9	2	0	47
Organization	15	26	6	1	0	48
Patience	8	25	12	3	0	48
Reasoning	20	24	2	1	0	47
Team player	10	20	12	5	0	47
Trustworthiness	14	19	10	4	0	47

Table 6. One-Sample Sign Test Results for Personality Characteristics

Personality Characteristic	p- value	Median - Score		Ties (Median = Score)	Total
		Negative Differences (Median < Score)	Positive Differences (Median > Score)		
Ambition	.001	7	27	12	46
Creativity	.265	11	18	20	49
Determination	.855	16	14	18	48
Organization	.007	19	5	22	46
Charisma	.067	12	24	12	48
Team player	.728	18	15	15	48
Leadership	.556	11	15	22	48
Reasoning	.327	16	10	20	46
Patience	.728	15	18	15	48
Maturity	.735	19	16	12	47
Curiosity	.000	3	27	16	46
Trustworthiness	.361	18	12	18	48

Conclusion

The findings of this study revealed that the academia perceived project project communications management as the only universal knowledge areas more than important to the ability to create written and oral communications (e.g., presentation, report, negotiation, marketing) appropriate to the construction discipline and the rest of the 9 universal knowledge areas as important to the skill. The results also indicated that the academia perceived project security management as the only domain-specific knowledge area less than important for this skill and the rest as important. In addition, reasoning was the only personality characteristic the academia perceived as more than important for this skill. The academia also perceived ambition and charisma as less than important for the skill. Based on the one-sample sign test results, the participants perceived the rest of the personality characteristics as important for the skill.

The already employed and the newly hired construction project managers must acquire critical competencies on time. Accordingly, a strategic plan is essential to keep construction project managers' competencies up to date and enable them to manage the ever-increasing complexity of the construction industry. The primary steps to reexamine how construction project managers should be educated and trained is to determine the most critical competencies to fill the existing gaps. This study is a step forward in identifying the most critical knowledge areas and personality characteristics required for the ability to create written and oral communications (e.g., presentation, report, negotiation, marketing) appropriate to the construction discipline.

The findings of this study contribute to improving CPM training programs and assessment criteria. The results can also assist in refining recruitment criteria and sustainable employability in CPM. Overall, the findings of this study make recommendations for forging the path ahead by assisting the construction industry in directing its efforts on core competency development areas and catering training and professional development to the real needs of the future workforce.

References


- AGC. (2018). *The Workforce Development Plan 2.0* (AGC of America's New Plan to Address Growing Construction Workforce Shortages, Issue. T. A. G. C. o. America. https://www.agc.org/sites/default/files/Files/Communications/Workforce_Development_Plan_2.0_FINAL.pdf
- Aghion, P., Antonin, C., Bunel, S., Coyle, D., Qureshi, Z., O'Mahony, M., Böhm, M. J., Ritzer, G., Shell, E. R., Woodcock, J., Moore, P. V., Muñiz, M., Andrés, J., Doménech, R., Serra, C. P., Gleason, N. W., Maitland, A., Ciulla, J. B., & Lee, K.-F. (2019). *Work in the Age of Data*. BBVA <https://www.bbvaopenmind.com/en/books/work-in-the-age-of-data/>
- Ahn, Y. H., Annie, R. P., & Kwon, H. (2012). Key competencies for US construction graduates: Industry perspective. *Journal of Professional Issues in Engineering Education and Practice*, 138(2), 123-130.
- Alroomi, A., Jeong, D. H. S., & Oberlender, G. D. (2012). Analysis of cost-estimating competencies using criticality matrix and factor analysis. *Journal of Construction Engineering and Management*, 138(11), 1270-1280.
- Association, I. P. M. (2006). ICB-IPMA competence baseline version 3.0. *International Project Management Association, Nijkerk*.
- BEA. (2019). *Gross Domestic Product by Industry: Second Quarter 2019*. U.S. Bureau of Economic Analysis. Retrieved October 29 from https://www.bea.gov/system/files/2019-10/gdpind219_2.pdf
- Blašková, M., Blaško, R., & Kucharčíková, A. (2014). Competences and Competence Model of University Teachers. *Procedia - Social and Behavioral Sciences*, 159, 457-467. <https://doi.org/https://doi.org/10.1016/j.sbspro.2014.12.407>
- BLS. (2019). *Construction: NAICS 23*. U.S. Bureau of Labor Statistics. Retrieved December 13 from <https://www.bls.gov/iag/tgs/iag23.htm#iag23emp1.f.p>

- Bogoviz, A. V., Suglobov, A. E., Maloletko, A. N., Kaurova, O. V., & Lobova, S. V. (2020). *Frontier Information Technology and Systems Research in Cooperative Economics* (Vol. 316). Springer Nature.
- Boroughani, T., Behshad, N., & Xodabande, I. (2023). Mobile-assisted academic vocabulary learning with digital flashcards: Exploring the impacts on university students' self-regulatory capacity. *Frontiers in Psychology, 14*, 1112429. <https://doi.org/10.3389/fpsyg.2023.1112429>
- Boroughani, T., Xodabande, I., & Karimpour, S. (2023). Self-regulated learning with mobile devices for university students: exploring the impacts on academic vocabulary development. *Discover Education, 2*(5). <https://doi.org/https://doi.org/10.1007/s44217-023-00028-z>
- Buchner, A., Erdfelder, E., Faul, F., & Lang, A.-G. (2017). *G * Power 3.1 manual*. Heinrich Heine University Düsseldorf. https://www.psychologie.hhu.de/fileadmin/redaktion/Fakultaeten/Mathematisch-Naturwissenschaftliche_Fakultaet/Psychologie/AAP/gpower/GPowerManual.pdf
- Chai, A. H. R. (2016). *Competencies of Construction Manager UTAR*].
- Debra, P., & Anil, S. (2019). *Future of work in construction*. A. a. RICS. https://www.rics.org/globalassets/rics-website/media/knowledge/20200603_autodesk_whitepaperconstruction_web.pdf
- Jena, A., & Satpathy, S. S. (2017). Importance of soft skills in project management. *International Journal of Scientific Research and Management, 5*(7), 6173-6180.
- Juneja, P. (2019). *Competency Based Assessment*. Management Study Guide (MSG). <https://www.managementstudyguide.com/what-are-competencies.htm>
- Lovecek, T., Ristvej, J., Sventekova, E., Mika, V., & Zagorecki, A. (2015). Currently required competencies of crisis and security managers and new tool for their acquirement—The eSEC portal. 2015 13th International Conference on Emerging eLearning Technologies and Applications (ICETA), MGI. (2017). *Reinventing construction: A route to higher productivity*. M. Company. <https://www.mckinsey.com/~media/McKinsey/Industries/Capital%20Projects%20and%20Infrastructure/Our%20Insights/Reinventing%20construction%20through%20a%20productivity%20revolution/MGI-Reinventing-construction-A-route-to-higher-productivity-Full-report.ashx>
- Mohammad, H., Yaman, S. K., Hassan, F., & Ismail, Z. (2016). Determining the technical competencies of construction managers in the Malaysia's construction industry. MATEC Web of Conferences,
- Omidvar, G., Jaryani, F., Samad, Z. B. A., Zafarghandi, S. F., & Nasab, S. S. (2011). A proposed framework for project managers' competencies and role of E-Portfolio to meet these competencies. *International Journal of e-Education, e-Business, e-Management and e-Learning, 1*(4), 311.
- Pariafsai, F., & Behzadan, A. H. (2021). Core Competencies for Construction Project Management: Literature Review and Content Analysis. *Journal of Civil Engineering Education, 147*(4), 04021010.
- Pariafsai, F., & Pariafsai, S. (2021). Classification of Key Competencies for Construction Project Management: Literature Review and Content Analysis. *International Journal of Scientific Research in Science, Engineering and Technology (IJSRSET), 8*(3), 211-234. <https://doi.org/https://doi.org/10.32628/IJSRSET218334>
- Pedler, M., Burgoyne, J., & Boydell, T. (2013). *A Manager's Guide to Self-development*. McGraw-Hill Education (UK).

- PMI. (2007). *Project manager competency development (PMCD) framework* (P. M. I. (PMI), Ed.). Project Management Institute (PMI).
- PMI. (2016). Construction Extension to the PMBOK® Guide.
- Rezaei, A., Boroghani, T., & Rahimi, M. A. (2013). Reflectivity/Impulsivity as an Important Individual Factor and Effectiveness of Awareness Raising Activities.
- Salehi, F., Pariafsai, F., & Dixit, M. K. (2023a). How Human Spatial Ability is Affected by the Misalignment of Idiotropic and Visual Axes. In D. D. Schmorow & C. M. Fidopiastis, *Augmented Cognition* Cham.
- Salehi, F., Pariafsai, F., & Dixit, M. K. (2023b). The impact of misaligned idiotropic and visual axes on spatial ability under altered visuospatial conditions. *Virtual Reality*.
<https://doi.org/https://doi.org/10.1007/s10055-023-00859-z>
- Sanghi, S. (2007). *The Handbook of Competency Mapping: Understanding, Designing and Implementing Competency Models in Organizations* (2nd ed.). SAGE Publications Pvt. Ltd.
<https://www.amazon.com/Handbook-Competency-Mapping-Understanding-Organizations/dp/0761935983>
- van Klink, M. R. d., & Boon, J. (2003). Competencies: The triumph of a fuzzy concept. *International Journal of Human Resources Development and Management*, 3(2), 125-137.
<https://doi.org/https://doi.org/10.1504/IJHRDM.2003.002415>
- Vazirani, N. (2010). Review paper: competencies and competency model—a brief overview of its development and application. *SIES Journal of management*, 7(1), 121-131.
<http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.469.7219&rep=rep1&type=pdf#page=123>
- WEF. (2016). *Shaping the Future of Construction: A Breakthrough in Mindset and Technology* (220416). W. E. Forum. <https://www.weforum.org/reports/shaping-the-future-of-construction-a-breakthrough-in-mindset-and-technology>
- Zint, M. (2021). *Power Analysis, Statistical Significance, & Effect Size*. My Environmental Education Evaluation Resource Assistant (Meera). <https://meera.snre.umich.edu/power-analysis-statistical-significance-effect-size>

Connecting the Clinical to the Classroom

Sheryl Cornelius

Presbyterian School of Nursing at Queens University of Charlotte, United States,  <https://orcid.org/0009-0005-6927-6931>

Abstract: The student said, "Oh, that is why we learned that!". The student that sparked this research admitted that as she went through the program she often thought, "why are we learning this? I cannot see utilizing this in my everyday job." In academia today, we often treat the clinical or practicum experience as a separate component of the learning. Some schools even front load the content so they do all of the experiential learning after the classroom portion is over. Experiential learning works best when the learner can connect what they see and hear in the classroom to what they are actually seeing and doing in the field. There are a number of ways to bring the two worlds together. One program did just that and based on findings, the students felt better prepared for the job after graduation. The element of the unknown was removed. Students reported feeling more prepared for their new career and were able to fully grow during the orientation.

Keywords: Clinical, Classroom, experiential learning

Citation: Cornelius, S. (2023). Connecting the Clinical to the Classroom. In *Proceedings of IConSES 2023--International Conference on Social and Education Sciences* (pp. 168-174), Las Vegas, NV, USA. ISTES Organization.

Introduction

For a healthcare student to succeed in the course of study many connections must be created throughout their program to allow for retention of information. Students must see the learning as a process and the client as a whole as opposed to the tasks involved in their care. One issue that has plagued educators over time is how to connect the content that is presented in the classroom or the lab to the clinical practice in a manner that encourages those connections.

Historically, programs of healthcare and nursing taught a passive lecture and activity package in the classroom that was more successful with auditory and visual learners. They sprinkled the experiential learning clinical hours weekly throughout the program and this allowed for the kinesthetic learners to gain some practice. Students were often studying diseases of the respiratory system in the classroom and had an oncology client in the clinical setting in the same week. With no congruence of classroom content to clinical content, the student treated these two pieces of learning as separate courses and rarely found the connection between the two. The two sections of the course were taught in different styles as well as with separate outlines of content. The classroom was very rigid, planned: while the clinical area was very opportunistic based on what clients were

available on the floor they were utilizing that day. The intentionality was not there to choose clients that matched the classroom. Students often looked for the tasks such as putting in a Foley catheter or starting an IV rather than what disease process was being discussed in the classroom.

We know “The learning style determines the learning quality, which in turn affects the well-being of college students” (Han, 2022). If we wanted all learners to retain both classroom and clinical situations we needed to utilize a way that brought the two together. The research method of organically combining the theory of the thinking with the way of action is the most effective approach to improve classroom retention of knowledge (Thoms, 2020).

According to Raab (2021), “the theory of “action learning” believes that learning activities are a series of continuous processes of action and reflection, which is the combination of structural knowledge and the four elements of questioning, reflection, and execution, emphasizing the construction of learning through the reciprocating cycle of knowledge, reflection, and action”. Further, Donald Schon’s theory reflecting-in-action (Schon, 1991), allows for students to reflect on what they know about the content as they are experiencing it and make connections between the new and prior content.

This unending loop of content from the lecture and activities in the classroom to the experiential learning of the same content in the clinical setting and then back to the classroom was the basis for this study. Allowing multiple learning styles to be utilized and with repetition of the content in different methods, students were able to retain the information longer through connections from the known knowledge to the learned knowledge.

Population

This study followed 92 college students through their second semester of a four semester Baccalaureate of Science in Nursing program at a small South Eastern private university. The course utilized was a Mental/Behavioral Health Nursing course that is offered Spring and Fall each year. Students were followed in two cohorts to gain a larger sample overall in the Fall and then Spring of 2022/2023 academic year. They were randomly chosen for clinical placement by an outside clinical coordinator not involved in the study as to keep the groups random. The demographics of the students are as below in Table 1.

Table 1. Demographics of Students

Variables		N	Mean
Group	A.	47	51
	B.	45	49
Age	20-24	70	76
	other	22	24

Gender	F	88	95.6
	M	4	0.04
Total		92	

Method

Two groups of students were studied in reference their clinical experience and the timing of it in connection with the classroom contact. Group A went to clinical weeks 3-7 of the 15-week semester; Group B went to clinical weeks 9-13 of the semester. Whether they were in clinical or not, students met in the classroom on campus each week for lecture, discussion, activities, and reflection. The content taught in the classroom was the same for all cohorts. The classroom was on Tuesday and the Clinical experience was on Wednesday each week so they had the content of the class fresh in their mind.

Group A began clinical experiences at a local inpatient behavioral health unit based in a locked hospital unit of the metropolitan city in which the university is based. The students received basic information in the two weeks prior to clinical on safety, what they might see in the hospital setting, what the client can and cannot do, and the basics of therapeutic communication. All students were to go in with the goal of completing a therapeutic conversation and to analyze the transcript of the conversation for improvement. Group two had clinical later in the semester once most of the content was already delivered, but with the same goal.

In addition to what was being taught in the classroom each week, Group A was prepped for clinical utilizing the content they had discussed in class that week. For example, when the topic of addiction and dual diagnosis was discussed in class, students were encouraged to seek out clients with these types of diagnoses in the clinical setting. If a student was on a cardiac floor and they were discussing respiratory disorders in the classroom; the student could still perform a focused respiratory assessment on a cardiac client as well as look for clients on the unit that had co-morbidities such as Chronic Obstructive Pulmonary Disease (COPD) or other chronic respiratory disorders.

The intentionality of creating an experience that repeated what they were doing in the classroom had to be there for the student and the professor. Professors and students alike were taught to think of the content in a concept-based way instead of just in the setting it was presented. They were encouraged to reflect in action by bringing what they had learned in the classroom the day prior to what they were seeing in the clinical setting on the next day and then talking through it with a debriefing as a group at the end of the clinical experience.

Professors in the past had thought, “we are on a cardiac floor, let’s see everything we can about cardiac in case we do not see it again”, when in fact the student had not even gotten to the cardiac content yet in the classroom and had a very disjointed experience. This added to the confusion for students of what to do while in the clinical

setting and how it was connected to the learning for the next exam they were preparing to take. This also made the learning very disconnected. When the student felt they did not have enough knowledge to care for the client

they were assigned, they sought something out that they did know. They had been taught all “skills” before clinical and wanted to practice putting in a catheter or placing an intravenous line. These are tasks that do not take as much critical thinking as managing the client’s care plan and long-term prognosis. The debriefing session after clinical when a student did more task-based care is much less fruitful. Students need to see an entire “case” or story of a client to connect the pieces of the learning needed. It is difficult to Assess, Diagnosis, Plan, Intervene, & Evaluate (Nursing Process) when the only things they did for the day are a multitude of tasks that did not connect to any client in specifics.

Adult learners need to connect the new content to something they already know. Malcolm Knowles (1973) described in his book *The Adult Learner* 5 assumptions that we can be seen in students at all ages after K-12.

1. Adults become more independent as they move through life. Rather than being dependent personalities like children, we become self-directed individuals as we grow older.
2. Adults have vast previous experience from which they can draw knowledge and references into the learning process.
3. Adults want to learn and are prepared to do so when there is a good reason.
4. Adult learners want their learning to be actually applicable to their everyday lives.
5. As humans grow older, their motivation to learn becomes internal. (Knowles, 1984)

These students had to have these needs met to fully get the experience we were trying to give to them. As we designed the classroom activities, we wanted students to have something to build upon. For example, practicing the principles of therapeutic communication in the classroom with a partner was “awkward” but they at least were able to put those principles into practice. Then once they were in the presence of a patient that they needed to speak therapeutically with, they at least had a practice session to look back on to remember what was good and what could have been executed more properly.

Students also needed to know why this was necessary to their everyday lives as a nurse and what is the rationale for being prepared with this information. Students quickly noticed how the conversations were very different in the setting of behavioral health than in the medical surgical areas. They needed this information to be able to practice safely in the clinical setting and to understand the material to be able to pass the exam.

Professors in the clinical area and in the classroom had to buy-in to the process because it was a substantial change for them. There also had to be significant communication between the clinical and classroom professors as well planning prior to the semester. If the clinical professors did not make the change, then the students did not truly get the benefit of the method. Some were much more open to the change than others. Professors also had to guide the debriefing session at the end to bring those connections together.

Group B did not get to attend a clinical experience until more than halfway through the semester. In conversations with their peers some were jealous that they were not getting to see it as they learned about it. Others just wanted to ensure they passed the exam and would “think about the clinical part later” a student stated. The students also were not “prepped” for clinical as the first group was prepped. The students were sent to clinical and were allowed to choose from a list of clients that the professor had selected. Some students chose clients that resembled what they had been discussing in the classroom, but most students chose clients that sounded interesting to them with no regard for diagnoses that were currently being taught.

At the end of the semester, students were asked to complete an 8-question survey in 5-part Likert style to determine what they felt they learned or did not learn in the class/clinical experience. Students took a standardized assessment formulated by the professor at the beginning of the class from an Elsevier product called Elsevier Adaptive Quizzing (EAQ)s. At the end of the semester the student took another standardized exam created by Health Education Systems Inc. (HESI) on Behavioral Health content. The EAQ score was compared to the HESI score to see that they had improved. The survey gave numeric data as well as qualitative comments about the process.

IRB approval was obtained from the university and all students that participated were under a voluntary basis. The Likert surveys were completed on paper without names and were collected by someone other than the principle researcher to maintain anonymity. Data was collected and input into an excel spreadsheet that was password protected. Pages that were originally written on were shredded in a secure place. All information was stored deidentified and securely on the university server and password protected.

Results

Overall, students that were in Group A reported that they were more prepared for clinical. Of the 92 students surveyed, 87% ($n=80$) reported SA or A that where the clinical was placed in the semester made a difference in their learning. Students in Group A that went to clinical as the content was being taught and sought out that content in the hospital setting claimed that it was easier for them to make the connections. Group B said they could see the difference in their classmates that were in clinical at the time of the content in class.

One student said, “When I am talking about therapeutic communication in the classroom then we practice it on each other, I do not always connect it to a real patient. When I used therapeutic communication the day after it was taught and we practiced in the classroom, it made things clear to then go practice it on a patient (Student survey, March 2023)”. Another said, “I wanted to just pick the most interesting patient but I see now how looking for the clients that we were studying in the classroom actually helped me bring things together and study for the exam.” Anecdotally, students reported in comments that they were more prepared for the exams as well while they were seeking the classroom content out in the clinical setting.

Students in Group A versus Group B did slightly better on the transition from the EAQ test at the beginning and the HESI exam at the end. Group A’s mean scores increased by 13% from pre-course EAQ to post course HESI; Group B increased by 9%. There are a number of variables to take into consideration but there is a definite increase in Group A (control group). The data will continue to be collected for a larger sample.

	EAQ Mean	HESI Mean	Mean Growth
Group A	78%	91%	13%
Group B	75%	84%	9%

Figure 1. Percentage of Growth from Pre-Course Testing to Post Course Testing

Table 2: Questions included in the survey

- How old are you? 20-24 years old OR other
- Which gender do you identify with? Male Female Other
- Which race do you identify with?
 *LatinX *African American or Black *Pacific Islander *Caucasian *Native or Indigenous *Asian
 *other

- How satisfied were you with the placement of your clinical- 1st half or 2nd half?
 *Very Much Disliked *Disliked *Neutral *Liked *Very Much Liked

Comments:

- Do you feel the placement made a difference in your learning in the course?
 *Very Much Disliked *Disliked *Neutral *Liked *Very Much Liked

Comments:

- Did you seek clients that were similar to the ones we were discussing in the classroom whether they were assigned to you or not?
 * Never *Sometimes *Neutral *Frequently *Always

Comments:

- Did you feel prepared for clinical?
 *Very Much Disliked *Disliked *Neutral *Liked *Very Much Liked

Comments:

- Which half were you in clinical – 1st or 2nd- and would you do that again if given the choice?
 * Never *Sometimes *Neutral *Frequently *Always

Taking into the consideration the increase in testing scores but also the Likert Survey and the comments in the survey- we will be continuing this process of preparing the students to look for what they are studying in class to

the same content in the clinical area. Our goal is to move it into other clinical areas besides Behavioral/Mental Health.

Conclusion

There is data to support making the clinical component match the classroom content at the same time does help increase the connections for the student and their bridge from classroom to clinical and eventually to career. To fall back on Knowles (1973), the adult learner is able to make connections to content that is known, they are seeing what it actually will mean to the activities of daily in an employment situation, and they see the connection to the learning. Utilizing the multiple learning styles also increases the retention of material.

Recommendations

Recommendation is to submit this data to the other courses in the program in hopes of it going into each clinical course. Faculty buy-in is a barrier so ensuring the faculty have the tools before the idea is pitched is essential. Prep the students early in the program so they are unknowingly looking at clinical as an extension of the classroom instead of a separate course.

References

- Han, Z. (2022). Exploration of Happy Learning for College Students with the Integration of Thinking Visualization and Action Learning in the Internet + Environment. *Journal of Environmental and Public Health*, 2022. <https://doi.org/10.1155/2022/9039630>.
- Knowles, M. (1973). *The Adult Learner: A Neglected Species*. Gulf Publishing Company, Houston, TX.
- Raab, M. (2021) How the body and the environment affect our thinking? *ScienceDirect: Judgment, Decision-Making, and Embodied Choices*, vol. 64 no. 12, pp. 29-46, 2021.
- Schon, D. A. (1991). *The Reflective Practitioner*. Ashgate Publishing.
- Thoms, V. (2020). Critical reflection in action, or learning to live again, and again. *Dance Chronicle*, vol. 43 no. 3, pp. 338-342, DOI: 10.1080/01472526.2020.1816741, 2020.

Recruitment Strategies for Master's Degree in AI among High Achieving Low-Income Engineering Students

Dimitrios Pados

Florida Atlantic University, USA,  <https://orcid.org/0000-0001-8959-6450>

Javad Hashemi

Florida Atlantic University, USA,  <https://orcid.org/0000-0002-3242-8752>

Nancy Romance

Florida Atlantic University, USA,  <https://orcid.org/0000-0002-8449-0187>

Xingquan (Hill) Zhu

Florida Atlantic University, USA,  <https://orcid.org/0000-0003-4129-9611>

Stella Batalama

Florida Atlantic University, USA,  <https://orcid.org/0000-0001-7667-7868>

Abstract: The unprecedented growth in the use of AI and its related technologies will put a tremendous stress on US institutions to produce the required number of technologically prepared workers to fill critically important job openings. In the US, low-income and URM students participate less vigorously in STEM-related fields; the problem is even more serious in post-baccalaureate level degrees. To address the future needs of the nation, we must increase the number of low-income students in STEM, with special attention to AI related technologies, to fill the millions of technology job openings. This paper will report on the impact of a NSF S-STEM project in which we combined (a) a mentorship model for talented, low-income students to develop a sense of self-efficacy and belongingness along with (b) a model of curricular and co-curricular supports (e.g., including engagement with AI technologies and research) and (c) limited financial assistance, all of which have increased the low-income student success in completing both their BS degree in engineering and their MS degree in AI, and addressing a national need.

Keywords: Low-Income, High-Achieving, Master's, AI, STEM

Citation: Pados, D., Hashemi, J., Romance, N., Zhu, X., & Batalama, S. (2023). Recruitment Strategies for Master's Degree in AI among High Achieving Low-Income Engineering Students. In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023-- International Conference on Social and Education Sciences* (pp. 175-186), Las Vegas, NV, USA. ISTES Organization.

Introduction

The STEM workforce size and availability remains a national security issue for the US in its competition with emerging economic powers. According to a 2022 report by the National Science Board, S&E degree production has experienced only a moderate rise in the US and European union compared to rapid rise in China¹. Over the past decade the US has experienced a 34% increase in the number of jobs requiring STEM expertise². However, the number of women and minorities pursuing S&E degrees significantly lags that of the white male group in the US³. The problem is exacerbated when considering STEM participation among children of low-income families, regardless of race and ethnicity⁴. Low-income students are pursuing STEM at a significantly lower rate than their high income counterparts⁴. Accordingly, the workforce shortage issue is becoming more serious in the US especially in industries that require skilled and high-tech labor and to address this challenge we need participation from all socioeconomic groups.

Considering that low-income students make up 45% of the total high school student body in the nation, their participation in the STEM fields becomes of critical importance¹¹. However, the participation of students from low-income families in STEM fields is problematic and deficient for a variety of reasons: 1) students from low-income families find the exams associated with entrance to STEM fields stressful and anxiety provoking⁷, 2) they have limited access to technology in their homes⁴, 3) the families live in poor neighborhoods with schools of lower financial means and lower quality education⁴, and 4) they often lack admission requirements. Even with all these impediments to success, some of the low-income students choose STEM fields. However, the success rate of these students who choose STEM field significantly lags their high-income counterparts: for example, only 10% of those students classified as low-income graduate from STEM fields with a 4-yr degree in comparison to 76% for their high income counterparts⁸⁻¹⁰. Therefore, the low-income students are highly likely to make slow progress towards advancing their education, often changing fields, or drop out altogether⁴. Often, because of financial reasons, pursuit of more advanced degrees such as MS and PhD are well beyond the scope of low-income students. Yet, we do believe that the primary objective of a low-income student is to start a career and become financially stable.

The situation of joining the skilled STEM workforce for low-income students is further exacerbated by the diffusion of Artificial Intelligence (AI) applications across all disciplines and career pathways. For instance, in 2022, 19% of the workforce were in jobs that were heavily exposed or impacted by AI while 23% are in jobs that have some exposure to AI. There have been calls to Integrate AI and STEM education^{5,6}. Advocates of AI in STEM education suggest that with the increasing prevalence of AI in our society and jobs, AI education should become a necessary aspect of all fields but especially STEM fields. One must look at AI in education the same way that we look at proficiency in language and comprehension; education of AI fundamentals must be integrated in all fields.

To address the abovementioned challenges, in this paper, we report on an NSF supported S-STEM initiative to help high achieving low-income students that have entered our engineering programs at Florida Atlantic University (FAU) to 1) stay with program and complete their degree requirements in a timely manner and 2) pursue an accelerated master's degree in AI or another engineering discipline. In reporting on our S STEM initiative, we hope to show that it is possible to mentor talented low-income students towards advanced degrees in engineering, especially in AI, and address the high tech and skilled workforce needs of the nation. Our hypothesis is that with a combination of limited financial assistance, curricular, and co-curricular support, talented low-income students will complete their degree requirements, pursue and complete their Master's degree in AI, and secure a high quality industry position upon graduation.

Methods

Program Details and Implementation

The project plan involved four major components: 1) identification and recruitment of qualified students, 2) curricular support, 3) co-curricular support, and 4) graduate school or career readiness. These four components comprise the project intervention, address major needs identified in the literature, and were selected to promote student success, persistence, timely graduation, and pursuit of a Master's degree.

1. *Student Identification and Recruitment:* Working with FAU's Financial Aid Office and Office of the Provost, and through extensive advertisement throughout the college, an eligible pool of students within the College of Engineering and Computer Science was identified (students from all departments were considered) each year. The following criteria were applied in order to determine students who were qualified: i) the students had to be classified as low-income as evidenced by their FAFSA application, ii) the students had to show unmet financial need, and iii) the students had to have a GPA of 3.25 and above. The applicant's records were checked within our Division of Engineering Student Services and Advising (DESSA) for completeness and accuracy. The students' academic and financial records including i) level of unmet financial need, ii) number of hours dedicated to outside work, iii) engagement in extracurricular activities, iv) overall academic potential, and v) special needs were checked and recorded. Institutional IRB was secured for access to student information.

2. *Cohort Structure:* In this research, our high achieving, low-income Scholars were organized into Cohorts to promote a goal-oriented and supportive environment that resulted in persistence to complete a BS degree and pursue a graduate degree. Cohort structures much like learning communities improve persistence among low income, underrepresented and FTIC students⁴⁸⁻⁵⁰. Effective Cohort configuration models promote social integration and a sense of belonging, two factors which support and amplify student success⁴⁹. The advantages of a cohort structure have been highlighted as belonging to a group of learners with similar goals, positive peer relationships, cooperative learning and peer teaching or tutoring, sense of cohesiveness, social and academic networks, and greater motivation⁴⁹.

3. Development of BS/MS Accelerated Degree Program: The University has established criteria for all accelerated (5-Yr) BS/MS degree programs within select disciplinary fields. In such programs, students can enroll in up to three graduate courses (9 credits) during their junior or senior undergraduate years that will apply towards both their BS and MS degrees. Because focus on AI is critical for the nation and applicable across all engineering domains²⁸, we developed a 5-year accelerated BS (in discipline)/MS (in AI) degree program. This was the first such degree program (BS-MS in AI) approved in Florida. We believe this is the first of its kind that offers a BS in any discipline and MS in AI. Any qualified student from any engineering discipline can apply for this program. For this program, students can enroll in 3 graduate courses of the four courses available during their undergraduate years: Computational Foundations of Artificial Intelligence - CAP5625, Data Mining and Machine Learning - CAP 6673, Artificial Intelligence -CAP 6635, and Robotic Applications -EEL5661. The selected courses will count as technical elective courses in the respective undergraduate programs; thus, students will not exceed the degree requirements in terms of number of credits. The mathematics and programming prerequisites for these four courses are satisfied by the students' general engineering curricula. Students will then be eligible to apply these same credits towards MS degree in AI. This flexibility means that the S-STEM graduate students would need only an additional 7 courses (2 semesters) to complete their MS degree. These additional courses could be selected from a menu of courses available in the college. Focus on AI is critical for the nation and applicable across all engineering domains²⁸.

4. Curricular Supports: The Curricular Support components applied during the study serve as a comprehensive package to support student success, retention, and graduation. These include hierarchical mentoring, undergraduate research (optional), industrial internships (optional), success seminars, and workforce/career development. Curricular Support activities are known to positively impact student intrapersonal competencies which is a project outcome. For each Cohort group, active engagement will be a key benchmark for all activities.

5. Success Seminars: The mechanism for communication with the scholars and the implementation and coordination of curricular supports were the Success Seminars which occurred on a weekly basis, every Monday. In the success seminars, industry speakers, faculty, community leaders, ethics experts, workforce development experts were invited to share their thoughts on diverse topics of interest. In many of these seminars, there were active conversations about the topic challenges of graduate school participation and impact of a Master's degree on one's career from both a career opportunity point of view and from a financial point of view. These S-STEM Cohort-based curricular interventions are known to positively impact high achieving - low-income student persistence and degree completion⁶⁻¹¹. The Success Seminar Series served as the context to engage Scholars in both the curricular and co-curricular support activities. As such, the seminars provided a forum for discussion, communication, teamwork, and consideration of alternative ways of thinking about how best to address their individual or group needs (e.g., balancing studying with working and the financial consequences)¹³⁻¹⁵.

6. *Co-Curricular Support*: Research clearly indicates that student success in postsecondary education is a function of both academic factors (i.e., Curricular Support components) and non-academic factors (financial literacy, intra and interpersonal competencies).

The Selection Process

The recruitment procedure involved coordination across offices/departments i.e., Institute of Educational Effectiveness (IEA), Office of Student Financial Aid (OSFA), the Division of Student Services and Activities (DESSA) in the College of Engineering and Computer Science (COECS), and finally the S-STEM team. Both IEA and OFSA are able to clearly identify the largest eligible pool of potential S STEM Scholars (i.e., low income/high financial need; cumulative GPA 3.25). Electronic announcements were disseminated to all students through the College's Director of Communications, so that notices are received by all potential participants. Applicants completed an interest survey as well as the project application, both of which are used in the selection process. In each round of search for qualified candidates, we had a large number of applications; however, we only considered those who had Free Application for Financial Student Aid (FAFSA) filed with the institution. Once the applicant's applications, including their student numbers, were received, a list was provided to IEA and OFSA for verification of income status and the level of applicant's unmet financial needs based on the students FAFSA applications. Those applicants that were not classified as low-income or were classified as low income, but their unmet financial needs were very small or zero, were excluded from the list. The list of students that met the low-income classification and had significant unmet financial need were then sent to DESSA for determination of their most recent GPAs. Finally, the students that qualified based on both academic performance and income classification were ranked based on their level of unmet financial need (UFN) and academic potential (GPA). The scoring weight for UNF was approximately twice as large as the weight given to GPA, Eq. 1. This will address the concern of helping those with greater needs. The PIs selected this ratio because UFN influences GPA and students with greater financial need may have a lower GPA because they have less time to dedicate to their studies.

$$Rank = \left(\frac{Student\ UFN}{UFN\ MAX} \times 0.66 \right) + \left(\frac{Student\ GPA}{GPA\ MAX} \times 0.34 \right) \quad \text{Eq. 1}$$

Thus, a student with an UFN equal to maximum and a GPA equal to maximum observed in the pool received the highest ranking of 1. This strategy enabled us to create a rank-ordered pool. If possible, the pool was further ranked based on their disciplines/departments to achieve an equitable distribution of interest. Based on NSF requirements, the maximum *annual amount* of individual scholarships could not exceed \$10K, and the total amount of support for the duration of the program could not exceed \$30K.

Results

Florida Atlantic University's NSF S STEM project which began in the Fall of 2019 has completed its third year. Up to now, the project has thus far served a total of 39 students in 4 cohorts (i.e., 11 in Cohort 1; 12 in Cohort 2; 8 in Cohort 3; 8 in Cohort 4). The project began at the start of the Covid-19 pandemic. All the S STEM Scholars

in Cohort 1, however, did very well, maintained a high GPA, completed sufficient credits to progress toward and/or graduate with their BS degree in engineering and enroll in the MS in AI.

GPA and Unmet Need

The average GPA and the average unmet financial need of the S-STEM Scholars students in each cohort—who were supported by the program, are presented in Table 1. The standard deviation in unmet financial need was around \$6,000. The data clearly shows that there are many academically strong students who are in need of financial assistance. Providing this assistance will reduce the need of the students to work while they are studying and therefore graduate earlier.

Table 1. Average GPA and unmet financial need of four cohorts supported by the S-STEM program.

Cohort #	# of Students	Avg. GPA	Avg. Unmet Need
1	12	3.71	\$ 12,192.00
2	12	3.43	\$ 7,233.00
3	8	3.77	\$ 10,194.00
4	8	3.62	\$ 10,115.00

Average Award Distributed

In Table 2, we present the average amount of assistance provided to each cohort based on the limitation that no student can receive more than \$10,000 per year and no more than \$30,000 in total across multiple years. The data for cohort #4 is partial because the funds are distributed in two installments, and this is our most recently started group meaning that we have currently only distributed the first half of the available stipends. The level of support presented in Table 2 was considered very important and impactful by the students receiving the support.

Table 2. Average financial award given to four cohorts supported by the S-STEM program.

Cohort #	Yr1	Yr2	Yr3	Yr4 (partial)
1	\$ 7,727	\$ 8,719	\$ 6,236	
2		\$ 2,579	\$ 7,899	\$ 3,442
3			\$ 5,417	\$ 3,055
4				\$ 3,011

Disciplines Engaged

As described earlier, students from all engineering departments and programs were considered for financial support under our S-STEM program. The distribution of students across departments in each cohort is presented in Table 3. It is not surprising that Computer Engineering and Computer Science fields had the largest number

of applications as these fields are very large across the nation and the interest of such students in the field of AI is high. However, students from Mechanical and Civil Engineering also showed interest in the program.

Table 3. The disciplinary programs of the scholars that participated in the S-STEM program from each cohort and the corresponding total.

Cohort #	# of Students	Computer Eng.	Computer Sci.	Mechanical Eng.	Civil Eng.	Data Sci.
1	11	6	3	1	1	
2	12	4	3	3	1	1
3	8	3	3	1	1	
4	8	2	5	1		
Total	39	15	14	6	3	1

Impact of Regular Meetings and Cohort Structure

Use of digital technology (Zoom, Webex, and TEAMS virtual platforms) proved to be very effective not only during the pandemic but also in the recovery period after the pandemic as participation of scholars was high. The features of the technology (e.g., breakout rooms) enabled us to vary our weekly format to make the sessions maximally interesting to the students. Selection of topics for the Seminar series became increasingly more sophisticated as Scholars advanced in their degree program and shifted focus to the AI trends across industry-government sectors, the trends across south Florida, and the job market potential and noted industries that have relocated to south Florida. In our Monday Morning success seminars, many topics were discussed. We used this Monday morning seminars to discuss important topics, invite speakers, and raise awareness about the importance of Graduate School. The Success Seminar series helped to build a sense of community among the Scholars as they shared their perspectives on various topics. The topics of discussion included 1) discussion of retention and timely graduation, 2) importance of grad school participation, 3) best practices for success in classroom, 4) emergence of AI and its impact on the job market, 5) importance of undergraduate research, 6) importance of internship experience, 7) Ethics and AI, 8) Industry speakers, 9) faculty speakers, 10) financial decisions and outcomes, 11) resume building, 12) meeting the advisors, 13) Career planning, and 14) meeting the industrial advisory board. The Project PI Team served as the main advisors to the Scholars for all matters related to the project.

Some specific topics of discussion in our success seminars are listed below:

- a. National Science Foundation’s Strategic Plan for AI
- b. Strategies for Learning in CS and AI – Research Best Practices for Learning in Complex Domains
- c. Challenges - ‘Landing the Right Job’ presented by a Scholar who had graduated.
- d. Trends in AI – across governmental, industry/business, and academic sectors including areas such as computer vision, natural language processing, cybersecurity, law enforcement, cloud technology.

- e. Exploring the Career Center Resources – Handshake, career fairs, creating business accounts (e.g., LinkedIn), practice sessions, document preparation, and other resources.
- f. Exploring Industry Trends – Scholars explored key regional industry websites (e.g., Tech Hub of South Florida) and chatted with the Director of Innovation and Policy.
- g. S STEM Scholars had opportunities to participate in college sponsored Boot Camps (e.g., Cybersecurity, Artificial Intelligence, Programming in C and Python).
- h. Most Scholars engaged in industry experiences (e.g., internships e.g., Hewlett-Packard; FPL) and/or research experiences (e.g., Autonomous vehicles; robotic arms).
- i. Communication skills were a key feature of all activities.

We also selected special reading assignments for team discussions. The objectives of the reading assignments and the follow-up discussion with scholars was to enhance their general knowledge and awareness of issues facing today’s graduates. A list of some of these topics is presented in Table 4:

Table 4. Sample reading assignments shared with the S-STEM Scholars and discussed in groups during the Monday morning success seminars.

<p>National Academies of Science, Engineering, and Medicine (NASEM, 2016) – <i>Developing a National STEM Workforce Strategy</i> ²¹</p>	<p>Report 1 addressed the need to embrace diversity, equity and inclusive practices in the recruitment and retention of the next generation of engineers, computer scientists, and STEM professionals across all domains of knowledge. Given the diversity of the Cohort, this topic made for rich conversations including a description of how each of them became interested in enrolling in a computer science degree program since most did not have college-educated parents, did not come from high-performing STEM oriented high schools, and honestly, did not think that they could tackle such a rigorous degree program. For the female students, the barriers they encountered were even more extreme and reflected what the literature has been reporting for quite some time.</p>
<p>National Research Council (NRC, 2000). <i>How People Learn Vol I</i> ⁷</p>	<p>Report 2 provided for rich discussions about how and under what circumstances people learn the best. Cohort members shared how they coped during the lock-down and pandemic with studying and maintaining good grades. Of interest, many noted that their preferred style of learning did align with the findings from this National Research Council (2000) report by John Bransford et al., (2000).</p>
<p>NASEM, (2018) – <i>How People Learn II</i> ²⁴</p>	<p>Report 3 was an addition to How People Learn some twenty-years later. Cohort members noted with interested the broader view of how learning occurs as highlighted in this report. https://www.nap.edu/catalog/24783/how-people-learn-ii-learners-contexts-and-cultures</p>
<p>NASEM, (2018) – <i>Frontiers of Engineering: Reports</i></p>	<p>Report 4 was important because it introduced Cohort members to cutting edge topics not addressed as part of the curriculum in computer science curriculum (e.g., BlockChain Technologies, Digital Twins).</p>

<p><i>on Leading Edge Engineering from the 2019 Symposium (2020)</i></p>	
<p>Office of the President of the US and the Select Committee on Artificial Intelligence (AI) of the National Science and Technology Council Report: <i>The National Artificial Intelligence Research and Development Strategic Plan: 2019 Update.</i> ²⁵</p>	<p>Report 5 resulted in the most in-depth series of conversations as the report, NSF's Strategic Plan for Artificial Intelligence, was of great interest as some Cohort members were currently enrolled in their first set of graduate courses in AI. The Strategic Plan outlined 8 specific recommendations, each of which became a topic for the week due to their inherent importance and relevance to the Cohort's MS in AI degree program. Topics included: (a) How NSF is making long-term investments in AI research, (b) Developing effective methods for Human-AI Collaboration, (c) Understanding and addressing ethical, legal and societal implications of AI, (d) Ensuring safety and security of AI Systems, e) Developing shared public datasets and environments for AI training and testing, (f) Measuring and evaluating AI technologies through standards and benchmarks, (g) developing better understanding of the importance of a national AI R&D workforce, and (h) Expanding public-private partnerships to accelerate advances in AI. Each of the 8 sessions produced a level of conversation often attributed to faculty, not students. Cohort members related their experiences, coursework, internships, and actual industry jobs to the conversations. Perhaps, most importantly, they had increased understanding as to why the NSF actually funds programs such as the one they are currently participating in. Such broadening of perspectives expanded Cohorts' knowledgebase and career readiness.</p> <p>https://www.nitrd.gov/pubs/National-AI-RD-Strategy-2019.pdf</p>
<p>Burning Glass Technologies and Labor Insights. (May, 2020-2021). ⁸</p>	<p>Report 6 provided an extensive overview of the current job market potential in the greater Miami (Dade County), Ft. Lauderdale (Ft. Lauderdale), and West Palm Beach areas. Combined, the total tri-county regional population is approximately ~6.5 million. <i>Regional Analysis of High-Tech Job opportunities-Miami-Fort Lauderdale-West Palm Beach, FL and BGTGCC Family.</i> https://www.burning-glass.com/products/labor-insight/. https://www.burning-glass.com/research-project/bcg-trending-jobs-skills/</p>
<p>ASEE: <i>2020-survey-for-skills-gaps-in-recent-engineering-graduates.</i> ³</p>	<p>Report 7 linked industry-based employment trends and recommendations to student development while completing the BS-MS in AI program. .</p> <p>https://www.asee.org/documents/cmc/2020-SURVEY-FOR-SKILLS-GAPS-IN-RECENT-ENGINEERING-GRADUATES.pdf</p>

Most students showed great interest in having an internship and engaged in identifying and selecting a company by themselves. Some students were already working as interns in local industries.

Given that most students decided to pursue an accelerated BS-MS, the PIs trained a DESSA advisor who was assigned to the scholars to ensure a streamlined transition from BS to accelerated MS programs. Each Scholar developed an academic plan of study with the help of the advisor. Any scholar that showed interest in pursuing undergraduate research, was introduced to faculty with research in the area of interest to the scholar.

Current Status of Scholars

Finally, the current status of the scholars in each cohort is presented in Table 5. For instance, in cohort 1, two students completed their BS degrees and did not pursue an MS degree, 6 students completed an MS degree, 1 is currently enrolled in a Master’s degree, 1 is still pursuing a BS, and 1 dropped out of the program. In cohort 2, 8 have completed their BS degrees and 4 completed their MS degrees. In cohort 3, 3 completed their BS degrees, 3 are still enrolled in their BS program, 1 completed an MS degree and one is enrolled in an MS degree. In Cohort 4, all students are engaged in their BS degrees and their status is in progress. Overall, from 31 students in the first 3 cohorts, 24 have completed either their BS or MS degrees (77%), 11 have completed their MS degrees (35%), 6 are still enrolled either in BS or MS programs (19%) , and 1 has dropped out (3%). Of the students that have completed their MS degrees, 8 have completed their MS in AI and 5 are currently enrolled in MS in AI.

Table 5. The completion/graduation status of the S-STEM scholars in each cohort.

Cohort #	of Students		Graduation Status	
1	Total	11	BS completed	2
	Male	10	MS Completed	6
	Female	1	Enrolled in MS	1
			Enrolled in BS	1
			Dropped out	1
2	Total	12	BS completed	8
	Male	11	MS Completed	4
	Female	1	Enrolled in MS	
			Enrolled in BS	
			Dropped out	
3	Total	8	BS completed	3
	Male	6	MS Completed	1
	Female	2	Enrolled in MS	1
			Enrolled in BS	3
			Dropped out	
4	Total	8	BS completed	
	Male	7	MS Completed	
	Female	1	Enrolled in MS	
			Enrolled in BS	8
			Dropped out	

Employment Trends

Upon graduation, the S STEM Scholars have been steadily successful in securing high quality jobs. Also, two in cohort #1 are pursuing PhD programs. Table 6 below illustrates the quality job placements of some students enrolled in Cohort 1. These companies represent important industry leaders.

Table 6. Post-graduation employment trends – Cohort 1&2

Students	Industries or Government Agencies Employing S STEM Scholar Graduates	PhD Program
7 (Cohorts 1-2)	<p>L3 Harris: An American technology and defense contractor specializing in command-and-control systems and surveillance solutions. (2 students). General Motors: A major manufacturer of automobiles and pioneer in vehicle safety and automation. (1 student). NextERA Energy: The World’s largest storer of energy with both existing and renewables portfolios and the adoption of emerging technologies to achieve Real Zero carbon emissions. (2 students). Northrup Grumman: A major US defense contractor who pioneers new technologies and breaks barriers to protect and advance safety systems from outer space to cyber space. (1 student). FPFX: Technology firm specializing in custom technology solutions for trading firms and brokerages. (1 student)</p>	2 – enrolled in the PhD in Computer Science with AI and Data Science Specialization

Conclusions

Based on the outcomes of our program, we conclude that NSF’s S-STEM program in support of academically strong low-income students is an effective program that produces the following results:

- 1) Participating in this program stay the course and complete their degree requirements in a timely manner.
- 2) A significant majority of Scholars took advantage of the opportunity to pursue an accelerated BS/MS program in Artificial Intelligence.
- 3) The BS in any engineering discipline combined with accelerated MS in AI was found to be attractive to all participants. Of the students that have completed their MS degrees, 8 have completed their MS in AI and 5 are currently enrolled in MS in AI. This combination promises to be a way of the future for many engineering professions.
- 4) Major focus on AI and related areas (e.g., autonomous systems, machine learning, deep learning, applications across industries such as cybersecurity, ethical and societal implications for AI) resulted in a great deal of excitement about knowledge in the field.

- 5) Increased focus on career development, employment trends, job-related skill sets, regional advances in AI/CS employment opportunities, and essential skills to acquire a high-quality job in the tech sector.
- 6) Scholars actively contributed to weekly discussions and enhanced their communication skills, the development of their fluency of ideas, and interacting and inquiring about topics their peers may have been more knowledgeable about.

Acknowledgement

The investigators gratefully acknowledge the support of NSF through S-STEM program, Award # 002196.

References

- Boggs, G. R., Dukes, C. M., Hawthorne, E. K., et al. (2022). Addressing the STEM Workforce Shortage. Center for Education and Workforce. *US Chamber of Commerce Foundation*.
- Cosman, B. (2014). The high school graduation rate is great, unless you're Poor. *The Wire*.
- Salgado, L., Artis, S., Lee, H. R., et al. (2020). The Motivation of Low-Income Engineering Transfer Students that Influences Choosing and Pursuing a baccalaureate Degree Attainment in Engineering. *ASEE's Virtual Conference*. Paper ID #29800.
- Donaldson, K., Lichtenstein, G., & Sheppard, S. (2008, June). Socioeconomic status and the undergraduate engineering experience: Preliminary findings from four American universities. In *2008 Annual Conference & Exposition* (pp. 13-1091).
- Engle, J., & Lynch, M. (2009). Charting a Necessary Path: The Baseline Report of Public Higher Education Systems in the Access to Success Initiative. *Education Trust*.
- Kochnar, R. 2023. *Which US Workers are More Exposed to AI on Their Jobs?* The Pew Research Center. <https://engineering.cmu.edu/news-events/news/2021/10/15-integrate-ai-stem.html>
- Lynch, M. (2017). *Why Low-Income Kids are Nowhere to be Found in STEM*. The Edvocate.
- National Science Board, National Science Foundation. (2019). Higher Education in Science and Engineering. *Science and Engineering Indicators 2020*. NSB-2019-7. Alexandria, VA. Available at <https://nces.nsf.gov/pubs/nsb20197/>.
- Pearson, J., Giacumo, L.A., Farid, A., & Sadegh, M. A. (2022). Systematic Multiple Studies Review of Low-Income, First-Generation, and Underrepresented, STEM-Degree Support Programs: Emerging Evidence-Based Models and Recommendations. *Educ. Sci.*, 12, 333. <https://doi.org/10.3390/educsci12050333>
- Rozek, C.S., Ramirez, G., Fine, R.D., & Beilock, S.L. (2019). Reducing socioeconomic disparities in the STEM pipeline through student emotion regulation. *Proc Natl Acad Sci U S A.*, 116(5), 1553-1558. doi: 10.1073/pnas.1808589116. Epub 2019 Jan 14. PMID: 30642965; PMCID: PMC6358706.

Familiarizing Pre-Service ESOL Teacher Candidates with the Funds of Knowledge Approach

Brian Hibbs

Dalton State College, USA,  <https://orcid.org/0009-0005-0894-1555>

Abstract: For several decades, English language learners in P-12 setting were initially viewed from a deficit perspective (Valenzuela, 1999) in which they were unfairly and unjustly compared with the dispositions, experiences, skills, etc. of their native-speaking counterparts. In recent years, however, these learners are increasingly considered from an asset-based perspective (Bartlett & García, 2011) in which their cultural and linguistic resources are being identified, understood, and valued. This paper thus provides an overview of a course unit on the funds of knowledge approach embedded in a ESOL culture and education course for pre-service elementary education teachers. The goal of the unit is to acquaint students with the funds of knowledge approach while also equipping them with specific strategies and techniques for incorporating English learners' funds of knowledge in their future classrooms. The paper begins with a summary of the history and principal tenets of the funds of knowledge approach and an overview of critical pedagogy, another theoretical framework which structured the course unit. The paper then outlines the readings, activities, and resources which constituted the multi-day course unit along with a rationale for including these resources in the unit.

Keywords: funds of knowledge, educator preparation, teacher education

Citation: Hibbs, B. (2023). Familiarizing Pre-service ESOL Teacher Candidates with the Funds of Knowledge Approach. In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023-- International Conference on Social and Education Sciences* (pp. 187-201), Las Vegas, NV, USA. ISTES Organization.

Introduction

Within the last several decades, P-12 classrooms have become increasingly diverse in regards to a variety of sociocultural variables, including ethnicity, exceptionality, gender, race, religion, sexual orientation, etc., and will likely continue to do so (National Center for Education Statistics, 2022). This same governmental body states that over 10% of the student population in P-12 schools was officially classified as English learners (National Center for Education Statistics, 2023). In regards to the variable of language, English learners (students learning English as a second or additional language) were seen for some time from a deficit perspective (Valenzuela, 1999) in that their abilities, knowledge, interests, skills, viewpoints, etc. do not necessarily align with those possessed by white, mainstream, middle-class students (Washington Office of Superintendent of Public Instruction, n.d.). González et al. (1994) argue that “an underlying assumption of many educational institutions has been that linguistically and culturally diverse working-class students do not emerge from households rich in

social and intellectual resources” (para. 1). Keefer et al. (2020) concur with this view and state that “students and families possess funds of knowledge regardless of their background” (p. 15). Street (2005) adds that “the knowledge and cultural resources of diverse students are often overlooked or seen as ‘baggage’ rather than as assets” (p. 22). Consequently, minority students’ background experiences are not always understood, valued, or incorporated into educational curricula, which can often result in missed learning opportunities and ultimately lead to lower grades, test scores, graduation rates, etc. Therefore, it is important for educators to advocate for these students by viewing their linguistic and cultural backgrounds as assets (Bartlett & García, 2011) that can be identified, appreciated, and capitalized upon in P-12 classrooms and beyond (Amaro-Jiménez & Semingson, 2011).

Theoretical Framework

This section highlights two theoretical frameworks which structured the course unit: funds of knowledge and critical pedagogy. Each of these frameworks is described below.

Funds of Knowledge

González, Moll, and Amanti (2005) explain that funds of knowledge are “...historically accumulated and culturally developed bodies of knowledge and skills essential for household or individual functioning and well-being” (p. 72). Funds of knowledge can be understood as intergenerational cultural and linguistic resources found in specific communities that are important for the past, present, and future existence of the members of the community as well as the community at large. Such cultural communities can be understood as “...a coordinated group of people with some traditions and understandings in common, extending across several generations, with varied roles and practices and continual change among among participants as well as transformation in the community’s practices” (Gutiérrez & Rogoff, 2003, p. 19). Moll et al. (1990a; 1990b) highlight the fact that funds of knowledge “...refers not only to the categories and content of knowledge found in households, but to how this knowledge is grounded, embedded, in the ‘thick’ social and cultural relations that make up family life” (p. 1). Thus, the approach strives not only to identify the linguistic and cultural resources contained within a given community but also to understand the historical derivation, evolution, and current utilization of these resources.

Contrary to popular belief, students do not arrive to school as “tabula rasa” or blank slates; they come to school accompanied with a wide variety of abilities, behaviors, beliefs, experiences, expertise, proficiencies, skills, talents, traditions, understandings, values, etc. Dworin (2006) points out that “...students bring crucial intellectual, cultural, and linguistic resources to their classrooms” (p. 511). López-Robertson (2017) asserts that, for example, the literacy practices of Latino students have traditionally been viewed from a deficit perspective in that such practices “...have been devalued in schools and their ways of constructing knowledge have been seen as an obstacle to their education” (p. 8). In opposition to this perspective, González et al. (1994) maintain that

the funds of knowledge approach “...debunks the pervasive idea that linguistically and culturally diverse working-class households lack worthwhile knowledge and experiences” (para. 13) by helping teachers “...view [such] households as repositories of funds of knowledge capable of providing opportunities for learning than to see them as hindrances to academic progress” (para. 10). Johnson & Johnson (2016) contend that this approach “...is a powerful step towards leveling the historically accumulated sociocultural biases that continue to drive practices in mainstream American classrooms” (p. 117). Consequently, students’ funds of knowledge must be identified, understood, valued, and incorporated into educational curricula in order to maximize student learning while also promoting their linguistic and cultural well-being. Street (2005) reminds us that one of the essential benefits of this approach is that it “...serve[s] as an important educational tool that moves us toward the ideal of better connecting with the lived experiences of our students – and their families” (p. 24). In other words, rather than seeing their out-of school experiences and understandings as inconsequential to the educational enterprise, teachers must instead show students the applicability and relevancy of their funds of knowledge to what they are learning.

The concept of funds of knowledge has been understood and applied in a variety of ways. For example, at the educational level, Johnson and Johnson (2016) distinguish between students’ personal (out-of-school) funds of knowledge, as defined above, and their scholastic (in-school) funds of knowledge, which they specify as “the accumulated set of skills, aptitudes, and habits students draw on when faced with accomplishing academic tasks” (p. 107). As these two categories of funds of knowledge are frequently seen as distinct and separate in nature, Johnson and Johnson (2016) contend that educators must work to “...integrat[e] students’ out-of-school experiences and cultural backgrounds into the academic realm” (p.107) in order to build learners’ awareness and understanding of the interdependent and interrelated nature of their out-of-school and in-school experiences. At the community level, Zipin (2009) distinguishes between funds of knowledge, which relates to specific expertise that communities possess, and funds of pedagogy, which are methods by which these competencies are obtained and conveyed (p. 324). This distinction highlights the importance of not only understanding the specific cultural and linguistic knowledge a given community possesses but also identifying and promoting the avenues by which this knowledge is transmitted to future generations.

Finally, at the individual level, Esteban-Guitart and Moll (2014) apply the notion of funds of knowledge to the concept of funds of identity, which they define as “...historically accumulated, culturally developed, and socially distributed resources that are essential for a person’s self-definition, self-expression, and self-understanding” (p. 31). Using a Vygotskian perspective, Esteban-Guitart and Moll (2014) argue that funds of knowledge are resources possessed by a given community in a universal sense; when a given member of the community appropriates one or more of these resources to construct their own cultural/linguistic profile, these funds of knowledge are then converted into funds of identity. In other words, funds of knowledge are external in nature and exist outside of a given person, whereas funds of identity are internal in nature and reside within the person.

Critical Pedagogy

Siraj-Blatchford (2010) defines pedagogy as “...the full set of instructional techniques and strategies that enable...learning to take place [in order to] provide...opportunities for the acquisition of knowledge, skills, attitudes and dispositions” (pp. 149-150). Hammersley-Fletcher and Hanley (2016) suggest that criticality centers around the notion that “...the nature of reasoning, the self and our relations with others, are open to challenge and debate” (p. 979). Building on this Darvin and Norton (2017) maintain that the “critical” in critical pedagogy refers to “...the shared assumption that social relationships are seldom constituted on equal terms, reflecting and constituting inequitable relations of power in the wider society” (p. 44). Thus, critical pedagogy can be understood as an enterprise where education is inextricably linked with society, where the fundamental goal of education is to explore and find solutions to dilemmas and issues of communal importance and concern, and where commonly-held notions concerning schooling are examined, confronted, and challenged.

McLaren (1997) describes critical pedagogy as “...A way of thinking about, negotiating, and transforming the relationship among classroom teaching, the production of knowledge, the institutional structures of school, and the social and material relations of the wider community, society, and nation state” (p. 1). Kane and Hiltabidel (2023) understand critical pedagogy as “an approach to teaching that centers students and their individual identities and experiences, specifically in order to examine power structures and inequities to challenge existing hegemony” (p. 40). Bohórquez (2012) agrees with these perspectives and contends that critical pedagogy “...deals with empowering the powerless and transforming social inequalities and injustices” (p. 199). Additionally, Jeyaraj and Harland (2016) state that one essential aspect of critical pedagogy is that it “...acknowledges positionality in terms of race, gender and ethnicity, and teaches students to oppose and reorganise social forms that are exploitative and damaging” (p. 588). Wink (2011) aligns with this view and contends that critical pedagogy “...gives voice to the voiceless [and] power to the powerless” (p. 6).

One of the fundamental tenets of critical pedagogy, thus, is to ensure educational success for all students by challenging spaces where the knowledge and experiences of mainstream, White, middle-class students are favored. Jeyaraj and Harland (2016) maintain that “...education institutions are not just *in* society, but function *for* society...” (p. 587; emphasis in original) and that, rather than promoting knowledge simply for its own sake, they visualize an “...education that sees knowledge as serving society” (p. 578). Oolwa-Yoshizawa (2018) concurs with this view by stating that “if a teacher can change the classroom, students can change the world” (p. 25). In other words, education should be utilized to improve the living and working conditions of all, not just for a privileged few. Oolwa-Yoshizawa (2018) specifies that “...teachers are agents of change” (p. 27) and that, consequently, educators can play a crucial role in fostering students’ critical thinking about the world in order to create a more equitable and just society: “It’s our job [as teachers] to wobble systems, to gently incite personal revolutions within our students, and to rebel against educational practices and ideologies which lesson anyone’s chance at becoming more than he or she is” (p. 27). Bohórquez (2012) asserts that teaching is inevitably a political enterprise since “...our classrooms and the outside world have a reciprocal relationship” (p. 196) and since “...everything we do in the classroom is related to broader [societal] concerns” (p. 195). Critical pedagogy,

thus, was utilized as a theoretical framework that structured the course unit in that the funds of knowledge approach works to oppose commonly-held assumptions concerning teaching and learning in which the understandings and proficiencies of White, mainstream, middle-class are taken as given and are employed as norms to which all students are compared.

Overview of the Course Unit

Instructional Context

The course unit on the funds of knowledge approach described in this paper was embedded within a culture and education course designed for pre-service elementary education teacher candidates pursuing the ESOL endorsement at a four-year open-access institution of higher education in the southeastern United States. The endorsement consists of three courses (applied linguistics for teachers of ESOL, methods of teaching ESOL, culture and education) intended to equip students with strategies and techniques to work effectively with English learners in their own instructional contexts. The culture and education ESOL course is designed to acquaint students with the role of culture in education through three distinct lenses: (1) cultural as a universal phenomenon (i.e., hot-climate versus cold-climate cultures (Lanier, 2000), Schumann’s Acculturation Theory (Schumann, 1978; 1986)), (2) the funds of knowledge approach, and (3) linguistic/dialectical variation. The goals of the funds of knowledge unit within the course are to acquaint students with the history and theory of the approach while also familiarizing them with specific ways to identify and incorporate P-12 students’ funds of knowledge into their future classrooms. The next section provides a synopsis of the course unit on funds of knowledge. The first module of the unit introduces teacher candidates to the origins and principal tenets of the approach. The second module presents the Funds of Knowledge Inventory Matrix which can help teachers identify and document P-12 students’ funds of knowledge and also determine ways to incorporate these students’ funds of knowledge into the curriculum. The third module furnishes teacher candidates with an opportunity to interview one or more K-5 students attending a community educational summer program to recognize these students’ funds of knowledge. The fourth module helps teacher candidates consider ways to strategically incorporate the approach in the classroom. In the fifth and final module, teacher candidates complete a course assignment which invites them to reflect on the understandings they gained during the course unit. Each module within the course unit is described separately below. Table 1 outlines the structure of the course unit.

Table 1. Modules of the course unit on funds of knowledge

Module	Description of the Module
1	Overview of the Funds of Knowledge Approach
2	Funds of Knowledge Inventory Matrix
3	Funds of Knowledge Interview
4	Strategies for Incorporating Funds of Knowledge in the Classroom
5	Course Unit Reflection

Module One: Overview of the Funds of Knowledge Approach

In preparation for Module 1, students individually read one of the following four articles: Amaro and Semingson (2011), González et al. (1994), Keefer et al. (2020), and Washington Office of Superintendent of Public Instruction (n.d.). These articles were chosen to acquaint teacher candidates with the history and theory of the funds of knowledge approach (Amaro and Semingson, 2011; González et al., 1994) and introduce them to several possibilities for incorporating funds of knowledge in the class (Keefer et al., 2020; Washington Office of Superintendent of Public Instruction, n.d.). Before reading the articles, students were randomly separated into four groups (Groups A-D) with each group reading one of the four articles (see Table 2 below).

Table 2. Funds of knowledge article by group (Module One)

<u>Group</u>	<u>Article</u>
A	Amaro and Semingson (2011)
B	González et al. (1994)
C	Keefer et al. (2020)
D	Washington Office of Superintendent of Public Instruction (n.d.)

In the first article, Amaro and Semingson (2011) provide a broad overview of the funds of knowledge approach and several important tenets that frame the approach along with a list of possible questions in both English and Spanish that teachers might conceivably use to identify the linguistic and literacy practices of their students. In the second article, González et al. (1994) outline the rationale for the approach and trace the origins of the approach in the late 1980s and early 1990s with both university researchers and teachers in Tucson, Arizona in which teachers conducted home visits and documented evidence of families' cultural and linguistic funds of knowledge. In the third article, Keefer et al. (2020) describe the implementation of the approach in the design of a social studies lesson for bilingual classrooms at the pre-K to first-grade levels. During the multi-day lesson, students interview their parents/caretakers about various of knowledge the families possess concerning food, music, and dance, share their findings with their classmates, and engage in a variety of activities concerning Latin American folk art. In the fourth article, the Washington Office of Superintendent of Public Instruction (n.d.) highlights the Funds of Knowledge Toolkit which consists of a three-column that includes various categories of funds of knowledge, space for teachers to document specific students' demonstrated funds of knowledge for each category they notice during home visits or school interactions, and space for teachers to identify ways they might possibly include students' funds of knowledge in the classroom.

Class discussion of the articles is organized as a jigsaw activity. In the first phase of the activity, students who read the same article group together and discuss their response to the article and important details they gleaned from the article (i.e., S1, S5, S9, and S13 in Table 3 below) (vertical groups). In the second phase of the activity, students reassemble themselves such that the groups now contain one member from each of the original vertical groups (i.e., S1, S2, S3, and S4 in Table 3 below) (horizontal groups). During this phase, students share essential

points contained in their respective article along with their perspectives concerning the article. In the third and final phase of the activity, students return to their original seats and write down three to five points of information they learned from the discussions in both the vertical groups and horizontal groups on a blank index card; they then share these points with their tablemates and the whole class.

Table 3. Jigsaw groupings

<u>Group A</u>	<u>Group B</u>	<u>Group C</u>	<u>Group D</u>
S1	S2	S3	S4
S5	S6	S7	S8
S9	S10	S11	S12
S13	S14	S15	S16

* “S” = “Student”

Module Two: Funds of Knowledge Inventory Matrix

In the second module of the course unit, teacher candidates participate in a multi-step activity designed to familiarize them with the nature and application of the Funds of Knowledge Inventory Matrix. The matrix utilized in this module was adapted from the Funds of Knowledge Inventory Matrix developed by the Washington Office of Superintendent of Public Instruction (n.d.) in combination with other sources (Moll, n.d.; Riojas-Cortez, 2001). The categories included in the adapted matrix are indicated in Table 4 below; a list of the categories along with examples of each category can be found in Appendix A.

Table 4. Sample categories from the adapted Funds of Knowledge Inventory Matrix

Language(s) / Dialect(s)	Traditions / Values	Caregiving
Family / Friends	Travel / Geography	Housekeeping
Education	Popular Culture	Work
Science	Economics	Nature
Politics	Sports	Technology
Religion	Health	Arts
Cooking	Construction	Mechanics

In the first phase of the activity, students complete the adapted matrix for themselves by identifying funds of knowledge they themselves possess in regards to each category listed in the matrix. In the second phase, students interview a classmate they are randomly paired with and document the classmate’s funds of knowledge according to each of the categories. A sample page from the adapted matrix is contained in Table 5.

In the third phase, student pairs complete a Venn diagram on which they indicate funds of knowledge they share with their classmate in the inner circle and the funds of knowledge they do not share with their classmate;

student pairs then share their findings with the class. In the fourth phase, the students reflect on their experiences during the first three phases of the activity and indicate their thoughts and perspectives concerning the matrix and whether they would (not) utilize the matrix in their future classrooms. In the fourth and final phase of the activity, and in preparation for the next phase of the course unit, students are randomly grouped together and are assigned several of the categories in the adapted matrix; in groups, they collaborate on a Google doc to identify child-friendly questions they could conceivably ask to solicit information from K-5 students concerning their funds of knowledge in the next module.

Table 5. Sample page from the adapted Funds of Knowledge Inventory Matrix

<p>Language(s) / Dialect(s) (i.e., Navajo, African-American English)</p> <ul style="list-style-type: none">• Me<ul style="list-style-type: none">○○• My Partner<ul style="list-style-type: none">○○ <p>Traditions / Values (i.e., Holiday Celebrations, Cultural Beliefs)</p> <ul style="list-style-type: none">• Me<ul style="list-style-type: none">○○• My Partner<ul style="list-style-type: none">○○ <p>Caregiving (i.e., Babysitting, Looking After Elder Family Members)</p> <ul style="list-style-type: none">• Me<ul style="list-style-type: none">○○• My Partner<ul style="list-style-type: none">○○ <p>Family / Friends (i.e., Visiting Grandparents, Going To The Movies)</p> <ul style="list-style-type: none">• Me<ul style="list-style-type: none">○○• My Partner<ul style="list-style-type: none">○○

Module Three: Funds of Knowledge Interview

In the third module of the course unit, teacher candidates attend a local educational multi-week program for K-5 students that consists of a variety of enrichment activities designed to maintain and extend their academic skills during the summer. During this module, teachers candidates are randomly paired with one or more students attending the program, complete a twenty-minute interview with the student(s) using the adapted Funds of Knowledge Inventory Matrix, and identify evidence of the students’ funds of knowledge regarding each category. The notes teacher candidates collect during the student interviews are used for the assignment in the fifth module in the course unit.

Module Four: Strategies for Incorporating Funds of Knowledge in the Classroom

In the fourth module of the course unit, teacher candidates read a series of articles intended to build on their emergent understanding concerning the theory and practice of the funds of knowledge approach. In this module, teacher candidates read one of the articles listed in Table 6 and participate in the jigsaw reading activity described in Module One.

Table 6: Funds of knowledge article by group (Module Four)

<u>Group</u>	<u>Article</u>
A	Di Stefano (2017)
B	Newman (2012)
C	Riojas-Cortez (2001)
D	Street (2005)

In the first article, Di Stefano (2017) describes two strategies she included in her first-grade dual language immersion (DLI) Spanish/English classroom. The first strategy consisted of the culture bag activity in which students selected items from home that they felt best represented their cultural identity, placed these items in a paper bag, brought the items to class, and shared the items with their classmates; the second strategy was comprised of inviting parents and community members to her class to share various activities and traditions that figure prominently in Latin@ popular culture. In the second article, Newman (2012) describes an approach to facilitating student writing through the use of mentor texts, defined as “those books, stories, poems, essays, and other writings that we come back to over and over again” (p. 25). In her classroom, students used texts written by Rene Saldaña and Sandra Cisneros as exemplars to frame their own writing, which allowed them to tap into their cultural and linguistic funds of knowledge when creating their own texts. In the third article, Riojas-Cortez (2001) noted twelve categories of funds of knowledge that her elementary bilingual (Spanish/English) students demonstrated and displayed during sociodramatic play at school. Finally, in the fourth article, Street (2005) outlines a project integrated in a secondary classroom in which students were permitted to choose the themes and topics of their own writing. By doing so, Street noted that his students were able to incorporate their own

funds of knowledge into their writing, which students felt was an empowering and democratic enterprise.

Module Five: Reflection on Course Unit

In the fifth and final module of the course unit, teacher candidates utilize their notes from the third module to complete a course assignment in which they imagine that the student(s) with whom they conducted interviews are in fact students in their own classrooms. As part of this course assignment entitled “Funds of Knowledge Reflection”, they consider the understandings they gained from the student interviews they conducted, the evidence of students’ funds of knowledge, and possible ways to incorporate these students’ funds of knowledge into their imagined future classrooms. The assignment also asks teacher candidates to think about and indicate their perspectives and views concerning the funds of knowledge approach and the inventory matrix. Appendix B contains the instructions for this assignment.

Conclusion

This paper described the activities, articles, and assignments contained within a course unit on the funds of knowledge approach embedded in a culture and education course designed for pre-service elementary education teachers. The paper outlined two theoretical frameworks that structure the course unit and outlined the five modules that compose the course unit in which teacher candidates are introduced to the origins, history, and fundamental tenets of the approach, participate in a multi-phase activity involving the adapted Funds of Knowledge Inventory Matrix, become acquainted with a variety of specific strategies and techniques for incorporating the approach in K-12 settings, interview one or more K-5 students and document evidence of their funds of knowledge, and complete an assignment in which they reflect on the understandings they gained throughout the course unit along with possible applications of this learning to their own instructional contexts. Considering the statistics mentioned at the outset of the paper regarding the increasing cultural and linguistic diversity of P-12 classrooms, it is imperative that educator preparation programs conscientiously and intentionally design experiences that will equip teacher candidates with the skills and dispositions they need to thrive in these educational settings; this paper highlights a course unit that attempts to fulfill this lofty yet worthwhile goal. It is hoped that administrators, educators, researchers, scholars, and stakeholders may be inspired by this paper to carefully consider ways to prepare their students for the multicultural and multilingual nature of P-12 classrooms today.

References

- Amaro-Jiménez, C., & Semingson, P. (2011). Tapping into the funds of knowledge of culturally and linguistically diverse students and families. *National Association for Bilingual Education (NABE) News*, 33(5), 5-8.

- Bartlett, L., & García, O. (2011). *Additive schooling in subtractive times: Bilingual education and Dominican immigrant youth in the heights*. Nashville, TN: Vanderbilt University Press.
- Bohórquez, Y. S. (2012). On rethinking our classrooms: A critical pedagogy view. *HOW: A Colombian Journal for Teachers of English*, 19(1), 194-208.
- Crookes, G. (2012). Critical pedagogy in language teaching. In C. Chapelle (Ed.), *The encyclopedia of applied linguistics* (pp. 1511-1514). Hoboken, NJ: Blackwell Publishing.
- Darvin, R., & Norton, B. (2017). Identity, language learning, and critical pedagogies in digital times. In J. Cenoz, D. Gorter, & S. May (Eds.), *Language awareness and multilingualism* (3rd ed.) (pp. 43-54). Cham, Switzerland: Springer International Publishing.
- Di Stefano, M. (2017). Culture bags and Latin@ popular culture: Integrating funds of knowledge in a dual language immersion setting. In K. Dejonge-Kannan, M. L. Spicer-Escalante, E. Abell, & A. Salgado (Eds.), *Perspectives on effective teaching in dual language immersion and foreign language classrooms: Selected papers from the Jack Lackstrom Linguistics Symposium, Volume 2* (pp. 40-50). Logan, UT: Department of Languages, Philosophy, and Communication Studies.
- Dworin, J. E. (2006). The family stories project: Using funds of knowledge for writing. *The Reading Teacher*, 59(6), 510-520.
- Esteban-Guitart, M., & Moll, L. C. (2014). Funds of identity: A new concept based on the funds of knowledge approach. *Culture & Psychology*, 20(1), 31-48.
- González, N., Moll, L. C., & Amanti, C. (2005). *Funds of knowledge: Theorizing practices in households, communities, and classrooms*. New York, NY: Routledge.
- González, N., Moll, L. C., Floyd-Tenery, M., Rivera, A., Rendón, P., Gonzales, R., & Amanti, C. (1994). *Funds of knowledge: Learning from language minority households*. Washington, D.C.: Center for Applied Linguistics.
- Gutiérrez, K. D., & Rogoff, B. (2003). Cultural ways of learning: Individual traits or repertoires of practice. *Educational Researcher*, 32(5), 19-25.
- Hammersley-Fletcher, L., & Hanley, C. (2016). The use of critical thinking in higher education in relation to the international student: Shifting policy and practice. *British Education Research Journal*, 42(6), 978-992.
- Jeyaraj, J. J., & Harland, T. (2016). Teaching with critical pedagogy in ELT: The problems of indoctrination and risk. *Pedagogy, Culture & Society*, 24(4), 587-598.
- Johnson, E. J., & Johnson, A. B. (2016). Enhancing academic investment through home-school connections and building on ELL students' scholastic funds of knowledge. *Journal of Language and Literacy Education*, 12(1), 104-121.
- Kane, S. M., & Hiltabidel, J. N. (2023). Shifting practices to empower teachers and students: Putting the "critical" in language awareness. In S. L. Finley, P. Correll, C. Pearman, & S. Huffman (Eds.), *Cultivating critical discourse in the classroom* (pp. 20-40). Hershey, PA: IGI Global.
- Keefer, N., Lopez, J., Young, J., & Haj-Broussard, M. (2020). Gathering funds of knowledge: An elementary social studies unit plan for bilingual settings. *Social Studies and the Young Learner*, 33(2), 14-19.
- Lanier, S. (2000). *Foreign to familiar: A guide to understanding hot- and cold-climate cultures*. Hagerstown, MD: McDougal Publishing.
-

- López-Robertson, J. (2017). *Diciendo cuentos/Telling stories: Learning from and about the community cultural wealth of Latina mamás through Latino children's literature. Language Arts, 95*(1), 7-16.
- McLaren, P. (1997). Critical pedagogy. *Teacher Education, 9*(1), 1.
- Moll, L. (n. d.). *Exploring cultural concepts: Funds of knowledge*. Retrieved from <https://modules.nceIn.fpg.unc.edu/sites/modules.nceIn.fpg.unc.edu/files/foundations/handouts/Mod%204%20Funds%20of%20knowledge.pdf>.
- Moll, L. C., Velez-Ibanez, C., & Rivera, C. (1990a). *Community knowledge and classroom practice: Combining resources for literacy instruction: A handbook for teachers and planners* (OBEMLA Contract No. 300-87-0131). Tucson, AZ: University of Arizona College of Education and Bureau of Applied Research in Anthropology.
- Moll, L. C., Velez-Ibanez, C., & Rivera, C. (1990b). *Community knowledge and classroom practice: Combining resources for literacy instruction: Technical report* (OBEMLA Contract No. 300-87-0131). Tucson, AZ: University of Arizona College of Education and Bureau of Applied Research in Anthropology.
- National Center for Education Statistics (2022). Racial/ethnic enrollment in public schools. *The condition of education*. Retrieved from https://nces.ed.gov/programs/coe/pdf/2022/cge_508.pdf.
- National Center for Education Statistics. (2023). English Learners in Public Schools. *Condition of Education*. U.S. Department of Education, Institute of Education Sciences. Retrieved from <https://nces.ed.gov/programs/coe/indicator/cgf>.
- Newman, B. M. (2012). Mentor texts and funds of knowledge: Situating writing within our students' worlds. *Voices from the Middle, 20*(1), 25-30.
- Oolwa-Yoshizawa, A. (2018). Implications of EFL critical pedagogy: Theory, practice and possibility. *Learning, 19*, 245–253.
- Riojas-Cortez, M. (2001). Preschoolers' funds of knowledge displayed through sociodramatic play episodes in a bilingual classroom. *Early Childhood Education Journal, 29*(1), 35-40.
- Schumann, J. (1978). The acculturation model for second-language acquisition. In R. C. Gingras (Ed.), *Second language acquisition and foreign language teaching* (pp. 27-50). Washington, D.C.: Center for Applied Linguistics.
- Schumann, J. H. (1986). Research on the acculturation model for second language acquisition. *Journal of Multilingual and Multicultural Development, 7*(5), 379-385.
- Siraj-Blatchford, I. (2010). A focus on pedagogy: Case studies of effective practice. In K. Sylva, E. Melhuish, P. Sammons, I. Siraj-Blatchford, & B. Taggart (Eds.), *Early childhood matters: Evidence from the Effective Pre-school and Primary Education project* (pp. 149-165). New York, NY: Routledge.
- Street, C. (2005). Funds of knowledge at work in the writing classroom. *Multicultural Education, 13*(2), 22-25.
- Valenzuela, A. (1999). *Subtractive schooling: U.S.-Mexican youth and the politics of caring*. Albany, NY: State University of New York Press.
- Washington Office of Superintendent of Public Instruction (n.d.). *Funds of knowledge toolkit*. Retrieved from https://www.k12.wa.us/sites/default/files/public/migrantbilingual/pubdocs/Funds_of_Knowledge_Toolkit.pdf.
- Wink, J. (2011). *Critical pedagogy: Notes from the real world* (4th ed.). Boston, MA: Pearson.

Zipin, L. (2009). Dark funds of knowledge, deep funds of pedagogy: Exploring boundaries between lifeworlds and schools. *Discourse: Studies in the Cultural Politics of Education*, 30(3), 317-331.

Appendix A: Categories and examples from the adapted Funds of Knowledge Inventory Matrix

Language(s) / Dialect(s) (i.e., Navajo, African-American English)
Traditions / Values (i.e., Holiday Celebrations, Cultural Beliefs)
Caregiving (i.e., Babysitting, Looking After Elder Family Members)
Family / Friends (i.e., Visiting Grandparents, Going To The Movies)
Travel / Geography (i.e., Going To The Beach, Visiting A Museum)
Housekeeping (i.e., Sweeping, Washing Dishes)
Education (i.e., Solving Crossword Puzzles, Going To The Library)
Popular Culture (i.e., “Power Rangers”, “Pokémon”)
Work (i.e., Realizing The Necessary Skills & Qualifications For Specific Jobs)
Science (i.e., Recycling, Exercising)
Economics (i.e., Balancing A Checkbook, Calculating Tips)
Nature (i.e., Gardening, Farming)
Politics (i.e., Roles & Functions Of Government, Distribution Of Power & Resources)
Sports (i.e., Rules & Regulations, Requisite Skills & Abilities)
Technology (i.e., Navigating The Internet, Dialing A Telephone)
Religion (i.e., Participating In Ceremonies, Understanding Doctrine & Teachings)
Health (i.e., Knowing The Nutritional Value Of Foods, Preventing Sickness & Disease)
Arts (i.e., Painting & Drawing, Playing A Musical Instrument, Performing)
Cooking (i.e., Preparing Meals, Recognizing The Ingredients Of Specific Dishes)
Construction (i.e., Building Furniture, Fabricating A Birdhouse)
Mechanics (i.e., Repairing Motors, Taking Apart & Reassembling Computer Parts)

Appendix B: Directions for the Funds of Knowledge Reflection assignment

A. Purpose

For this assignment, you will have an opportunity to interview an English learner, identify the cultural and linguistic assets the learner possesses, and consider ways to incorporate the learner's funds of knowledge in your future instruction.

B. Task

You should complete the following activities in preparation for the funds of knowledge reflection:

- Identify an English learner at Kid City with whom you wish to work. Use a pseudonym when referring to the learner in your reflection. Gather background information on the learner. What is his/her educational and linguistic history? What is his/her first language? How long has s/he been in the United States? How long has s/he been speaking English? What is his/her family background?
- Interview the English learner at Kid City. During the interview, collect biographical information concerning the English learner, and administer the Funds of Knowledge Matrix with the student. Utilize the matrix to gather information about what the learner knows about each of the categories listed. Then select one of the cultural/linguistic identity activities we have completed in class, invite the learner to complete the activity, and ask the learner to explain their completed activity to you. Make note of the funds of knowledge the learner possesses as evidenced by the product created by the learner in completing the activity.
- Imagine that the learner is a student in your classroom. Based on the information you gained from the Funds of Knowledge Inventory Matrix and the cultural/linguistic identity activity, identify several categories of funds of knowledge possessed by the learner, and consider ways you might incorporate the learner's funds of knowledge in future instruction.


The final product for this assignment is up to you (i.e., essay, PowerPoint, poster, video), so be as creative as possible! You should ensure that, regardless of the form of your assignment, the final product incorporates all of the requirements listed below. Your funds of knowledge reflection should include:

- a biographical description of the learner
 - the name of the learner (pseudonym)
 - the age of the learner
 - the grade the learner is in
 - the country of origin of the learner
 - the family background of the learner
 - the learner's most/least favorite school subject
 - the learner's extracurricular interests
 - other background/contextual information concerning the learner

- a summary of the funds of knowledge approach
 - What are “funds of knowledge”? How has this concept been defined/understood?
 - What is the funds of knowledge approach? What is the historical context surrounding the initiation and subsequent development of the approach? What are several important principles/tenets that guide the philosophy governing the approach?
 - Why is the funds of knowledge approach important for educating minority students? More specifically, why is the approach important for educating English learners?
 - How has the funds of knowledge approach been incorporated into K-12 classrooms? Provide several examples of how the approach has been integrated into K-12 classrooms.
 - What are your overall attitudes, feelings, impressions, opinions, perceptions, views, etc. concerning the funds of knowledge approach? What do you see as strengths/weaknesses of the funds of knowledge approach? How might the approach be expanded, refined, and/or modified?
- a discussion of the information you obtained about the learner from administering the Funds of Knowledge Inventory Matrix
 - Describe the procedures you employed to introduce and explain the matrix. Then explain the process by which the learner responded to your questions as you administered the matrix.
 - Which categories of funds of knowledge contained in the matrix does the learner possess? Give several examples of various funds of knowledge categories possessed by the learner.
 - Which categories of funds of knowledge contained in the matrix does the learner not possess? What might explain the fact that the learner does not possess these funds of knowledge?
 - What are your overall attitudes, feelings, impressions, opinions, perceptions, views, etc. concerning the matrix? Why? How might you expand, refine, and/or modify the matrix? Do you plan to utilize the matrix with your future students? Why (not)?
- an overview of the educational and instructional implications of the learner’s identified funds of knowledge
 - Which funds of knowledge did the learner demonstrate only on the matrix? Which funds of knowledge did the learner display only through the activity? Which funds of knowledge did the learner exhibit via both the matrix and the activity?
 - Imagine that the learner is a student in your classroom. Select several important/significant funds of knowledge the learner possesses. Then describe specific activities, procedures, strategies, and/or techniques you plan to employ to incorporate each of the learner’s funds of knowledge in your future instruction.

ACEs are Wild: How Educators Can Positively Influence the “Hand” Students are dealt

Dr. Amanda M. Butler

Charleston Southern University, United States,  <https://orcid.org/0000-0002-7485-6579>

Abstract: Failing test scores in reading proficiency have been a blemish on our nation’s report card for decades as scores have remained static despite the readily-available information on language and literacy attainment, and the employment of research-based strategies in classrooms. While we continue our quest to efficiently bolster reading skills, a less obvious solution may have little to do with literacy and everything to do with neuroscience. Over 60% of youths have suffered from one or more adverse childhood experiences (ACEs), and children who experience adversity are more likely to struggle in school. Cortisol, a hormone released under stress, limits brain function and negatively impacts one’s working memory, decision-making skills, and attention, all of which are required for reading proficiency. Researchers have proven that oxytocin, the “love hormone”, reverses the effects of cortisol and is easily triggered in classroom settings via physical contact. By reversing the effects of cortisol, students will have the “mental real estate” to learn and retain the skills and knowledge necessary to become proficient readers.

Keywords: adverse childhood experiences, literacy, neurophysiology

Citation: Butler, A. M. (2023). ACEs are Wild: How Educators Can Positively Influence the “Hand” Students are dealt. In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023-- International Conference on Social and Education Sciences* (pp. 202-214), Las Vegas, NV, USA. ISTES Organization.

Introduction

National concerns regarding poor academic achievement in K-12 schools have been sweeping headlines for decades, and while Covid-19 has become a convenient scapegoat for various problems in American schools, the current status of our educational shortcomings has longstanding roots. Forty years ago, a landmark report highlighted problems in our educational system and encouraged discussions to resolve the identified problems (United States National Commission on Excellence in Education, 1983). This report spurred numerous studies that advanced our knowledge of best teaching practices; however, national scores have remained predominantly static (Hussar et al., 2020), thus failing to narrow the achievement gap. Results from the Programme of International Student Assessment (PISA) reported that the United States ranked 13th in reading and has maintained a flat curvilinear trajectory from 2000-2018 (OECD, 2018), indicating stagnant literacy rates spanning nearly two decades. Prior to Covid-19, the National Association of Educational Progress (NAEP, 2019) reported that only 35% of fourth graders and 34% of eighth graders nationwide scored at or above

proficiency in reading. The most recent report from NAEP (2022) indicated that fourth graders in 21 states have made no significant progress, while students in 29 states plus Washington, D.C. have shown a decrease since 2019.

These abysmal scores prompted leading researchers to investigate and draw connections between neuroscience and literacy. The term ‘Science of Reading’ emerged in literacy journals a few years ago and has quickly gained attention among education researchers, school district leaders, and state legislators. The Reading League (2022) defined the Science of Reading (SoR) as “a vast, interdisciplinary body of scientifically-based research about reading and issues related to reading and writing” (p. 6). SoR advances what is known about literacy development to include psychology and neuroscience in order to create a more comprehensive framework. This has spurred hope within the literacy community because the science behind literacy acquisition is brain-based and foundational. One vital area of neuroscience has been given limited attention, though – the biology and physiology of the reading brain.

The purpose of this article is to expand upon the current research on literacy acquisition as it pertains to neuroscience and to offer an alternative method to narrowing the achievement gap, specifically focused on improving the literacy skills of children who have experienced traumatic events.

Adverse Childhood Experiences

Adverse childhood experiences, or ACEs, is the term used for children under 18 who experience traumatic events that initiate feelings of unsafe, unstable, and unsupported environments as a result of abuse, neglect, and household dysfunction (Division of Violence Prevention, 2019). As seen in Figure 1, a more detailed list of specific types of ACEs is provided below each category.

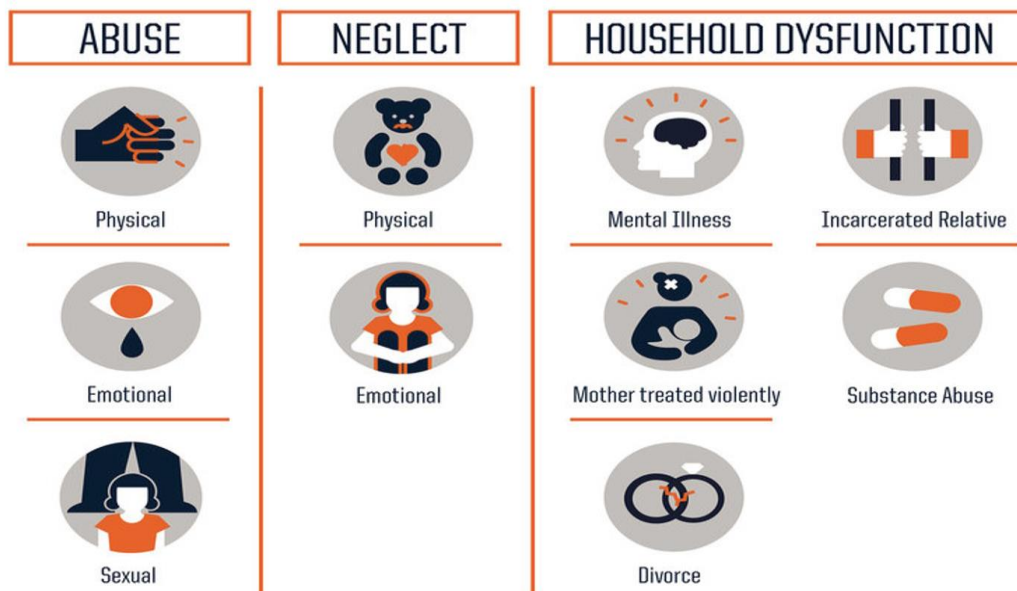


Figure 1. Three Types of Adversity

The former president of the American Academy of Pediatrics stated, “Adverse childhood experiences are the single greatest unaddressed public health threat facing our nation today” (Council on Accreditation, 2018, para. 1), as there are myriad lifelong physical and psychological effects resulting from such experiences. The effects of ACEs, depending on the number of experiences and severity of each, could extend into adulthood, as employment, income potential, mental health, and overall quality of life may be impacted (Division of Violence Prevention, 2019; Jimenez et al., 2016), as indicated in Figure 2.

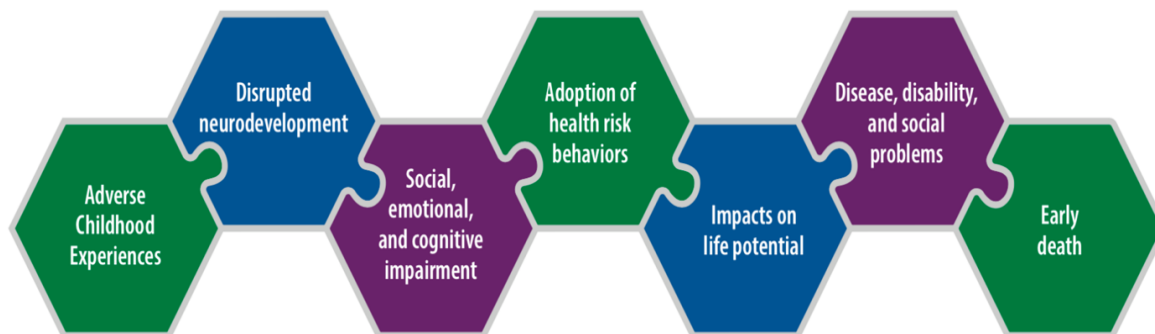


Figure 2. Lifelong Effects of Adverse Childhood Experiences

Children who have been repeatedly exposed to the same ACE or experienced different types of ACEs should be considered at-risk. With every exposure, associations between ACEs and school readiness, low achievement, social problems, and aggression become increasingly prevalent, thus, congruently widening the achievement gap (Blair, 2002; Jimenez et al., 2016). The CDC’s most recent report states that 61% of surveyed participants have experienced one type of ACE, and approximately 17% have experienced four or more types of ACEs (2022). It is important to remember that these numbers only reflect what was reported and percentages could be higher.

It is impossible for educators to know the history of every student every year; however, researchers have found that children from low-SES homes are at greater risk for ACEs. Due to the cascading effects of adult stress on children, obstacles of parenting under pressure, financial hardships, and/or living in unsafe, unstable, or overcrowded environments disturb the quality of caregiving (Blair & Raver, 2012).

The Reading Brain and ACEs

The effects of ACEs may significantly alter a child’s brain and affect their ability to learn, regardless of the quality of instruction. It is imperative that teachers and educational leaders understand that the best teaching strategies and resources will not narrow classroom achievement gaps if a student has a cognitive impairment from current or past traumas. In the subsequent sections, cognitive processes and the effects of ACEs are explained and connected to achievement outcomes.

Executive Function

Hormones can alter brain function, and children’s brains are more susceptible since the brain is not fully developed until age 25 (Massachusetts Institute of Technology, 2018). One particular function necessary for learning and accomplishing tasks is called executive function (EF). EF refers to a set of cognitive processes that are crucial to learning and accomplishing tasks in school (Korucu et al., 2020), e.g., paying attention, communicating effectively, prioritizing, following multistep directions, and requires strong functioning in the area of the brain called the prefrontal cortex (PFC) (National Scientific Council on the Developing Child, 2011). Between early childhood and adolescence, the PFC remains highly “plastic” and is shaped by both negative and positive experiences.

Three functions comprise EF skills: (a) working memory, (b) inhibition, and (c) cognitive flexibility. EF skills work in concert with one another, and they must be fully operational to complete a multitude of tasks in both school and work environments (Hudson, et al., 2016; Lubin et al., 2016). Working memory allows an individual to hold a piece of information for a short time while new information is received. Inhibition allows one to control their impulses and focus their attention on tasks. Cognitive or mental flexibility allows one to successfully switch from one activity to another or apply a new set of rules to different contexts (Developing Child, 2011). Researchers have been able to predict EF capabilities in older children from events experienced in early childhood (Raver et al., 2013).

Executive function is heavily influenced by the brain’s neural physiological signals communicated between the adrenal glands and various regions in the PFC, and proper functioning of each EF skill may be compromised when an individual feels threatened or stressed. Compromised functions are a result of cortisol production, a hormone created and released by the adrenal glands during times of stress to initiate a primal fight, flight, or freeze response (Thau & Sharma, 2019). Frequent states of chronic stress may alter the brain’s architecture and, with long-term exposure, may result in atrophy in some regions (Shonkoff & Garner, 2012).

It is important to note that not all stress is equal. The Center on the Developing Child (2014) described three different types of stress: (1) positive stress e.g., attending a new school, having a toy taken away; (2) tolerable stress e.g., experiencing a natural disaster, losing a loved one; and (3) toxic stress e.g., physical/emotional abuse/neglect, extreme poverty. When a child’s basic physiological and psychological needs are not met, toxic stress is probable and will likely impair function of the PFC, thereby affecting students’ learning capabilities (National Scientific Council on the Developing Child, 2010). Throughout the rest of this article, any reference to stress should be assumed as toxic stress.

Executive Function and Literacy

Life experiences as early as infancy can have lasting impacts on relationships, cognitive functioning, and overall well-being throughout childhood and into adulthood (Bethel et al., 2019; Blair, 2010; Blair & Raver, 2012;

National Scientific Council on the Developing Child, 2010; Suor et al., 2015). These experiences, both positive and negative, create neural changes and are more pronounced in young children and adolescents because the brain is still developing (Blair, 2002; Blair, 2010; Nelson, 1999). In turn, learning would be impacted tremendously.

A longitudinal study measured cortisol levels in children ages 2-4 at yearly intervals who suffered from living in poverty, witnessed domestic violence in their homes, or whose caregivers were emotionally unavailable (Suor et al., 2015). The cortisol samples indicated that children either had elevated, moderate, or unusually low levels. When participants turned 4, a standardized assessment was administered to measure their cognitive functioning. In instances of both elevated and low levels of cortisol, researchers discovered a reduction in cognitive functioning. Cortisol levels deemed too low may be a consequence of prolonged exposure to trauma. Children who showed only a moderate level of cortisol did not exhibit the same reduction in cognitive functioning the other two groups exhibited. Suor and colleagues explained that the reduction may have been from neurotoxic effects on the prefrontal cortex and hippocampus, which are two areas of the brain that are still developing in children and support cognitive functioning.

More specifically, ACEs have deleterious effects on children's literacy development, as cortisol interferes with specific EF skills, including working memory, inhibition, and cognitive flexibility (DeDreu, 2016; Vogel & Schwabe, 2016). To read accurately and fluently, working memory is necessary for phonemic awareness, phoneme-grapheme correspondence, sight word recognition, and word analogy skills (Ehri et al., 2014). Additionally, it is required for readers to make sense of and retain new information and apply it to preexisting knowledge. Inhibition requires readers to maintain focus on the topic as they identify necessary information and ignore irrelevant information (Hudson et al., 2016). Cognitive flexibility is required for background knowledge activation, mental representations, and inferring (Kendeou et al., 2014). It is also required for self-monitoring and shifting attention to make connections between preexisting knowledge and new information (Westby, 2014).

Over the last decade, researchers have been able to predict the causes of poor EF skills, as well as connect the development of EF skills to later reading trajectories and achievement gaps (Finders et al., 2020; Liu et al., 2018; Montoya et al., 2019; Nayfeld et al., 2013; Patael et al., 2018; Raver et al., 2013). Low SES has been found to be a robust predictor of poor EF skills in children (Jimenez et al., 2016; Raver et al., 2013). EF skills have also predicted comprehension skills in young children, while, conversely, comprehension skills predicted EF skills in older students (Meixner et al., 2018).

It is imperative for educators and researchers to understand not only how reading proficiency is dependent on EF skills but also why EF skills are so low in children. This information can be used to better understand the root causes for EF deficiencies so that at-risk students are correctly and expeditiously identified, and opportunities for teachers to narrow the achievement gaps through effective interventions may be implemented.

Reversing the Damage

Progress toward improving students' literacy scores has been stagnant over the last several decades, and the achievement gap has not been narrowed. With an increased focus on EF skills and neuroscience, researchers' and educators' attention has been redirected; however, there is one element missing from much of the research. Teachers' roles in rewiring students' prefrontal cortex have not garnered much attention, and it may be a simpler and more effective approach to narrowing the achievement gap.

Oxytocin

Similar to cortisol, oxytocin is a hormone released by the nervous system that affects the PFC. Unlike cortisol, these effects are positive. Otherwise known as the "love hormone", oxytocin triggers a state of calmness by slowing the heart rate and lowering blood pressure (Uvnas-Moberg et al., 2015). It also stimulates feelings of trust, bonding, and cooperation toward others and improves pro-social behaviors (Barraza & Zak, 2009; Kosfeld et al., 2005; Zak et al., 2007). If the nervous system is in a heightened state, oxytocin stymies the effects of cortisol and works to slow down the neurophysiological response to stress. This anxiolytic effect allows executive functioning to be restored, thereby reenabling the brain to take in and retain information (DeDreu, 2016).

Researchers viewed fMRI scans to understand the effects of oxytocin on various regions of the brain and learned that "a prolonged priming effect of OT (oxytocin) can elicit functional rewiring of neuronal networks" (Bethlehem et al., 2013, p. 969). Each time oxytocin is released, the benefits can last up to 30 minutes (Zak, 2017), which may sound insignificant; however, fMRI images proved that neurological repairs to the prefrontal cortex are possible when oxytocin is present over long periods.

This information could have tremendous implications for narrowing the achievement gap because adults, specifically classroom teachers, have the ability to trigger oxytocin throughout the day every day in students via physical touch.

Interpersonal Touch

For over 50 years, a single touch between humans has been studied in a multitude of contexts with participants from various dyads: (a) adult strangers (Crusco & Wetzel, 1984; Fisher et al., 1976; Guéguen & Jacob, 2005; Hertenstein et al., 2009); (b) adult friends, family, and caregivers to children and adults (Harrison et al., 2019; Jones & Glover, 2014; Kraus et al., 2010; Spitz, 1947); (c) educators to college students (Guéguen, 2004; Steward & Lupfer, 1987); and (d) educators to K-12 students (Gutshall, 2008; Wheldall et al., 1986). Researchers learned that touch between two people, known as interpersonal (IP) touch, triggers a release of oxytocin and counteracts the effects of cortisol (Barraza & Zak, 2009; Kosfeld et al., 2005; Unvas-Moberg et al., 2015; Zak et al., 2007).

Numerous studies have centered on the effects of IP touch, neuroscience, and academic achievement; however, research that focuses on all three variables is lacking in scholarly literature. Butler's (2021) research resulted in an unintended but significant finding. A five-year-old boy had experienced several ACEs, and strong evidence suggested he was living in an unsafe situation at the time of this study. He had not met any of the literacy or math benchmarks by mid-year and was volatile toward peers and teachers. After receiving a side-by-side interactive read-aloud intervention designed to simulate a lap reading environment, he eventually became non-combative with his peers and teachers, and he met or exceeded all benchmark assessments. The student continued to thrive through fourth grade but then moved out of state and could no longer be tracked.

Another study highlighted the success found with fourth-grade struggling readers and their "reading buddies" (Gutshall, 2009). The reading buddies were a group of college students majoring in education. During the first seven weeks of this 21-week study, students' only instructions were to "accompany their buddies to the library, pick a cozy spot, and snuggle up and read" (p. 436). After the first seven weeks, students' average oral reading fluency (ORF) rate increased by 20 words, and their attitude and motivation improved.

During the next seven weeks, the reading buddies were replaced with a computer-based reading intervention and then re-assessed. Gutshall found that student growth stalled; however, the positive ORF growth students made with their reading buddies remained. The reading buddies returned to their struggling readers for another seven weeks, and students were re-assessed once more. The post-assessment indicated that students' average reading rate increased by another 20 words, thereby totaling an average increase of 40 words. Since there was no control group, it is unclear whether the "snuggling" made a difference; however, it is evident that the relationship between the participants made a substantial difference.

The number of studies on the effects of touch between professors and students in higher education is also limited, though it does offer a more complete understanding of how IP touch during classroom instruction affects students' behaviors, attitudes, and opinions. Guéguen's research (2004) focused on how IP touch of student participants shaped their level of in-class participation. At random, the professor employed a slight tap to students' upper-arm area for one second when assisting with math problems and offering encouragement. Then, volunteers were invited to solve a statistical problem on the board in front of the class. Both male and female students who received the one-second touch volunteered more than those who volunteered without being touched. These findings indicated that touching students while offering encouragement has an increased effect on affective behaviors, such as participation.

Other studies have focused on how a handshake or a brief touch on the arm affects students' attitudes and opinions about their teachers (Steward & Lupfer, 1987; Wilson et al, 2009) and their compliance with on-task behavior (Wheldall, 1986). While interpersonal touch and student achievement are not directly correlated in these studies, affective factors, i.e., improved participation, motivation, engagement, and cooperation, are directly correlated to academic achievement (Deng, et al, 2016; Kuo, 2015; Lai et al, 2015).

An Alternative Approach to Narrowing the Achievement Gap

Neurophysiology combines neuroscience and physiology to study nervous systems (Luhman, 2013), and it is imperative to consider this component when researching the role of the PFC and EF skills in academic achievement. Advances in neurocognitive science have proven that oxytocin promotes feelings of cooperation and trust toward others, improves motivation and attitude, and is released via interpersonal touch (Barraza & Zak, 2009; Kosfeld et al., 2005; Unvas-Moberg et al., 2015; Zak et al., 2007). Psychology and brain-based studies are becoming increasingly integrated into the education field to better understand literacy acquisition; however, the neurophysiology underpinning is absent from the frameworks despite the wealth of research highlighting its significance in literacy acquisition and general academic achievement. The achievement path of those who suffer from ACEs and toxic stress is markedly disparate compared to students with moderate or no stress. As shown in Figure 3, toxic stress triggers the release of cortisol and impairs the PFC, thereby interrupting executive function and impeding the learning process. This response creates a physiological barrier that has a debilitating effect on brain function and cognition, thereby affecting achievement outcomes. Over time, IP touch is powerful enough to mitigate the effects of cortisol and carve a new path for student achievement. IP touch can occur in a split second and does not require a grandiose gesture. To trigger oxytocin throughout the day, teachers can give students a high-five, fist bump, elbow/forearm bump, or a pat on the upper back or arm. Teachers of young children can simulate an interactive read-aloud setting similar to the aforementioned studies. IP touch will look different across grade levels; nonetheless, as Figure 3 shows, the effects will be the same.

A Framework Model of Differentiated Learning Capabilities and Academic Outcomes According to Students' Stress Levels and Interpersonal Touch Opportunities

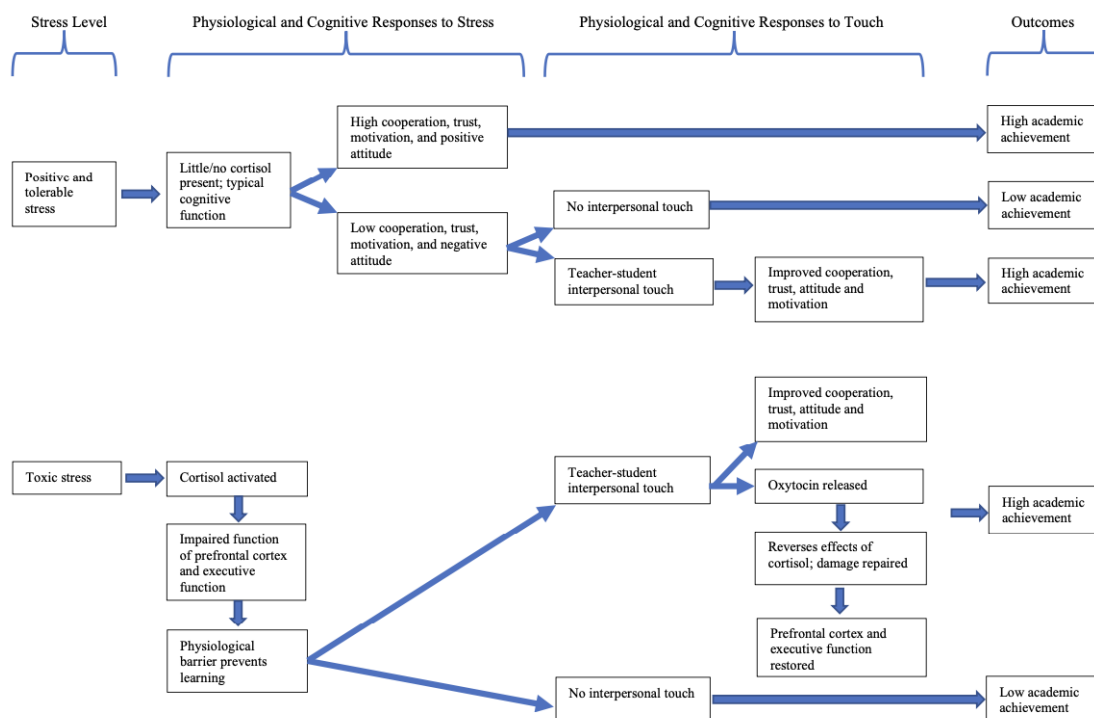


Figure 3. Projected Academic Outcomes by Stress Levels

Conclusion

The landscape of K-12 education continues to shift as innovative research emerges and historic seminal works inspire new theories and research. Neuroscience is embedded in the Science of Reading, and the effects of childhood trauma are well-documented, but a confluence of ACEs, neuroscience, and IP touch is minimal in educational literature. The viral videos of teachers greeting students at the door with various handshakes and hugs were praised, shared, and replicated, but what most likely do not know is that these practices ignite a flurry of oxytocin in both the students and the teacher, and every child, irrespective of their stress level, reap cognitive benefits. Teachers use these strategies because they have seen them transform their relationships with students, but the effects of IP touch run much deeper.

Narrowing the achievement gap will require a concerted effort within schools and districts to address the neural impacts of ACEs and to become knowledgeable about how EF skills affect aptitude. Most importantly, educators at every level must understand the effects of stress on children's PFC and be strategic in applying IP touch daily to calm students' nervous systems. When working with struggling readers who have experienced trauma, teachers should not rush to add another strategy or intervention into the curriculum because, if a child's brain is not primed for learning, no amount of highly effective teaching will be sufficient on its own. This was the case with the previously discussed kindergartner. The interventions this child received throughout the year did not generate adequate progress; however, once he received an intervention that included IP touch, the achievement gap between this child and his peers no longer existed. A first-things-first approach is necessary for successful teaching, and for students who have suffered from toxic stress due to ACEs, restoration of the PFC must be a teacher's top priority.

Recommendations

It is imperative that educators and district leaders take a first-things-first approach and invest in understanding why some students struggle, specifically those who have experienced adversity and continue to underperform.

References

- Butler, A. (2021). The unlikely outcome of a struggling kindergartner: A cognitive rags to riches tale. *Teacher Education Journal of South Carolina*, 14(1), 1-13.
- Barraza, J. A., & Zak, P. J. (2009). Empathy towards strangers triggers oxytocin release and subsequent generosity. <http://neuroeconomicstudies.org/images/pdf-files/2009/empathy-towards-strangers.pdf>
- Bethel, C., Jones, J., Gombojav, N., Linkenbach, J., & Sege, R. (2019, September 9). Positive childhood experiences and adult mental and relational health in a statewide sample: Associations across adverse childhood experiences levels. *JAMA Pediatrics*, 173(11), e193007. doi:10.1001/jamapediatrics.2019.3007

- Bethlehem, R. A., van Honk, J., Auyeung, B., Baron-Cohen, S. (2013). Oxytocin, brain physiology, and functional connectivity: A review of intranasal oxytocin fMRI studies. *Psychoneuroendocrinology*, 38(7), 962-74. doi: 10.1016/j.psyneuen.2012.10.011.
- Blair, C. (2002). School readiness: Integrating cognition and emotion in a neurobiological conceptualization of children's functioning at school entry. *American Psychologist*, 57, 111-127.
- Blair, C. (2010). Stress and the development of self-regulation in context. *Child Development Perspectives*, 4(3), 181–188. <https://doi.org/10.1111/j.1750-8606.2010.00145.x>
- Blair, C., & Raver, C. C. (2012). Child development in the context of adversity: Experiential canalization of brain and behavior. *American Psychology*, 67(4), 309-318. doi:10.1037/a0027493
- Center on the Developing Child. (2011). Building the brain's 'air traffic control' system: How early experiences shape the development of executive function (Working Paper No. 11). <https://harvardcenter.wpenginpowered.com/wp-content/uploads/2011/05/How-Early-Experiences-Shape-the-Development-of-Executive-Function.pdf>
- Center on the Developing Child. (2014). A decade of science informing policy: The story of the national scientific council on the developing child. <https://46y5eh11fhgw3ve3ytpwxt9r-wpengin.netdna-ssl.com/wp-content/uploads/2015/09/A-Decade-of-Science-Informing-Policy.pdf>
- Centers for Disease Control and Prevention. (2022). Fast facts: Preventing adverse childhood experiences. <https://www.cdc.gov/violenceprevention/aces/fastfact.html>
- Council on Accreditation. (2018, April 10). *How to combat the effects of adverse childhood experiences*. <https://coanet.org/2018/04/how-to-combat-the-effects-of-adverse-childhood-experiences/#:~:text=Robert%20Block%2C%20former%20president%20of,and%20one%20that%20cannot%20be>
- Crusco, A. H., & Wetzell, C. G. (1984). The Midas touch: The effects of interpersonal touch on restaurant tipping. *Personality and Social Psychology Bulletin*, 10(4), 512-517. doi:10.1177/0146167284104003
- De Dreu, C. K. W. (2016). Oxytocin conditions human group psychology. In E. Harmon-Jones & M. Inzlicht (Eds.), *Frontiers of social psychology. Social neuroscience: Biological approaches to social psychology* (pp. 143–163). New York, NY: Routledge/Taylor & Francis Group. doi:10.4324/9781315628714-8
- Deng, X.-Y., Liu, S.-Z, Peng, Y., & Fu, Z.-Z. (2016). The research on affective factors which influence students' performance in college English classes. *International Conference on Social Science Development*. <https://pdfs.semanticscholar.org/5f0b/1a08fbb0ce9ad9f68a4106096e93057a071c.pdf>
- Division of Violence Prevention. (2019). *Preventing adverse childhood experiences (ACEs): Leveraging the best available evidence*. Centers for Disease Control and Prevention, National Center for Injury Prevention and Control. <https://www.cdc.gov/violenceprevention/pdf/preventingACEs.pdf>
- Ehri, L. C., Cardoso-Martins, C., & Carroll, J. M. (2014). Developmental variation in reading words. In Stone, C. A., Silliman, E. R., Ehren, B. J., & Wallach, G. P. *Handbook of language & literacy: Development and disorders* (pp. 385-407). New York, NY: Guilford Press.
- Finders, J., Mcclenlland, M., Geldhof, G. J, Rothwell, D., Hatfield B. (2020). Explaining achievement gaps in kindergarten and third grade: The role of self-regulation and executive function skills. *Early Childhood Research Quarterly*, 54, 72-85.

- Fisher, J. D., Rytting, M., Heslin, R. (1976). Hands touching hands: Affective and evaluative effects of an interpersonal touch. *Sociometry*, 39(4), 416-421. doi:10.2307/3033506
- Guéguen, N. (2004). Nonverbal encouragement of participation in a course: The effect of touching. *Social Psychology of Education*, 7, 89-98. doi:10.1023/B:SPOE.0000010691.30834.14
- Guéguen, N., & Jacob, C. (2005). The effect of touch on tipping: An evaluation in a French bar. *International Journal of Hospitality Management*, 24(2), 295–299. doi:10.1016/j.ijhm.2004.06.004
- Gutshall, A. (2008). 4th grade readers... Not too old to snuggle. *Phi Delta Kappan*, 90(6), 435-437. http://www.pdkmembers.org/members_online/publications/Archive/pdf/k0902gut.pdf
- Harrison, T. M., Chen, C. Y., Stein, P., Brown, R., & Heathcock, J. C. (2019). Neonatal skin-to-skin contact: Implications for learning and autonomic nervous system function in infants with congenital heart disease. *Biological Research for Nursing*, 21(3), 296-306. doi.org.10.1177/1099800419827599
- Hertenstein, M. J., Holmes, R., McCullough, M., & Keltner, D. (2009). The communication of emotion via touch. *Emotion*, 9(4), 566-573. doi:10.1037/a0016108
- Hudson, N., Scheff, J., Tarsha, M., Cutting, L. (2016). Reading comprehension and executive function. *Perspectives on Language and Literacy*. 23-29.
- Hussar, B., Zhang, J., Hein, S., Wang, K., Roberts, A., Cui, J., Smith, M., Bullock Mann, F., Barmer, A., & Dilig, R. (2020). The condition of education 2020 (NCES 2020-144). U.S. Department of Education. Washington, DC: National Center for Education Statistics. <https://nces.ed.gov/pubs2020/2020144.pdf>
- Jimenez, M. E., Wade, R., Jr., Lin, Y., Morrow, L., & Reichman, N. E. (2016). Adverse experiences in early childhood and kindergarten outcomes. *Pediatrics*, 137(2). DOI: 10.1542/peds.2015-1839
- Jones, T., & Glover, L. (2014). Exploring the psychological processes underlying touch: Lessons from the Alexander Technique. *Clinical Psychology and Psychotherapy*, 21, 140-153. doi:10.1002/cpp.1824
- Kendeou, P., van den Broek, P., Helder, A. and Karlsson, J. (2014). A cognitive view of reading comprehension: Implications for reading difficulties. *Learning Disabilities Research & Practice*, 29, 10-16. <https://doi.org/10.1111/ldrp.12025>
- Korucu, I., Litowski, E., Schmitt, S. (2020) Examining associations between home literacy environment, executive function, and school readiness. *Early Education and Development* 31(3), 455-473. doi: 10.1080/10409289.2020.1716287
- Kosfeld, M., Heinrichs, M., Zak, P. J., Fischbacher, U., and Fehr, E. (2005). Oxytocin increases trust in humans. *Nature* 435, 673–676.
- Kraus, M. W., Huang, C., & Keltner, D. (2010). Tactile communication, cooperation, and performance: An ethological study of the NBA. *Emotion*, 10(5), 745-749. doi:10.1037/a0019382
- Kuo, Y.-C. (2015). Affective factors in learning, instruction, and technology. In J. M. Spector, *The SAGE Encyclopedia of Educational Technology* (pp. 13-16). SAGE Publications. ISBN: 978-1-4522-5822-5
- Lai, S.-L., Stevens, C., Martinez, J., & Ye, R. (2015). A cross-national study of students' attitudes toward school. *Pastoral Care in Education*, 33(1), 33–46. doi:10.1080/02643944.2015.1005120
- Liu, T., Sun, H., Lin, D., Li, H., Yeung, S., Wong, T. T.-Y. (2018). The unique role of executive function skills in predicting Hong Kong kindergartens' reading comprehension. *British Journal of Educational Psychology*. 628-644.

- Lubin, A., Boulc'h, L., Paxton, S., Leone, C. (2016). Executive functions differently contributed to fourth graders' mathematics, reading, and spelling skills. *Journal of Cognitive Education and Psychology*, 15(3), 444-463. doi.org: 10.1891/1945-8959.15.3.444.
- Massachusetts Institute of Technology. (2018). Young adult development project: Brain changes. <https://hr.mit.edu/static/worklife/youngadult/brain.html>
- Meixner, J., Warner, G., Lensing, N., Schiefele, U., Elsner, B.(2019). The relation between executive functions and reading comprehension in primary-school students: A cross-lagged-panel analysis. *Early Childhood Research Quarterly*, 46, 62-74.
- Montoya, M., Susperreguy, M., Dinarte, L., Morrison, F., Martin, E., Barahona, C., Forster, C. (2019). Executive function in Chilean preschool children: Do short-term memory, working memory and response inhibition contribute differently to early academic skills? *Early Childhood Research Quarterly*, 46,187-200.
- Nayfield, I., Fuccillo, J., Greenfield, D. (2013). Executive functions in early learning: Extending the relationship between executive and school readiness to science. *Learning and Individual Differences*, 26, 81-88. doi.org/10.1016/j.lindif.2013.04.011.
- National Assessment for Educational Progress. (2019). The nation's report card. <https://www.nationsreportcard.gov/reading?grade=4>
- National Assessment for Educational Progress. (2022). The nation's report card. <https://www.nationsreportcard.gov/highlights/reading/2022/>
- National Scientific Council on the Developing Child. (2010). Persistent fear and anxiety can affect young children's learning and development (Working paper no. 9). <http://www.developingchild.net>
- Nelson, C. A. (1999). Neural plasticity and human development. *Current Directions in Psychological Science*, 8(2), 42-45.
- OECD (2018). PISA 2018 results. https://www.oecd.org/pisa/PISA-results_ENGLISH.png
- Patael, S. Z., Ferris, E. A., Black, J. M., Hancock, R., Gabrieli, J. D. E., Cutting LE, Hoefl, F. (2018) Brain basis of cognitive resilience: Prefrontal cortex predicts better reading comprehension in relation to decoding. *PLOS ONE* 13(6): e0198791. <https://doi.org/10.1371/journal.pone.0198791>
- Raver, C. C., McCoy, D. C., Lowenstein, A. E., & Pess, R. (2013). Predicting individual differences in low-income children's executive control from early to middle childhood. *Developmental Science*, 16(3), 394-408. doi: 10.1111/desc.12027
- Shonkoff, J. P., & Garner, A. S. (2012). The lifelong effects of early childhood adversity and toxic stress. *Pediatrics*, 129, e232-e246. <https://pediatrics.aappublications.org/content/pediatrics/129/1/e232.full.pdf>
- Spitz, R. A. (1947). Hospitalism. *The Psychoanalytic Study of the Child*, 2, 113-117. doi:10.1080/00797308.1946.11823540
- Steward, A. L., & Lupfer, M. (1987), Touching as teaching: The effect of touch on students' perceptions and performance. *Journal of Applied Social Psychology*, 17, 800-809. doi:10.1111/j.1559-1816.1987.tb00340.x

- Suor, J. H., Sturge-Apple, M. L., Davies, P. T., Cicchetti, D. & Manning, L. G. (2015). Tracing differential pathways of risk: Associations among family adversity, cortisol, and cognitive functioning in childhood. *Child Development*, 86(4), 1142-1158. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4683120/>
- Thau, L., & Sharma, S. (2019, February 15). Physiology, cortisol. StatPearls. <https://www.ncbi.nlm.nih.gov/books/NBK538239/>
- United States National Commission on Excellence in Education (1983). *A nation at risk: The imperative for educational reform*. Washington, D.C.: The National Commission on Excellence in Education.
- Uvnäs-Moberg, K., Handlin, L., Petersson, M. (2015). Self-soothing behaviors with particular reference to oxytocin release induced by non-noxious sensory stimulation. *Frontier Psychology*, 5(1529), 1-16.
- Vogel, S., & Schwabe, L. (2016). Learning and memory under stress: Implications for the classroom. *Science of Learning*, 1(16011), 1-16. <https://www.nature.com/articles/npjscilearn201611.pdf>
- Westby, C. E. (2014). A language perspective on executive functioning, metacognition, and self-regulation in reading. In Stone, C. A., Silliman, E. R., Ehren, B. J., & Wallach, G. P. *Handbook of language & literacy: Development and disorders* (pp. 385-407). New York, NY: Guilford Press.
- Wheldall, K., Bevan, K., Shortall, K. (1986). A touch of reinforcement: The effects of contingent teacher touch on the classroom behavior of young children. *Educational Review*, 38(3), 207-216. doi:10.1080/0013191860380301
- Wilson, J. H., Stadler, J. R., Schwartz, B. M. & Goff, D. M. (2009). Touching your students: The impact of a handshake on the first day of class. *Journal of the Scholarship of Teaching and Learning*, 9(1), 108-117. <https://files.eric.ed.gov/fulltext/EJ854882.pdf>
- Zak, P. J. (2017). *The trust factor: The science of creating high-performance companies*. New York, NY: AMACOM.
- Zak, P. J., Stanton, A. A., & Ahmadi, S. (2007). Oxytocin increases generosity in humans. *PLoS One*, 2(11), e1128. doi:10.1371/journal.pone.0001128

Investigating Student Achievement in Special Education: A Comparative Analysis of Online Schools and Traditional Face-to-Face Institutions

Donna Baumgardner

Tarleton State University, United States,  <http://orcid.org/0000-0003-0137-9019>

Stephanie Atchley

Tarleton State University, United States,  <http://orcid.org/0000-0002-4969-0917>

Holly Lambert

Ingram ISD, United States,  <http://orcid.org/0009-0004-2032-2979>

Abstract: The number of students leaving traditional face-to-face public schools and moving to online school environments continues to grow. The National Center for Educational Statistics reported that almost 300,000 K-12 students were served in a fully online environment for the 2019-2020 school year (US Department of Education, n.d.). This study investigates the impact of online and traditional learning on student achievement, specifically focusing on students with disabilities. The study used descriptive statistics to analyze state standardized testing data retrieved from the Texas Academic Performance Reports (TAPR) from three school districts in Texas to compare online schools and traditional face-to-face institutions from the 2020-2021 school year. The findings reveal that online schools outperformed their traditional counterparts. This research highlights the growing significance of online programming in K-12 education.

Keywords: Online education, Special education, Public K-12 schools, Leadership

Citation: Baumgardner, D., Atchley, S., & Lambert, H. (2023). Investigating Student Achievement in Special Education: A Comparative Analysis of Online Schools and Traditional Face-to-Face Institutions. In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023-- International Conference on Social and Education Sciences* (pp. 215-222), Las Vegas, NV, USA. ISTES Organization.

Introduction

Texas recorded 5,371,586 K-12 public school enrollments during the 2020-21 school year (Texas Education Agency, 2020). By 2022-2023, enrollment in K-12 schools increased to 5,518,432, an increase of over 146,000 students, according to the Texas Education Agency (2023). The push for online learning and an increase in enrollment in Texas K-12 public schools has gained attention in the 2023 Texas State legislature, with Senate Bills 1861 and 1068 and House Bill 681 focusing on online (virtual) classes since the aftermath of COVID. The Individuals with Disabilities Education Act (2004) requires all students with disabilities with an Individualized

Education Plan to have their education delivered according to that plan. Individualized Education Plans must be adhered to even if the student attends schools in-person or online.

The Internet, the World Wide Web, was unavailable before the mid-1990s (Kennedy, 2014). With the availability of the internet, online learning began to evolve into the platforms and tools we use today. In 2002, the No Child Left Behind Act supported the exploration of online learning. Blended learning is a concept that came about more recently. According to an article by Kennedy (2014), private schools in states like California and Colorado blazed the trail for online learning programs. The pandemic forced the progression and availability of online programs since these programs became the main mode of education during school closures, and K-12 online programs in states continue to improve and grow.

Literature Review

Growth of Online Schools

In 1999, a significant increase in homeschooling was the driving force behind the rise of online learning. Homeschooled students increased from 800,000 in 1999 to around 2 million in 2011 (Horn & Staker, 2011). While online learning was available, some families struggled to have the resources and means to access the online platform. In 2006, approximately 38 states had created online learning programs led by state policies; furthermore, 18 states served around 65,000 students (Watson, 2007). State-led online learning increased access for students. By 2019, at least 50% of secondary courses were delivered via an online learning platform (Horn & Staker, 2011).

Over the past two decades, online learning has steadily grown across the United States. Online learning became a necessity overnight in 2020 with the closing of schools across the nation due to the COVID-19 pandemic. Currently, some schools have found it useful to utilize a blended learning model to enhance the learning environment for students.

Comparison of Online and Traditional Learning

Over the last two decades, online learning for K-12 students has substantially changed and become a popular mode of education delivery (Mann et al., 2021). Completed research by Mann et al. (2021) on how student profiles affected academic success using the online learning data available after the pandemic brought to light that online courses are improving, and there is a need for ongoing research on online learning academic performance (Mann et al., 2021).

A meta-analysis completed in 2004 concluded that there was no significant difference in success when comparing online and traditional learning (Kingsbury, 2021). Online learning platforms have undergone many improvements since 2004, and the success rate could differ from previous studies. Kingsbury (2021) asserts that

there were many data unknowns as schools navigated the COVID-19 pandemic. Much of the data during the pandemic did not have full engagement or representation from students.

The International Association for K-12 Online Learning (Patrick & Powell, 2009) found that online learning could revolutionize traditional learning. However, more research is needed to compare online versus traditional learning success rates. Patrick and Powell (2009) reviewed data from the U.S. Department of Education that displayed that students achieved higher online learning than in traditional in-person settings. That same 2008 U.S. Department of Education study also noted a lack of research on the effectiveness of online learning for K-12 students.

Based on the research, there is a significant research gap in studies focusing on K-12 schools, as many focus on higher education learning models. Much of the research focuses on certain subject areas and lacks highlighting certain populations, such as special education. Other research discusses factors involving virtual learning, such as learners' level of engagement, student traits, and teacher techniques linked to academic success. There is research about parent, teacher, and student satisfaction with online learning compared to traditional learning. Many studies came during or immediately after the coronavirus pandemic and did not have access to virtual data then. Numerous studies about the benefits of blending online and traditional learning do not conclude that one method is better.

Theoretical Framework

This study utilized connectivism as a guiding framework. The researchers sought to measure student performance in traditional versus virtual school environments. Connectivism promotes the idea that learning can successfully occur via digital channels (Siemens, 2004). Connectivism, as promoted by George Siemens in 2004, is a contemporary theoretical framework that recognizes the impact of digital technology and networks on learning and knowledge acquisition.

Information constantly flows in the digital age, reshaping how individuals access and utilize knowledge. Siemens (2004) emphasizes that learning is no longer confined to individual environments but occurs within a broader context of networks and connections. Likewise, Goldie (2016) emphasized that connectivism is dependent on these networks of knowledge formed from the interactions and experiences of individuals and organizations.

Connectivism is particularly relevant in the context of this study due to the focus on remote learning. It offers a framework for harnessing digital technology to create a culture of continuous learning and knowledge sharing. By recognizing the significance of networked connections and embracing digital tools for learning, schools can adapt to the ever-changing information landscape and empower their students to thrive in a dynamic, knowledge-driven world.

Methods

This quantitative study analyzed data from three different school districts within the northeast, south, and southeastern portions of Texas, with enrollment numbers varying from 10,450 to 196,943, each with traditional face-to-face classes and encompassing an online charter school within the school district. The study used descriptive statistics and comparative analysis to compare face-to-face and online school data using the Texas Academic Performance Reports (TAPR) that publish end-of-year STAAR (State of Texas Assessments of Academic Readiness) test results by the Texas Education Agency from the 2020-2021 school year. A total of 246,492 students enrolled in the school year analyzed. For a comparative analysis, English and math STAAR scores were used for fifth and eighth grades, while the English II and Algebra I end-of-course exams were used for high school.

Results

The answers to the research questions:

1. Are online schools serving a proportionate number of students who receive special education services versus traditional face-to-face institutions?

Virtual schools A and B serve special education students at a higher percentage rate than their face-to-face counterparts. School C serves more special education students face-to-face. Please see Table 1, 2020-2021 School Enrollment Data.

2. Which mode of delivery has a higher student success rate in special education?

School A, face-to-face special education students had a higher success rate, according to STAAR results. Virtual schools B and C had a higher special education success rate in 2020-2021. Please see Table 2, 2020-2021 STAAR Data Results.

3. Which delivery mode provides a higher student success rate for all student populations?

School A, face-to-face, had higher overall score averages of 11.3 points in reading and English 1 end-of-course exam and 24 points in math. School A's special education face-to-face was also better than online (virtual) by 5 points in reading and English 1 end-of-course exam and 11.7 points in math and Algebra 1 end-of-course exam.

School B, online (virtual), had higher overall scores of 21.6 in reading and English 1 end-of-course exam and 10 points higher in math and Algebra 1 end-of-course exam. School B's online special education was better by 44 points in reading and English 1 end-of-course exam and 36 points in math and Algebra 1 end-of-course exam.

School C, virtual, had higher overall scores of 21.4 in reading and English 1 end-of-course exam and 21.4 higher in math and Algebra 1 end-of-course exam. It is necessary to note that the data for School C could not be compared for 5th-grade reading and math, as Texas does not include STAAR scores when the population is too small (TEA., 2021). Therefore, only 8th grade and end-of-course exam scores were used to find the point

difference between online special education and face-to-face. School C's special education online scores were better than their face-to-face counterparts. Using only the 8th-grade reading and English 1 end-of-course exam, the online school did better by 39.5 points, and using only the 8th-grade math and algebra one end-of-course exam, the online school did better by 10 points. Overall, the online (virtual) schools outperformed the traditional face-to-face schools.

Data

Table 1. 2020-2021 Student Enrollment Data

	School A F2F	School A Online	School B F2F	School B Online	School C F2F	School C Online	
Enrollment Per school	15,267 total	10,450 total	10,858 total	4,952 total	196,943 total	8,022 total	246,492
Gen ed enrollment	13,067 gen ed	8,771 gen ed	9,854 gen ed	4,644 gen ed	180,705 gen ed	7,608 gen ed	224,649
Special Education enrollment	2,200 14.4% Needs intervention	1,679 16.1%	1,004 9.2% Needs intervention	308 19.7%	16,238 8.2% Needs intervention	414 5.2%	21,843 8.86%
EC-5	4,174 27.3%	1,921 18.4%	4,022 33.2%	1,223 24.7%	102,699 52.2%	1,685 21%	115,724 46.9%
6-8	4,518 29.6%	3,367 32.2%	3,168 29.2%	1,795 36.2%	40,704 20.7%	2,645 33%	56,197 22.8%
9-12	6,575 43.1%	5,162 49.5%	3,668 33.7%	1,934 39.0%	53,540 27.2%	3,692 46.1%	75,571 30.6%

Table 2. 2020-2021 STAAR Data Results

2020-2021	School A		School B		School C	
	F2F	Online	F2F	Online	F2F	Online
General Education						
5th Read	70	50	60	79	66	82
8th Read	74	66	66	90	65	90
English 1 EOC	67	61	69	91	63	86
Average	70.3	59	65	86.6	64.6	86
5th Math	63	26	52	64	60	89
8th Math	52	32	60	68	37	65
Algebra 1 EOC	55	40	56	60	61	68
Average	56.6	32.6	56	64	52.6	74
Special Education						
2020-2021						
Special Education	School A		School A		School A	
	F2F	Online	F2F	Online	F2F	Online
5th Read	38	22	35	89	36	*
8th Read	34	35	43	73	34	80
English 1 EOC	27	27	33	81	31	64
Average	33	28	37	81	32.5	72
5th Math	43	20	35	80	38	*
8th Math	26	17	37	67	25	29
Algebra 1 EOC	15	12	34	67	36	52
Average	28	16.3	35.3	71.3	30.5	40.5

Discussion

The data in Table 1 displays school enrollment varying from 10,450 to 196,943, with a total enrollment between face-to-face institutions and online charter schools of 246,492. It is important to note that the schools used in this study enroll 8.86% of students. According to TEA (2021), approximately 11.3% of students with disabilities received services during the 2020-2021 school year. Table 1 shows that online schools A and B are well over the state average for students with disabilities, while online school C is below. Although online schools serve students with disabilities above the state average, the TAPR reports list the three traditional face-to-face schools used in this study as schools that need intervention for students with disabilities (TEA, 2021).

Table 2 breaks down the STAAR results for each school and shows the passing rates for 5th grade, 8th grade, and high school levels in math/Algebra 1 and reading/English 1 assessments in general and special education populations. The asterisk denotes that the Texas Education Agency masked results due to a small student group to protect student identities. The online schools outperformed their traditional face-to-face counterpart in each grade level. According to Patrick & Powell (2009), several studies published from 1989 through 2004 found that online programs out-measured traditional face-to-face programs. In addition, Patrick & Powell (2009) noted a U.S. Department of Education report regarding the Washington State Digital Learning Commons that "on-time graduation rates and college/workforce readiness" (p. 5) improved in the studied schools. This study shows the same trends.

It is important to mention that Texas combines special education disabilities under five categories, as explained in Table 3 (TEA, 2021).

Table 3. Disability Breakdown

	School A F2F	School A Online	School B F2F	School B Online	School C F2F	School C Online
Section 504	1608/10.5%	1235/11.8%	1029/9.5%	480/9.7%	6879/3.5%	735/9.2%
Dyslexia	886/5.8%	577/5.5%	483/4.5%	195/63.3%	4798/2.4%	221/2.8%
Intellectual Disabilities	981/44.8%	734/43.7%	389/38.9%	85/27.5%	7375/45.9%	144/34.8%
Physical Disabilities	221/10.01%	131/7.8%	183/18.3%	58/18.3%	2648/16.5%	37/8.9%
Autism	297/13.6%	241/14.4%	164/16.4%	73/23.7%	2774/17.3%	87/21.0%
Behavior Disabilities	681/31.1%	573/34.1%	248/24.8%	95/30.8%	3027/18.9%	146/35.3%

Table 3 illustrates the number of students in each category and the percentage for each virtual and face-to-face school. The breakdown of disabilities into categories may vary from other states. Disabilities listed under the Intellectual Disabilities section include IDEA categories of Intellectual and Learning disabilities, developmental

delay, and traumatic brain injury (TEA, 2021). Although dyslexia is a learning disability listed as a specific learning disability category under IDEA (IDEA, 2004), TEA breaks dyslexia out as a separate category, making the TEA category of intellectual disability numbers appear much higher. Disabilities listed under the physical disabilities section include orthopedic, auditory, visual, and speech impairments and deaf-blindness.

Autism is listed separately as it is under IDEA. Disabilities listed under the behavior disabilities section include other health impairments and emotional disturbance. Other health impairments under IDEA include ADD/ADHD.

Recommendations

Based on the research in this study, it is evident that further research is necessary to determine what factors support success in online learning. Factors such as student engagement, course instructor, course design, and program admission requirements impact the success of online learning. Other research inquiries into what type of learner performs better in a virtual learning environment would benefit online programs. Research on the types of support available to certain student populations, such as special education or emergent bilingual learners, would shed light on online learning options. Another factor that would need investigating is the type of professional development course instructors receive before teaching online. Funding options for school districts or charters to support online learning would broaden the online learning community. Legislatures should explore making school funding more available for online learning to support more course options for students.

Notes

Table 1 data was compiled from the Texas Academic Performance Reports. <https://tea.texas.gov/texas-schools/accountability/academic-accountability/performance-reporting/texas-academic-performance-reports> (TEA, 2021).

Table 2 data was compiled from the Texas Academic Performance Reports. <https://tea.texas.gov/texas-schools/accountability/academic-accountability/performance-reporting/texas-academic-performance-reports>. The asterisk denotes state masking due to small population (TEA., 2021).

Table 3 data was compiled from the Texas Academic Performance Reports. <https://tea.texas.gov/texas-schools/accountability/academic-accountability/performance-reporting/texas-academic-performance-reports> (TEA, 2021).

References


Goldie, J. (2016) Connectivism: a knowledge learning theory for the digital age? *Medical Teacher*, 38(10), pp.

1064-1069. (doi:10.3109/0142159X.2016.1173661)

- Horn, Michael B., and Heather Staker. "The Rise of K-12 Blended Learning." *Innosight Institute*, 2011. *Innosight Institute*, <https://aurora-institute.org/wp-content/uploads/The-Rise-of-K-12-Blended-Learning.pdf>.
- Individuals with disabilities education act of 2004, 20 U.S.C. § 1400 *et seq.* <https://uscode.house.gov/view.xhtml?path=/prelim@title20/chapter33&edition=prelim>
- Kennedy, Kathryn. *Handbook of Research on K-12 Online and Blended Learning*. Edited by Richard Eugene Ferdig and Kathryn Kennedy, E.T.C. Press, 2014. *A.C.M. Digital Library*, <https://dl.acm.org/doi/abs/10.5555/2811036.2811038>.
- Kingsbury, I. (2021, January 30). Online Learning: How do brick and mortar schools stack up to virtual schools? *Educational Information Technologies*, 6567–6588. <https://doi.org/10.1007/s10639-021-10450-1>
- Mann, B., Li, W., & Besnoy, K. (2021). Digital divides: K-12 student profiles and online learning. *Education Policy Analysis Archives*, 29(112). <https://doi.org/10.14507/epaa.29.6351>
- Patrick, S., & Powell, A. (2009, August). A Summary of Research on the Effectiveness of K-12 Online Learning. *International Association for K-12 Online Learning*, 1-9.
- Texas Education Agency. (2023) *Enrollment in Texas Public Schools 2020-23*. <https://tea.texas.gov/reports-and-data/school-performance/accountability-research/enroll-2022-23.pdf>
- Texas Education Agency. (2022). *Enrollment in Texas public schools*. <https://tea.texas.gov/reports-and-data/school-performance/accountability-research/enrollment-trends>.
- Texas Education Agency. (2022). *Enrollment in Texas Public Schools 2021-22*. Texas Education Agency. <https://tea.texas.gov/reports-and-data/school-performance/accountability-research/enroll-2021-22.pdf>
- Texas Education Agency. (2021). *Enrollment in Texas Public Schools 2020-21*. Texas Education Agency. <https://tea.texas.gov/reports-and-data/school-performance/accountability-research/enroll-2020-21.pdf>
- Texas Education Agency. (n.d.). *2020-21 Texas Academic Performance Report (TAPR) Glossary*. Texas Education Agency. <https://tea.texas.gov/texas-schools/accountability/academic-accountability/performance-reporting/tapr-glossary-2021.pdf>
- Texas Education Agency. (n.d.). *2022 Texas Academic Performance Report (TAPR)*. https://rptsvr1.tea.texas.gov/perfreport/tapr/tapr_srch.html?srch=D
- Texas Education Agency. (2020, August). *Enrollment in Texas Public Schools 2019-20*. Texas Education Agency. <https://tea.texas.gov/reports-and-data/school-performance/accountability-research/enroll2019-20.pdf>
- US Department of Education. (n.d.). *Common core of data (CCD)*. Table 3. Number of virtual schools, total state enrollment, total virtual school enrollment, and virtual school enrollment as a percentage of state total enrollment: School year 2019–20. https://nces.ed.gov/ccd/tables/201920_Virtual_Schools_table_3.asp
- Watson, John F. "A National Primer on K-12 Online Learning." *North American Council for Online Learning*, 2007, p. 2. *ERIC*, <https://files.eric.ed.gov/fulltext/ED509633.pdf>.

From Research Learning to Research Production: Collective Methodology

Eliecer Montero-Ojeda

Corporación Universitaria Minuto de Dios – UNIMINUTO -, Colombia  <https://orcid.org/0000-0001-5811-0083>

Abstract: The purpose of this research is to solve the problem of producing research (academic journals, books, book chapters) based on the curriculum. In this sense, the methodology called NODE PROJECTS has been developed. Its objective is to promote and manage collaborative scientific research based on the needs of the environment at a national and international level, generating new knowledge and innovation. The node projects are aimed at empathetic students with a theme and scenarios for its development so that they can participate as co-researchers and/or research assistants. Its scope is national and/or international depending on the nature of each project. Thus, it has been possible to evidence in a master's program, the development of a total of 86 research projects and their dissemination, during the years 2020, 2021 and 2022 in a much higher percentage than in previous years. These projects are built within the courses assigned to the line of research within the academic path of the program. The suggested research route is three 48-hour courses per term. The topics to be included in the courses would range from the formulation of the research project to the results, discussion, conclusions and of course its publication.

Keywords: Research Learning, Research Production, Collective Methodology

Citation: Montero-Ojeda, E. (2023). From Research Learning to Research Production: Collective Methodology. In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023-- International Conference on Social and Education Sciences* (pp. 223-228), Las Vegas, NV, USA. ISTES Organization.

Introduction

Countries with knowledge-based economies tend to generate similar rates of economic growth with a continuous accumulation and transmission of knowledge that positively impacts their socioeconomic development (Mansell and Steinmueller 2000; Teitel, 1994). In Latin America and of course in Colombia, the results of science and technology (S&T) are not encouraging. Compared to developed countries, for decades there has been a low level of investment in research and development (R+D), human capital and technological infrastructure, and there is a low development of the knowledge-based economy (Casas, 2004).

Despite the recent problems of drug trafficking and violence, Colombia has a stable democratic system, social security problems and a concern to strengthen relations with developed countries such as the United States (Ardila, 2015). Between 2006 and 2013, Colombia contributed 4% of scientific publications in Latin America (RICYT, 2017). Understanding the relationship between economic growth and scientific and technological

development requires better S&T indicators (Teitel, 1985). This need is even more critical in Latin American countries with different research contexts, resources and policies from developed countries (Aguado and Becerril, 2016; Morales Gaitán and Aguado López, 2010).

Likewise, in Latin America and of course in Colombia, scientific productivity is concentrated in universities, an aspect that within the framework of organizational theory implies a similarity of the university organizational system with the business organizational system (Weick et al., 2009). It has been argued that scientific production encompasses multiple socioeconomic processes and variables, and reflects the scientific capacity of a country at the level of individuals, associations and consumers (Witter, 1997).

The present research proposes a collective methodology that has been designed and implemented by a master's level program of a Colombian university to solve the problem of research production (academic journals, books, book chapters) from the academic route defined in its curriculum. In this sense, the master's program has developed since the year of its implementation: 2018, a total of 86 research projects that have generated dissemination products such as journals, book chapters and books, during the years 2020, 2021 and 2022 in a much higher percentage than in previous years.

Method

The proposed collective methodology is a dynamic and permanent research route throughout the study plan of the academic program, it has been called *NODE PROJECTS*. A node project is created by research professors of the academic program with the support of a research group associated with the institution.

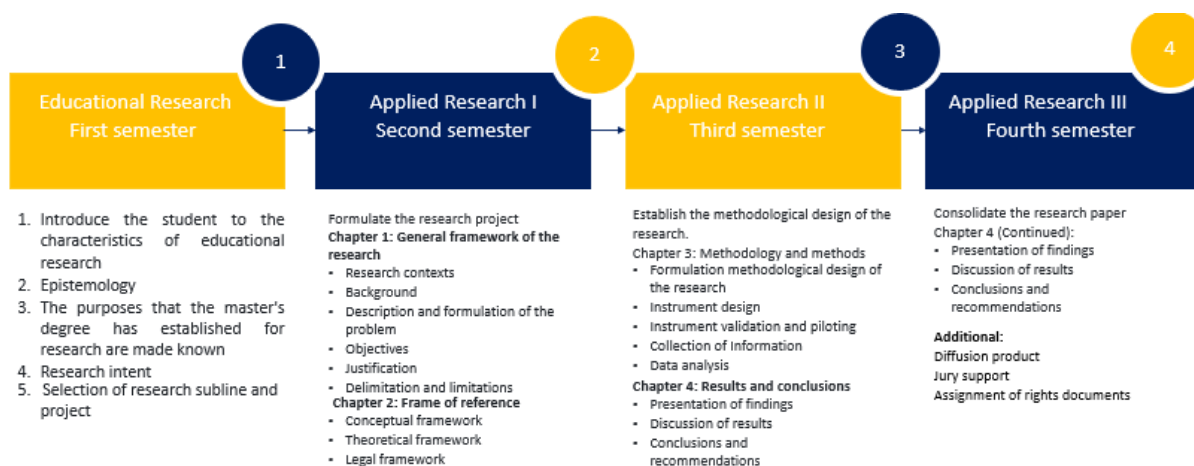


Figure 1. Methodology NODE PROJECT

Its objective is to promote and manage collaborative scientific research based on the needs of the environment at national and international level, generating new knowledge and innovation, through the publication of journals, book chapters in indexed journals and / or events of high academic impact.

Node projects are aimed at empathetic students with a theme and scenarios for their development to participate as co-researchers and/or research assistants as graduate students. Its scope is national and/or international depending on the nature of each project. These projects are built within the courses assigned to the research line within the academic route of the program. In that sense, the established design is as follows:

Results

As of 2018, this methodology was implemented in a university in Colombia. They started with five lines of research and during the last 5 years, two additional ones have been created. They are:



Figure 2. Lines of Research

The following graph denotes the growth in percent of the research function compared to the other functions developed by the professors of the academic program of the Master of Education in recent years.

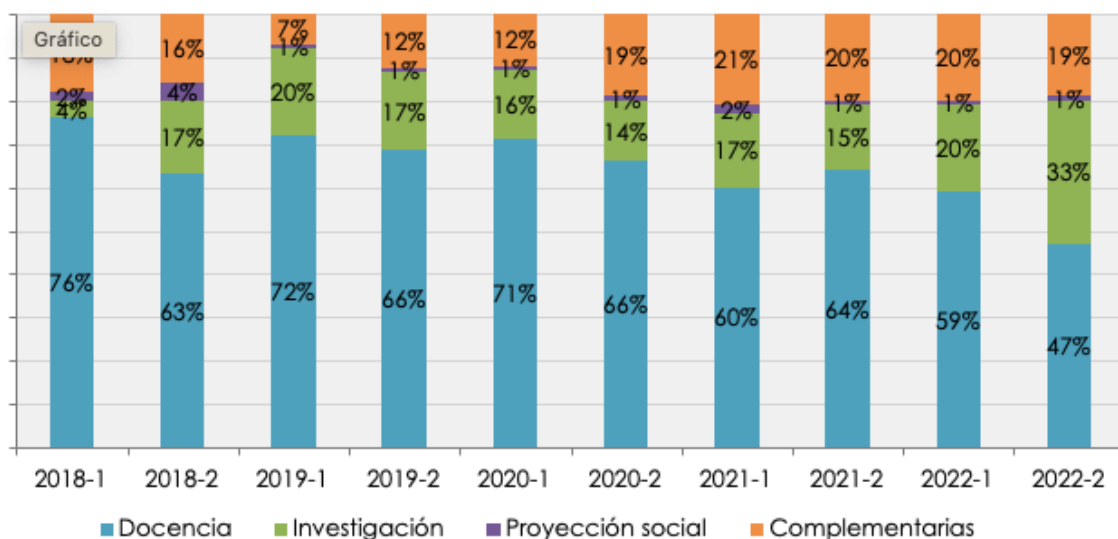


Figure 3. Comparison of the percentage of teaching time

Likewise, the implementation of the collective methodology explained above has increased the study groups that carry out research in the academic program. A study group is a strategy that promotes the grouping of students and professors to carry out research activities that go beyond the formal academic process and that stimulate the acquisition of research skills. The study groups that have been created and the semester-by-semester participation of students and professors is as follows:

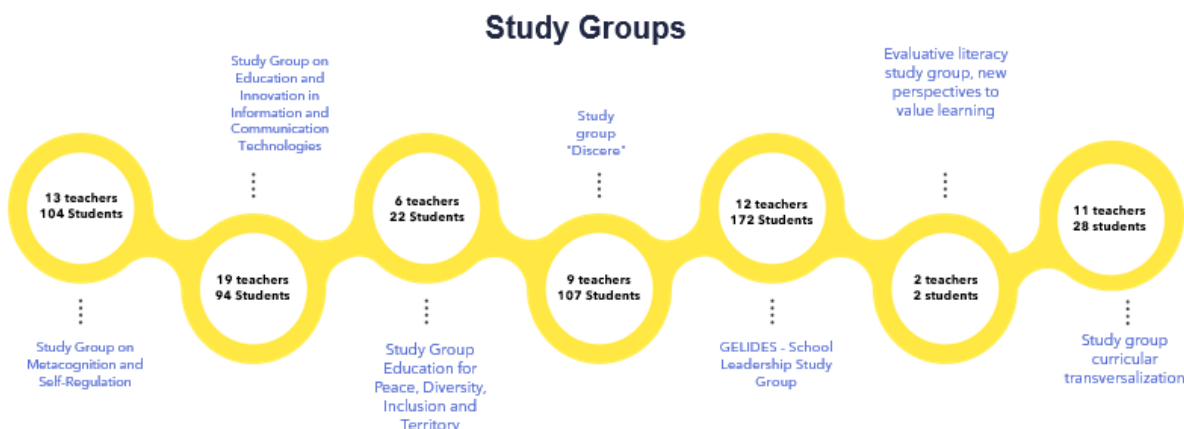


Figure 4. Study Groups

In addition to the increase in research projects,

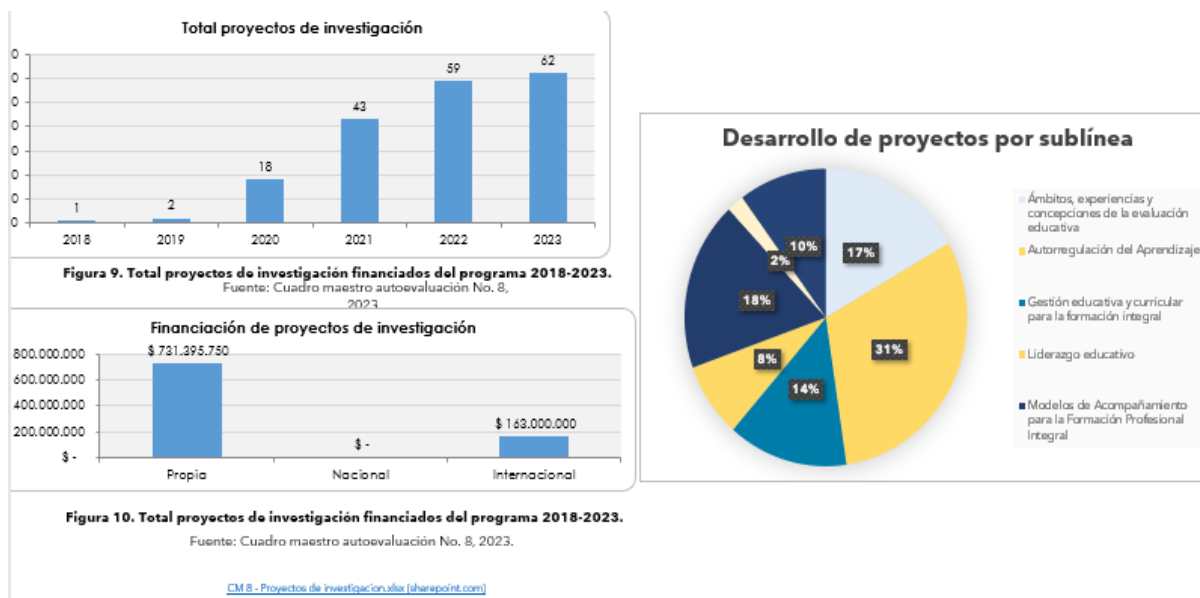


Figure 5. Research Projects 2018-2023

And finally, the growth in scientific publications, as a result of applied research projects, the object of study of this research.

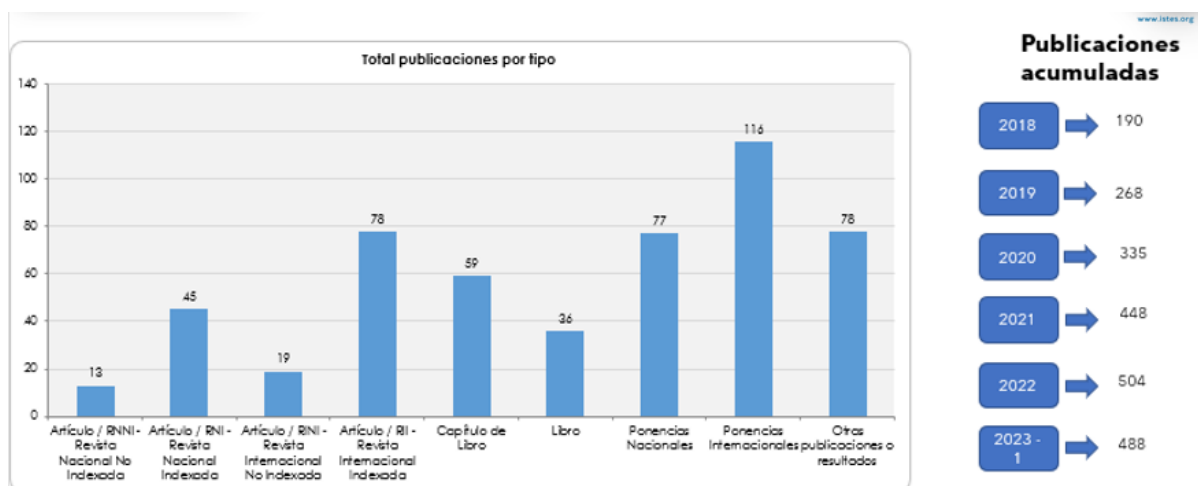


Figure 6. Publications developed between 2018 and 2023

Conclusion

The results shown above attest to the achievements of the implementation of the collective methodology NODE PROJECTS. Research within the program is governed by the institutional policies and guidelines given by the Science, Technology, Innovation and Society System (STI&S). Likewise, the formative research route composed of four academic courses corresponding to 12 academic credits of the curriculum is recognized, which are articulated with the thematic axes and the areas of deepening of the program, thus allowing to strengthen the development of capacity for inquiry, critical thinking and in the approach and solution of problems.

In the same way, the implementation of strategies that strengthen teacher-student interaction is recognized from the development of co-authored research projects that strengthen scientific production and its impact at national and international level under the Node project approach.

On the other hand, in terms of academic production of students and teachers, the high participation of professors and students are evident in scientific events with a total of 176 papers, where knowledge is exchanged and new networks and learning communities are generated. It also highlights the publication of research results journals in national and international journals, as well as the production of 27 books research results and 49 book chapters. Several graduates have received recognition and distinctions for this (Annex 33). Likewise, the accumulated publications show a progressive advance in terms of forms of dissemination of research. As of 2018, production has been increasing at a higher rate, increasing year by year, reaching an accumulated of 434 publications made by 2022.

All of the above allows us to highlight that the impact of the program is produced thanks to this interaction with the environment from the training activities of each course. The node projects have made it possible for the program to be a reference in various contexts of the Colombian geography, from rural, local, regional, national

and international scenarios where teachers, students and graduates are present. These projects have allowed forging strategies, not only to research, but to generate knowledge through the promotion of high-impact publications, as well as the mobility and participation in scientific, academic and research events of professors and students.

Recommendations

According to the experience in the implementation of the methodology described, it is suggested that the defined courses be included within the curriculum at the undergraduate or graduate level. On the other hand, it is suggested that the same teacher-advisor who starts the process with the first course, continue until completing the last course. Last but not least, the systematization of applied research projects and all their products is required; whether they are books research products, book chapters, articles in journals and presentations

References

- Aguado López, E.; Becerril García, A. (2016). Revista Investigación Económica: análisis bibliométrico a partir de redalyc.org, 2005-2014. *Investigación Económica*, 75 (295), 3-30. <https://doi.org/10.1016/j.inveco.2016.03.001>.
- Ardila, M. (2015). Colombia y México: hacia ¿diplomacias democráticas de baja intensidad? *Desafíos*, 27 (2), 221- 252. <https://doi.org/10.12804/desafios27.2.2015.07>.
- Casas Guerrero, R. (2004). Conocimiento, tecnología desarrollo en América Latina. *Revista Mexicana de Sociología*, 66, Número especial, 255-277. <https://doi.org/10.2307/3541453>.
- Mansell, R.; Steinmueller, W.E. (2000). *Mobilizing the Information Society: Strategies for Growth and Opportunity*. Oxford: Oxford University Press.
- RICYT (2017). Red Iberoamericana e Interamericana de indicadores de Ciencia y Tecnología. Disponible en: <http://www.ricyt.org/indicadores>. [Fecha de consulta: 01/09/2023].
- Teitel, S. (1985). Indicadores científico-tecnológicos: la América Latina, países industrializados y otros países en vía de desarrollo. *El Trimestre Económico*, 52 (205), 95-119.
- Weick, K.; Caldera González, D.; Ortega Carrillo, M. (2009). Las organizaciones educativas como sistemas flojamente acoplados. *Revista Gestión y Estrategia*, (36), 93-110.
- Witter, G. (1997). *Produção científica*. Campinas: Átomo.

101 Dogs and the Terms We Use to Define Their Roles: A Scoping Review

Jedediah E. Bragg

New Mexico Highlands University, Facundo Valdez School of Social Work, United States

Erika M. DuBose

University of Oklahoma, United States

Andrew Helt

University of Oklahoma, Anne & Henry Zarrow School of Social Work, United States

Jacob T. Welsh

New Mexico Highlands University, United States

Kimberly Spellman

University of Oklahoma, Anne & Henry Zarrow School of Social Work, United States

Abstract: Despite the popularity of dogs working with humans in a helping role, inconsistency abounds within the language describing such animals in research. Between definitions provided by the Americans with Disabilities Act and by the American Psychological Association, a clear taxonomy exists, dividing canine roles into the categories of service dogs, therapy dogs, animal assisted therapy dogs, and emotional support animals. With clear definitions available yet ambiguity remaining in the literature, this study explores where the confusion lies through a scoping review of over 200 articles, noting where the articles consistently match each category's definition and where they do not. Articles about "service dogs" and "emotional support animals" consistently meet those categories' definitions, while articles about "therapy dogs" and "animal-assisted therapy dogs" do not, creating confusion for readers. Implications for the reporting of future research on canine helping roles are discussed. Further, a dearth of articles on emotional support animals highlights the need for more research.

Keywords: service dog; therapy dog; emotional support animal; animal-assisted therapy dog; animal-assisted activities

Citation: Bragg, J. E., DuBose, E. M., Helt, A., Welsh, J. T., & Spellman, K. (2023). 101 Dogs and the Terms We Use to Define Their Roles: A Scoping Review. In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023-- International Conference on Social and Education Sciences* (pp. 229-244), Las Vegas, NV, USA. ISTES Organization.

Introduction

Canines have had a close relationship with humankind for generations, earning the title of “man’s best friend” (Lindsay, 2000). Canine roles have evolved throughout history from protecting, hunting, and herding to becoming companion animals and supporting humans in many other roles, including human service roles. These integral human service roles include working as service dogs (SD), emotional support animals (ESA), dogs working in animal-assisted activities (AAA) such as therapy dogs (TD), and dogs working in therapy as animal-assisted therapy dogs (AAT-D) (National Network: Information, Guidance, and Training, on the Americans with Disabilities Act, 2017; Winkle & Linder, 2018).

The popularity of canine assistance for humans is growing exponentially (Fine et al., 2019; Karetnick, 2022; Schoenfeld-Tacher et al., 2017; Trainer, 2016). Despite this continued growth, confusion abounds surrounding the taxonomy used to describe and identify canine roles, hindering research in this area (López-Cepero, 2020). Consequently, researchers in the area have called for the use of a standardized terminology when identifying canine roles (Johnson et al., n.d.; López-Cepero, 2020). As illustrated in **Figure 1**, many canine assistance roles fall into the category of animal-assisted intervention (AAI). AAI includes interventions with either general goals or specific goals in which a trained handler/animal team facilitates improvements in physical, social, emotional, and/or cognitive function (Johnson et al., n.d.; Winkle & Linder, 2018). AAI is typically divided into three subcategories: animal-assisted education (AAE), animal-assisted activity (AAA), and animal-assisted therapy (AAT) (Johnson et al., n.d.; Winkle & Linder, 2018). This article refers only to animal-assisted therapy with dogs (AAT-D).

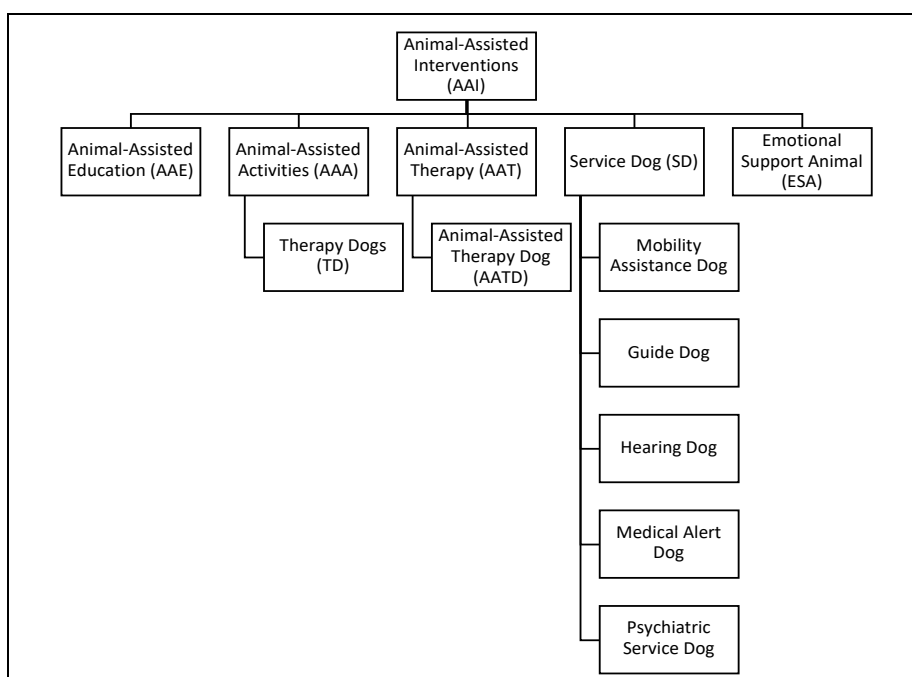


Figure 18. Flow chart of animal-assisted interventions

Animal-assisted education consists of interventions directed by specific goals which promote improvements in cognitive functioning (Johnson et al., n.d.; Winkle & Linder, 2018). The intervention must be directed or delivered by a trained and licensed professional within their practice standards (Johnson et al., n.d.; Winkle & Linder, 2018). This review excludes AAE due to a lack of available research using the term. AAT-D consists of interventions facilitating improvements in physical, emotional, and/or cognitive functioning, directed by a specific therapeutic goal, and conducted by licensed professionals within the healthcare or human services fields (Johnson et al., n.d.; Winkle & Linder, 2018). For an intervention to be considered AAT-D, the animal/handler teams must be integral to the treatment process (Johnson et al., n.d.; Winkle & Linder, 2018).

Finally, in contrast with AAE and AAT-D, AAA consists of interventions directed by general goals with objectives that may be spontaneous rather than planned (Johnson et al., n.d.; Winkle & Linder, 2018). Of note, “therapy dogs” (TD), which engage in visitations within various settings, including schools, hospitals, nursing facilities, airports, et cetera, fall within the category of animal-assisted activity. Unlike AAE and AAT-D, animal-assisted activities can be implemented by persons without licensure who may even be minors (Johnson et al., n.d.; Winkle & Linder, 2018). Organizations administering the intervention may require varying levels of training for animal-handler teams (Johnson et al., n.d.; Winkle & Linder, 2018). While there is a growing push to use the term AAA rather than TD due to the potential for confusing TD with AAT-D (Association of Animal-Assisted Intervention Professionals, 2021), within this article TD is used because the current trend in research is to use TD instead of AAA.

Service Dogs

Definitions of AAI typically exclude two specific roles: service dogs (SD), and emotional support animals (ESA). Service dogs (SD) are defined by the Americans with Disabilities Act (ADA) as dogs that are “individually trained to do work or perform tasks for people with disabilities” (National Network: Information, Guidance, and Training, on the Americans with Disabilities Act, 2017, para. 2). The ADA notes that such work or tasks include guiding people who are blind, alerting people who are deaf, pulling a wheelchair, alerting and protecting a person who is having a seizure, reminding a person with mental illness to take prescribed medications, calming a person with Post Traumatic Stress Disorder (PTSD) during an anxiety attack, or performing other duties. Service animals are working animals, not companion pets. The work or tasks a dog has been trained to provide must be directly related to the person’s disability (National Network: Information, Guidance, and Training, on the Americans with Disabilities Act, 2017).

While some SDs work with people with psychiatric diagnoses, they differ from ESAs in that they are trained to perform specific tasks for their person. For example, a SD may be trained to identify signs of an anxiety attack and respond to those signs by providing deep pressure therapy (Lloyd et al., 2019). While SD use is not tracked, an estimated 500,000 people utilized a service dog to complete activities of daily living in 2016 (Trainer, 2016), a number that is growing (Schoenfeld-Tacher et al., 2017).

Emotional Support Animal

Whereas SDs perform specific “work or tasks” for an individual, ESAs are defined as companion animals (in our case, dogs) who help individuals with emotional or mental health challenges by providing comfort (Otto et al., 2021). ESAs do not require any specific training. ESAs are not covered by the Americans with Disabilities Act and thus do not have the right to public access (National Network: Information, Guidance, and Training, on the Americans with Disabilities Act, 2017). Rather, ESA’s legal status falls under the Fair Housing Act (U.S. Department of Justice & U.S. Department of Housing and Urban Development, 2004). Housing providers must make “reasonable accommodations” for an individual with an ESA (U.S. Department of Justice & U.S. Department of Housing and Urban Development, 2004). To legally obtain an ESA or to determine the role of a companion pet as an ESA, an individual must have a letter from a clinical mental health professional noting the need for an ESA (Otto et al., 2021). Varying federal and state legal distinctions differentiate between SDs and ESA, including training requirements for SDs but not ESAs and various penalties for falsely representing an ESA or companion animal as a SD.

Therapy Dog

Next, we have TDs and AAT-Ds. A TD’s roles are categorized as animal assisted activities. Colloquially known as *happiness providers*, TDs provide comfort and affection for members of the public without serving specific treatment goals (Association of Animal-Assisted Intervention Professionals, 2021; Winkle & Linder, 2018). TDs fill their role in various public locations, including hospitals, libraries, schools, assisted living facilities, and college campuses. TDs may also work in mental health settings, such as psychiatric hospitals or community mental health clinics – yet simply working in a mental health setting does not mean that a dog is engaged as an AAT-D. TDs may be handled by their owner and are typically companion pets when not engaged in therapy dog work. While TDs are not legally required to hold certification, TDs can be certified through local or national therapy dog organizations, which have their own policies regarding the role of a TD in public.

Animal-Assisted Therapy – Dog

While both TDs and AAT-Ds have the word “therapy” in their name, the terms should not be used interchangeably. AAT-Ds have a distinct, specialized role. According to the American Psychological Association, AAT-Ds are defined as therapeutic animals used to enhance individuals’ physical, social, emotional, or cognitive functioning through goal-directed interventions administered by licensed providers (Association of Animal-Assisted Intervention Professionals, 2021; Winkle & Linder, 2018).

The AAT-Ds role is integral, not incidental, to the treatment plan. AAT-Ds are only utilized in a therapeutic setting, not a public one. The AAT-D must be engaged with a clinical health care provider who leads the process. A clinical health care provider who utilizes an AAT-D might also employ the same dog in TD work in

other settings, but the roles remain distinct. Use of AAT-Ds has grown as providers recognize the benefits of complementary therapies for individuals with mental health challenges (Fine et al., 2019).

For the widespread use of SDs, ESAs, TDs, and AAT-Ds to be implemented accurately, research must show what interventions are effective and ethical for both the human and the animal. Consistent and correct use of terminology to identify SDs, ESAs, TDs, and AAT-Ds is essential to communicate this research to consumers and other researchers. Unfortunately, some confusion appears to exist within current literature.

If such confusion is widespread, evidence for one intervention may be wrongly attributed to another intervention. For example, evidence for the effectiveness of AAT-Ds may be attributed to TDs through unclear or inaccurate use of terms and vice versa. To recognize the extent to which this confusion permeates the literature, we conducted a scoping review of the usage of the terms SD, ESA, TD, and AAT-D within academic journals, assessing whether the authors accurately identify the correct role of the canine/handler team.

Scoping Review

Scoping reviews systematically explore the evidence available on a topic (Arksey & O'Malley, 2005). They make clear which areas of the topic are well-researched and what areas have little existing literature (Arksey & O'Malley, 2005). A scoping review, although systematic in method, is not the same as a systematic review (Arksey & O'Malley, 2005; Munn et al., 2018). A systematic review brings together evidence to evaluate a practice question and establish best practice based on the available evidence (Munn et al., 2018).

A scoping review does not answer a specific clinical or practical question but provides a thorough exploration of the research available on a topic and how that research has been done (Arksey & O'Malley, 2005; Munn et al., 2018). A scoping review is also not the same as a literature review. A literature review is not systematic in nature and does not employ a pre-determined search method (Munn et al., 2018). Therefore, what studies are included can be subject to reviewer biases (Munn et al., 2018). A scoping review uses a pre-determined search protocol that systematically gathers all available evidence in a repeatable manner with steps such as inter-reviewer reliability checks taken to reduce subjectivity (Arksey & O'Malley, 2005; Munn et al., 2018).

One purpose of a scoping review is to guide the contributions of future researchers on the topic (Munn et al., 2018). An important part of this guidance includes providing or clarifying definitions so that further research is standardized and easily interpretable (Davis et al., 2009; Munn et al., 2018). Scoping reviews are an ideal way of clarifying definitions because their systematic methodology brings together all the terminology used throughout the literature (Munn et al., 2018).

With knowledge of all previous terminology, scoping review authors are well-positioned to offer standard definitions to promote accuracy in reporting from future studies (Munn et al., 2018). In this scoping review, we describe the current confusion in research surrounding the terms SD, ESA, TD, and AAT-D. Upon the

foundation of this scoping review, we offer standard definitions to promote clarity and accuracy in future studies involving canine interventions.

Materials and Methods

Sample

Authors established search terms that would populate a wide array of articles focusing on SDs, ESAs (specifically, dogs), TDs, and AAT-Ds. All search terms can be found in **Figure 2**. Each of the listed search terms was searched with and without hyphenation, plural usage, and acronyms. To aid in increasing results from various disciplines, five repositories were searched: 1) Academic Search Complete; 2) CINAHL Complete; 3) Medline; 4) Psychology and Behavioral Sciences Collection; and 5) Social Work Abstracts. The search returned 7,236 publications.

- | | |
|---------------------------------|--------------------------------------|
| • Animal-Assisted Therapy | • Guide Dog |
| • Animal-Assisted Intervention | • Medical Alert Dog |
| • Animal-Assisted Activities | • Mobility Dog |
| • Animal-Assisted Therapy Dog | • Psychiatric Service Dog |
| • Assistance Dog | • Post-Traumatic Stress Disorder Dog |
| • Autism Dog | • PTSD Dog |
| • Canine-Assisted Activities | • Seizure Alert Dog |
| • Canine-Assisted Interventions | • Service Animal |
| • Diabetic Alert Dog | • Service Dog |
| • Dog-Assisted Activities | • Therapy Animal |
| • Dog-Assisted Interventions | • Therapy Dog |
| • Emotional Support Animal | |

Figure 19. Scoping review search terms

Based on predetermined criteria for inclusion, we excluded articles published >7 years prior to the start of the study, articles not available in the English language, articles that were not peer-reviewed or academic, articles for which full text was not accessible, duplicate articles, and articles that were too broad or outside of the scope of the research. Due to searching in multiple repositories, our search returned many duplicate articles.

Additionally, articles excluded due to being too broad consisted of articles that are not canine-focused, articles that are not focused on SDs, ESAs, TDs, or AAT-Ds, articles focused on multiple types of canine roles simultaneously, and articles from outside the US or Canada. Due to legal variations in what is constituted a SD or ESA, the authors did not look outside of the US and Canada. 261 articles were included for final review. A full breakdown of the exclusion process can be found in Figure 3.

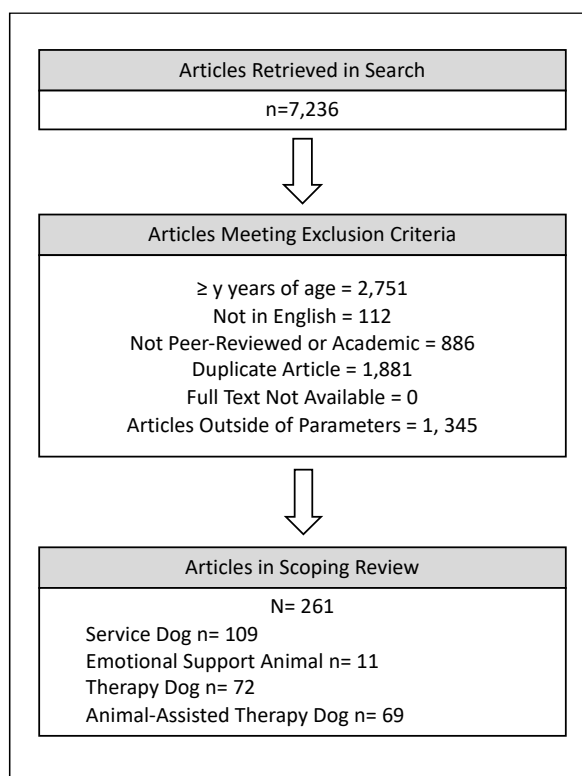


Figure 20. Scoping review exclusion criteria

Analysis

Based on the article’s title, abstract, and keywords, each article was initially assigned to one of four categories: "service dog," "emotional support animal," "therapy dog," or "animal-assisted therapy dog." For example, if an article title included the phrase "service dogs," it was labeled "service dog" for evaluation purposes. For triangulation, each article was then randomly assigned to two reviewers who coded each article based on predetermined criteria. Each of the four total reviewers coded approximately 50% of the articles. Reviewers independently coded each article as "meets definition," "does not meet definition," or "unsure if meets definition," based upon the aforementioned definitions. If the coding matched between reviewers, the article was determined to fit that coding category and was not discussed by the entire reviewer team. However, if the two reviewers disagreed on whether the article met the definition or did not meet the definition or were unsure if the article met the definition, the entire reviewer team discussed the article.

When the whole reviewer team met to discuss an article, each initial reviewer explained how they came to their decision to code the article as "meets definition," "unsure," or "does not meet definition." Each reviewer based their explanation on notes taken while evaluating and coding the article originally as well as on a second independent review of the article. The other reviewers examined the article and contributed to the discussion regarding the article. After discussion, the reviewers voted on the coding. If consensus was reached, the article was coded as such. If consensus was not reached, the article was coded as "unsure."

Results

Canine-Assisted Interventions

For 78.2% of all articles, the reviewers' initial codes agreed that the article meets the intervention's definition, does not meet the intervention's definition, or that there is clear confusion about what type of intervention was utilized. A complete breakdown of initial coding and final coding is illustrated in **Table 1**. As presented in **Table 2**, 73.6% of all articles clearly meet the definition of the term indicated in the title, keywords, and abstract. Of the remaining 26.4% of articles, 16.1% clearly do not meet the definition and 10.3% left reviewers unsure whether they meet the definition. With over a quarter of AAI articles not meeting the clear definition of the listed intervention, further analysis by intervention type is necessary to identify where the confusion lies.

Table 2. Canine-assisted intervention articles initial coding based upon definition criteria

	N	(%)
<i>Canine-Assisted Interventions</i>	261	
Reviewers Matched	204	(78.2)
Reviewers Did Not Match	57	(21.8)
<i>Service Dog</i>	109	
Reviewers Matched	94	(86.2)
Reviewers Did Not Match	15	(13.8)
<i>Emotional Support Animal</i>	11	
Reviewers Matched	10	(90.9)
Reviewers Did Not Match	1	(9.1)
<i>Therapy Dog</i>	72	
Reviewers Matched	57	(79.2)
Reviewers Did Not Match	15	(20.8)
<i>Animal-Assisted Therapy Dog</i>	69	
Reviewers Matched	43	(62.3)
Reviewers Did Not Match	26	(37.7)

Table 3. Canine-assisted intervention articles final coding based upon definition criteria

	N	(%)
<i>Canine-Assisted Interventions</i>	261	
Meeting Definition	192	(73.6)
Not Meeting Definition	42	(16.1)
Unclear if Meets Definition	27	(10.3)
<i>Service Dog</i>	109	
Meeting Definition	97	(89.0)
Not Meeting Definition	7	(6.4)
Unclear if Meets Definition	5	(4.6)
<i>Emotional Support Animal</i>	11	

	N	(%)
Meeting Definition	11	(100)
Not Meeting Definition	-	-
Unclear if Meets Definition	-	-
Therapy Dog	72	
Meeting Definition	62	(86.1)
Not Meeting Definition	2	(2.8)
Unclear if Meets Definition	8	(11.1)
Animal-Assisted Therapy Dog	69	
Meeting Definition	22	(31.9)
Not Meeting Definition	33	(47.8)
Unclear if Meets Definition	14	(20.3)

Service Dog

Of the articles coded as SD (n=109) based upon title, keywords, and abstracts, the reviewers agreed that the articles meet the term's definition 86.2% of the time. Reviewers disagreed 13.8% of the time. After discussion among all reviewers, 89.0% of articles were found to meet the definition, a slight increase. 6.4% of articles clearly do not meet the definition and 4.6% of articles left reviewers unsure. Some articles do clearly define service dog. For example, Whitworth et al. (2020) note that service dogs for veterans with PTSD "carry out precise functions for veterans having difficulty completing tasks as a result of their disability...for some of these veterans, service dogs assist with physical and emotional tasks such as maintaining balance, retrieving dropped items, or reminding the veteran to take medication"(2020, p. 606). However, while the ADA clearly defines a service dog as a working animal that supports individuals with disabilities, the term's usage in the literature does not always match the ADA's definition. For example, in the article *By My Side: The University's First Service Dogs* (Lahman, 2018), the author gives a near-textbook definition of service dogs. However, upon thoroughly reviewing the manuscript, the study has little to do with service dogs or service dog training. Instead, evaluated in the article is how puppies that would eventually start SD training but may not become SDs were socialized at an early age on a college campus and how the puppies impacted the daily lives of those exposed to the puppies on campus.

Some articles clearly define SDs but do not clearly describe the role the canine played in the intervention, leaving it unclear whether the dog's role in the intervention truly met the definition of SD. Such is the case in "Canine Companionship is Associated with Modification of Attentional Bias in Posttraumatic Stress Disorder" (Woodward et al., 2017). The purpose of the study was to assess the impact of the "presence or absence of a familiar service canine in 23 veterans with chronic military-related posttraumatic stress disorder"(2017, p. 1). The authors presented a clear definition of SD. However, in the intervention, the participants were exposed to SDs in training through a volunteer group. The article does not clearly describe the nature of the "exposure" experience. Was the SD in training truly working as a SD or rather aiding as an augment in therapy similar to an AAT-D? The reviewers agreed that while the definition of SD was accurate the actual intervention used likely

fell more in line with the definitions of AAT-D or TD. Without a clear explanation of the role of the canine in the study, the reviewers could not confirm that the article meets the definition of a SD. Therefore, the article was given a final code of “unsure if meets definition”.

Additionally, many states do not consider a service dog-in training to be a service dog. Lack of clarity in articles about service dogs-in-training and state differences in their legal status created some discrepancies in reviewers’ decisions. For example, in the article *Voices from Behind Prison Walls*, the intervention included having incarcerated women train dogs for service dog work (Minton et al., 2015). While the article defines service dog appropriately, the fact that the intervention was training service dogs led to discrepancy between reviewers. For those reasons, the article was ultimately coded as “unsure if meets definition.”

Emotional Support Animal

In contrast to the number of SD articles, far fewer ESA articles exist ($n = 11$). Many other articles mention ESAs but do not focus on them and therefore were not considered as ESA articles for the purpose of this scoping review. Upon initial coding, the reviewers agreed that the article matches the definition of ESA for 90.9% of articles. The reviewers' initial codes did not match for one article. Upon discussion among all reviewers, consensus was reached and 100% of the articles were determined to meet the definition of ESA. As ESA articles are clearly labelled, the interventions within the articles reflect an accurate understanding of the current working definition of ESA. For example, in Butwin’s (2019), “Emotional support animals are more than just pets”, ESAs are defined in terms of both what they are and what they are not. Butwin writes that ESAs are “any companion animal that provides therapeutic benefits to individuals with mental or psychiatric disabilities” (2019, p. 202). Butwin continues, “licensed medical health professionals prescribe them to offer companionship, relieve loneliness, and help persons with verifiable disabilities such as depression, anxiety, and phobias” (2019, p. 202). Butwin notes the differences between ESA and other types of working animals, stating, “While emotional support animals and animals used for AAA and AAT can all be used to treat persons with mental or emotional disabilities, animals used for AAA and AAT are typically certified and trained to interact with people in formal environments... Emotional support animals, on the other hand, are assigned to stay with only one owner, do not need to be certified, and offer benefits in more informal environments” (2019, p. 203). Similar clear definitions of ESA are characteristic of ESA articles.

Therapy Dog

Among the articles classified as TD ($n=72$), reviewers initially agreed 79.2% of the time, meeting to discuss the remaining 20.8%. After discussion, reviewers agreed that 86.1% of the articles meet the definition of TD, 2.8% do not meet the definition, and 11.1% left the reviewers unsure. As these results show, most authors clearly explain the definition and role of a therapy dog. However, some confusion remains. Many of the issues in coding the articles occurred when the article’s intervention utilized AAT-D rather than TD. One possible reason

that articles are erroneously labeled TD rather than AAT-D is the presence of the phrase “therapy dog” within the term Animal Assisted Therapy-Dog.

In some TD-labeled articles, neither TD nor AAT-D is defined clearly. For example, in “The Therapy Dog Will See You Now,” the authors define AAT as “a scheduled encounter with a certified therapy team, consisting of an animal and its handler for the purpose of supporting or improving patients’ social emotional physical or cognitive functioning” (Dickson & Rummel, 2019 para. 4). Not only does this definition fail to match the correct definition of AAT-D, but it also fails to define TD at all despite the term appearing in the article’s title. The mismatch between the term defined in the text and the term used in the title led reviewers to categorize the article as “unsure if meets definition.” The reviewers encountered other issues as well. While Vitztum et al. (2016) explained that an intervention with a therapy dog is not the same as with a companion pet, the study’s intervention utilized healthcare providers working with dogs to achieve a goal for a patient rather than an encounter with a therapy dog and handler for the purpose of improving an individual’s emotional state. This intervention may match the definition of AAT-D instead of TD. Thus, the reviewers were unsure if the intervention met the definition of a therapy dog even though the article’s title includes the term “therapy dog”.

Animal-Assisted Therapy Dog

AAT-D is the most problematic category in this scoping review. Of the AAT-D articles (n=69), reviewers initially agreed on 62.3% of articles, meeting to discuss the remaining 37.7%. After all articles received their final coding, results showed that 31.9% meet the definition of AAT-D, 47.8% do not meet the definition, and 20.3% left reviewers unsure about what type of intervention is actually covered in the article. Unsurprisingly, many of the articles appear to define TD rather than AAT-D and to reflect neither the use of a clinical provider nor specific therapeutic goals, both of which are the hallmarks of AAT-D. Several articles correctly define AAT-D while utilizing an intervention that was clearly not using AAT-Ds. For example, Stevens et al. define therapy with an AAT-D as “a structured, goal-oriented activity, typically supervised or directed by health care professionals” (2017, p. 97). However, the intervention studied involved bringing a dog “visitor” and their volunteer handler to a patient’s room without a goal-directed outcome and analyzing a patient follow-up survey to investigate patients’ satisfaction of their hospital experience following the dog visit (Stevens et al., 2017). Other articles labeled as AAT-D create novel terminology for their intervention, such as “pet therapy” in the article “Using Pet Therapy to Decrease Patients' Anxiety on Two Diverse Inpatient Units,” despite having AAT-D in keywords (Mulvaney-Roth et al., 2022). Similar to the Stevens et al. (2017), this article accurately defines AAT-D while utilizing an intervention that involved a therapy dog and handler rather than an AAT-D and licensed professional with targeted goals. Similarly, in the article “Dogs as an Adjunct to Therapy: Effects of Animal-Assisted Therapy on Rehabilitation Following Spinal Cord Injury,” the title clearly describes AAT for patients undergoing physical rehabilitation (Thompkins et al., 2019). However, the authors state that the intervention uses a “therapy dog team” working with patients rather than a clinical professional providing goal-directed work with a dog. This discrepancy led the reviewers to categorize the article as TD rather than AAT-D, speaking to the initial problem of inaccurate taxonomy that faces readers.

Discussion

While reliance on animal aiding humans has grown, the language used to describe such dogs has become confusing. Many umbrella terms like “working dogs” or “assistance dogs” are used under which SD, ESA, TD, and AAT-D are categorized. We first defined each of the four types of assistance dog for our own work using both the Americans with Disabilities Act and the American Psychological Association. Having defined the terms, our research found a wide inconsistency between other researchers’ descriptions of such dogs, resulting in confusion both between classifications and within each classification. Often, dogs are erroneously labeled in ways that do not describe their function or the ways in which they are utilized.

Articles about TDs and AAT-Ds contain the largest number of problematic language errors within research on the role of the dogs. Some authors confuse the role of a TD with the role of an AAT-D despite the major differences in their training and function. A TD’s job is to spread happiness without a directed goal within groups of people. AAT-Ds work with individual clients alongside licensed providers who are trained to provide a goal-directed therapeutic process with the dog. Nearly 1 in 3 articles labeled as AAT-D in the title, keywords, or abstract do not meet the definition of AAT-D. While articles labeled TD reflect an understanding of the definition 86% of the time, we found that the confusion between TD and AAT-D goes both ways. Therapy dog visits are labeled as animal-assisted therapy and animal-assisted therapy is labeled as therapy dog visits. Perhaps the phrase “therapy dog” within “animal-assisted therapy dog” explains some of the ambiguity in interventions that are incorrectly labeled as AAT-D (Association of Animal-Assisted Intervention Professionals, 2021). Some articles labeled AAT-D lack enough details to determine whether the intervention is labeled correctly or not. Overall, the lack of clear, accurate usage of AAT-D in the literature obfuscates research findings regarding AAT-D. While nearly the same number of articles address AAT-D as TD and SD, the wide variation in definitions among AAT-D articles makes it difficult to draw accurate conclusions from the current literature. Future researchers of AAT-Ds or TDs must pay careful attention to labeling and clearly defining such interventions correctly to avoid confusion and incorrect application among consumers of their research.

Articles about SDs and ESAs fare better in using terms correctly with nearly all articles matching the correct definitions. Several reasons explain SDs clearer usage. Service dogs have provided assistance to people with disabilities for longer than most other types of dogs in human service roles (Leoni, 1560; Swanbeck, 2002). Additionally, SDs are more readily recognized due to aiding people with disabilities, as guide dogs, hearing dogs, mobility assistance dogs, and medical alert dogs. Having a very specific definition through the Americans with Disabilities Act also helps researchers use the term correctly. ESA is also used clearly and accurately in the small number of articles addressing ESAs. This clarity may be since ESAs are a much different type of working or assistance animal than SD, TD, or AA-TD.

While SDs and ESAs are largely well defined in research, the overall confusion in the language describing dogs in human service roles goes beyond research, affecting the public’s perception and understanding of the dogs’

role. A dog wearing a vest can be in any of the defined roles – or simply a companion animal, as dog vests are ubiquitous and can be found online without restriction. Furthermore, dogs aiding humans are not required to wear a descriptive vest while performing their functions. Acceptance of dogs in assistance roles, especially ESAs, suffers among the public because of improper usage of terms.

The public's poor understanding of ESAs likely leaks into helping professions because little research exists to counteract it. While ESA is defined well in the literature, the lack of ESA literature revealed by this scoping review poses a major challenge for practitioners. Licensed mental health professionals are tasked with writing professional opinion letters stating that a person would benefit from an ESA – letters which are required in order to acquire an ESA. With so little research on ESAs, professionals have little evidence available to guide their judgment on writing such a letter. With public stigma against ESAs combined with little guidance from research, professionals often hesitate to write such a letter. This hesitation contributes to making the acquisition of a legitimate ESA difficult for people who might find an ESA beneficial. More research on ESAs is badly needed.

Limitations

One major limitation of this scoping review is the limited number of articles included on Emotional Support Animals. Some of this limitation stems from our exclusion of ESA articles that did not address dogs. ESAs can be not only dogs but other animals as well. In fact, a licensed mental health provider writing a professional opinion letter regarding an individual's need for an ESA may choose not to specify what type of animal recommended. This scoping review does not include ESA articles which provided information on other types of ESAs, such as peacocks and guinea pigs. While the exclusion of non-canine ESA articles partly explains the limited number of ESA articles in this review, the underlying factor is a lack of research on ESAs overall. While ESAs are rising in popularity (Stockman, 2019), research has not caught up with this trend. Reasons for this lack of available research could include the widespread and varied use of ESAs among people with disabilities, which may limit opportunities for a focused study on their characteristics and benefits. These factors together limited this scoping review to only 11 articles on ESAs, which in turn limits the implications of this research on working animal taxonomy.

Another limitation has to do with the impact of the wide variety of nomenclature for service dogs. While our search addressed many terms often used to refer to SDs, other terms likely exist which were not included. For example, SDs are often labeled with other general terms such as assistance animals or working animals rather than as service dogs, highlighting the necessity of standardizing SD terminology. Additionally, SDs are often given more specific labels such as diabetic alert dog or posttraumatic stress disorder dog. While some of these specific labels were included in our search terms, some were likely missed given the large number of such terms that are possible. Thus, while systematic efforts were made to include as many SD articles as possible, our review may not include all SD articles available.

Future Directions

As elucidate in this review, further research is needed on Emotional Support Animals, both in terms of their definition and their specific role for people with disabilities. Additionally, future research could examine terminology used within each category of dog's roles, ensuring the taxonomy within each individual group is clear.

Conclusions

This scoping review reveals much room for improvement in the standardization of terminology referring to the roles dogs play in aiding humans. To standardize the taxonomy, future researchers should follow the definitions for SD, ESA, TD, and AAT-D set forth in this paper. As previously stated, SDs are dogs that are “individually trained to do work or perform tasks for people with disabilities” (National Network: Information, Guidance, and Training, on the Americans with Disabilities Act, 2017, para. 2). ESAs are companion animals that provide comfort to an individual with mental health challenges (Otto et al., 2021). TDs work with their handlers to provide comfort to members of the public without specific treatment targets (Winkle & Linder, 2018). AAT-Ds are dogs that are integral to a goal-directed intervention administered by a licensed provider which enhances an individual's physical, social, emotional, or cognitive functioning (Winkle & Linder, 2018).

Using these terms correctly enables clear communication between researchers, promotes evidence-based practice among consumers of research, and informs public policy. In the helping professions, evidence-based practice is a growing and essential emphasis. Evidence-based practice relies on sound research supporting or not supporting a particular intervention as effective within a given population. Researchers working to build this evidence base rely on prior researchers to label the intervention correctly to inform their new research. Consumers of research rely on the authors to label the intervention correctly to determine if evidence supports that intervention. Otherwise, evidence that truly supports one intervention may be falsely interpreted as supporting a different intervention. Those hoping to influence public policy look to research to provide definitions and best practices to inform public policy in relation to the roles, responsibilities, and privileges of the canines in these roles and the humans working with them, ensuring the overall welfare and safety of all. Future researchers in this area would do well to provide clarity in terms for all readers.

References

- Arksey, H., & O'Malley, L. (2005). Scoping studies: Towards a methodological framework. *International Journal of Social Research Methodology*, 8(1), 19–32. <https://doi.org/10.1080/1364557032000119616>
- Association of Animal-Assisted Intervention Professionals. (2021). *Standards of practice for animal-assisted interventions*. <https://therapyanimalstandards.org/downloads>

- Butwin, J. (2019). Emotional support animals are more than just pets: It is time for the Department of Justice to align its emotional support animal policies with other anti-discrimination laws. *Fordham Urban Law Journal*, 47(1), 195–229.
- Davis, K., Drey, N., & Gould, D. (2009). What are scoping studies? A review of the nursing literature. *International Journal of Nursing Studies*, 46(10), 1386–1400.
<https://doi.org/10.1016/j.ijnurstu.2009.02.010>
- Dickson, A., & Rummel, M. (2019). The therapy dog will see you now. *Journal of Oncology Navigation & Survivorship*, 10(8), 308–310.
- Fine, A. H., Beck, A. M., & Ng, Z. (2019). The state of animal-assisted interventions: Addressing the contemporary issues that will shape the future. *International Journal of Environmental Research and Public Health*, 16(20), Article 20. <https://doi.org/10.3390/ijerph16203997>
- Johnson, A., Van Fleet, R., Stewart, L., Crowley, S., DePrekel, M., Eccles, E., Hey, L., Howie, A. R., Johnson, C., King, B., Runge, N., Snyder, S., Trevathan-Minnis, M., & Submitted by the Human-Animal Interactions Ethics Workgroup. (n.d.). *Summary of Considerations for APA Ethical Standards Competencies in Animal-Assisted Interventions*.
- Karetnick, J. (2022). *Service Dogs 101: Everything You Need To Know About Service Dogs*. American Kennel Club. <https://www.akc.org/expert-advice/training/service-dog-training-101/>
- Lahman, M. P. (2018). By my side: The university's first service dogs. *Health Communication*, 33(2), 222–224.
<https://doi.org/10.1080/10410236.2016.1250185>
- Leoni, L. (1560). *Blind man with a staff and water-flask, led by a dog [reverse]* [Bronze/Later casting]. National Gallery of Art. <https://www.nga.gov/collection/art-object-page.45095.html>
- Lindsay, S. R. (2000). Origins and Domestication. In *Handbook of Applied Dog Behavior and Training* (Vol. 1, pp. 3–30). Blackwell Publishing.
- Lloyd, J., Johnston, L., & Lewis, J. (2019). Psychiatric assistance dog use for people living with mental health disorders. *Frontiers in Veterinary Science*, 6. <https://doi.org/10.3389/fvets.2019.00166>
- López-Cepero, J. (2020). Current status of animal-assisted interventions in scientific literature: A critical comment on their internal validity. *Animals*, 10(6), Article 6. <https://doi.org/10.3390/ani10060985>
- Minton, C. A., Perez, P. R., & Miller, K. (2015). Voices from behind prison walls: The impact of training service dogs on women in prison. *Society & Animals*, 23(5), 484–501.
<https://doi.org/10.1163/15685306-12341379>
- Mulvaney-Roth, P., Jackson, C., Bert, L., Eriksen, S., & Ryan, M. (2022). Using pet therapy to decrease patients' anxiety on two diverse inpatient units. *Journal of the American Psychiatric Nurses Association*, 29(2). <https://doi.org/10.1177/1078390321999719>
- Munn, Z., Peters, M. D. J., Stern, C., Tufanaru, C., McArthur, A., & Aromataris, E. (2018). Systematic review or scoping review? Guidance for authors when choosing between a systematic or scoping review approach. *BMC Medical Research Methodology*, 18(1), 143. <https://doi.org/10.1186/s12874-018-0611-x>
- National Network: Information, Guidance, and Training, on the Americans with Disabilities Act. (2017). *Service Animals*. <https://adata.org/factsheet/service-animals>

- Otto, C. M., Darling, T., Murphy, L., Ng, Z., Pierce, B., Singletary, M., & Zoran, D. (2021). 2021 AAHA working, assistance, and therapy dog guidelines. *Journal of the American Animal Hospital Association*, 57(6), 253–277. <https://doi.org/10.5326/JAAHA-MS-7250>
- Schoenfeld-Tacher, R., Hellyer, P., Cheung, L., & Kogan, L. (2017). Public perceptions of service dogs, emotional support dogs, and therapy dogs. *International Journal of Environmental Research and Public Health*, 14(6), Article 6. <https://doi.org/10.3390/ijerph14060642>
- Stevens, P., Kepros, J. P., & Mosher, B. D. (2017). Use of a dog visitation program to improve patient satisfaction in trauma patients. *Journal of Trauma Nursing / JTN*, 24(2), 97–101. <https://doi.org/10.1097/JTN.0000000000000272>
- Stockman, F. (2019, June 19). People are taking emotional support animals everywhere. States are cracking down. *The New York Times*, 12.
- Swanbeck, S. (2002). *The seeing eye*. Arcadia Publishing.
- Thompkins, A. M., Adkins, S. J., Leopard, M., Spencer, C., Bentley, D., Bolden, L., Jagielski, C. H., Richardson, E., Goodman, A. M., & Schwebel, D. C. (2019). Dogs as an adjunct to therapy: Effects of animal-assisted therapy on rehabilitation following spinal cord injury. *Anthrozoös*, 32(5), 679–690. <https://doi.org/10.1080/08927936.2019.1645513>
- Trainer, M. (2016, September 30). Service dogs save lives. *ShareAmerica*. <https://share.america.gov/service-dogs-save-lives/>
- U.S. Department of Justice & U.S. Department of Housing and Urban Development. (2004). *Reasonable accommodations under the Fair Housing Act*. <https://www.hud.gov/sites/documents/hud DOJstatement.pdf>
- Vitztum, C., Kelly, P. J., & Cheng, A.-L. (2016). Hospital-based therapy dog walking for adolescents with orthopedic limitations: A pilot study. *Comprehensive Child and Adolescent Nursing*, 39(4), 256–271. <https://doi.org/10.1080/24694193.2016.1196266>
- Whitworth, J., O'Brien, C., Wharton, T., & Scotland-Coogan, D. (2020). Understanding partner perceptions of a service dog training program for veterans with PTSD: Building a bridge to trauma resiliency. *Social Work in Mental Health*, 18(6), 604–622. <https://doi.org/10.1080/15332985.2020.1806181>
- Winkle, M. Y., & Linder, D. E. (2018). Animal-assisted interventions: Taxonomy and best practices. *Human-Animal Interaction Bulletin*, 6(Special Edition), 24–36. <https://doi.org/10.1079/hai.2018.0014>
- Woodward, S. H., Jamison, A. L., Gala, S., & Holmes, T. H. (2017). Canine companionship is associated with modification of attentional bias in posttraumatic stress disorder. *PLOS ONE*, 12(10), e0179912. <https://doi.org/10.1371/journal.pone.0179912>

Disparities in Health Coverage across the Cancer Continuum: A Secondary Data Analysis

Sumona Hoque Mumu

University of Louisiana at Lafayette, USA,  <https://orcid.org/0000-0003-0386-8991>

Ismatara Reena

University of Louisiana at Lafayette, USA,  <https://orcid.org/0000-0003-1054-8726>

Abstract: Inadequate health insurance reduces access to care and results in poorer health outcomes. The current study assesses the disparity in reported cancer distribution by health insurance coverage. The study analyzes secondary data pooled from the National Health Interview Survey (NHIS) 2021, a nationally representative clustered sample of adults (≥ 18 years) from 50 states of the USA ($N = 29482$) utilizing several inferential and regression models. In the US, 7.8% did not have at least one government or non-government health coverage, and 12.4% had a current diagnosis of at least one cancer in 2021. Age >65 , high school graduate and above, being a citizen, white race, and female gender were substantially correlated with a higher diagnosis of cancer ($p < .005$). Not having a health insurance is mainly observed among the Hispanic group, male gender, education less than high school, and non-citizens (odds ratio [OR] > 1 , and $p < .005$). Regression analysis revealed a substantially greater likelihood of cancer among uninsured ($P=0.000$) and Medicaid-insured ($P=0.011$) patients compared with privately or Medicare insured patients. Several disparities are observed among the US populations with cancer. Expanding comprehensive health insurance coverage including incorporation of screening services may address the prevailing disparity in the USA.

Keywords: Cancer, Disparities, Health coverage, Medicaid, Uninsured

Citation: Mumu, S. H. & Reena, I. (2023). Disparities in Health Coverage across the Cancer Continuum: A Secondary Data Analysis. In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023--International Conference on Social and Education Sciences* (pp. 245-255), Las Vegas, NV, USA. ISTES Organization.

Introduction

Cancer remains a substantial challenge in the United States, reflecting both its high prevalence and the significant health burden it imposes on the population. The burden of the US's non-insured population of all ages is estimated to be 31.6 million (Terlizzi & Cohen, 2022). The incidence of cancer in the USA has seen a consistent rise over the years, with data revealing that approximately 1.9 million new cancer cases were diagnosed in 2021 alone, according to the American Cancer Society. Furthering to the point, cancer amounted to

over 600,000 deaths in the United States (U. S.) in 2021 (Siegel et al., 2021). This places cancer as one of the leading causes of morbidity and mortality in the country. This concerning trend is further exacerbated by the fact that the country accounts for a significant portion of the global cancer burden. The USA has one of the highest cancer incidence rates in the world, with cancer-related mortality also posing a substantial threat. The economic and emotional toll associated with cancer underscores the urgency of effective prevention, early detection, and treatment strategies.

Cancer diagnosis is a critical aspect of cancer care, as early detection can greatly improve treatment outcomes. However, several barriers exist in the United States that hinder timely and accurate cancer diagnosis. These barriers include limited access to healthcare services, especially among underserved populations, which can delay early detection. Additionally, issues such as health disparities, socioeconomic factors, and lack of awareness about cancer screening programs can further impede early diagnosis (Zhao et al., 2022). Access to healthcare in the United States is a complex issue influenced by multiple factors, including insurance coverage, socioeconomic status, geographical location, and healthcare infrastructure (Aziz et al., 2022).

Cancer incidence and prognosis have exhibited disparities among different populations based on healthcare access (Zavala et al., 2021) Healthcare access plays a pivotal role in determining health outcomes, especially in the context of cancer care. One of the primary factors affecting healthcare access in the U.S. is the presence or absence of health insurance. Lack of insurance can result in delayed medical care, adverse health outcome, delayed diagnosis including cancer screenings and early intervention, ultimately leading to more advanced and challenging-to-treat diseases (Sedney et al., 2020).

While healthcare access is a fundamental component of achieving equitable health outcomes, it does not guarantee complete equity by itself (Bullock & Bradford, 2016). Access to healthcare ensures that individuals have the opportunity to receive necessary medical services, including preventative care and treatment. However, several additional factors can influence the equitable distribution of health outcomes. Equity in healthcare outcomes is also dependent on the quality of care, cultural competence, and the effectiveness of the healthcare system. Disparities in healthcare quality, provider biases, and variations in healthcare delivery can impact outcomes, even when individuals have access to care. Furthermore, social determinants of health, such as income, education, employment, and living conditions, play a significant role in shaping health outcomes. These determinants can affect an individual's overall health status and access to healthcare services.

In light of the aforementioned literature-driven facts, it has become evident that there is a need for a comprehensive investigation into recent estimates of demographic variations that influence healthcare access and disparities in reported cancer distribution, by health insurance coverage. Recent estimates of demographic variations influencing healthcare access and disparities in reported cancer distribution by health insurance coverage, based on nationally representative data, are currently unavailable for proper intervention and analysis. Therefore, the primary purpose of this study is to bridge this crucial gap by gathering and analyzing the most recent and representative data available. By doing so, we aim to shed light on the factors affecting healthcare

access, present status of healthcare access and its impact on cancer distribution, ultimately providing a foundation for equitable cancer care and outcomes for all.

Method

Data Source

Data for this study were obtained from the National Health Interview Survey (NHIS) sample adult interview dataset (NHIS-2021) accessed through the Research Data Center (RDC) of the National Center for Health Statistics (NCHS) under the Center for Disease Control and Prevention (CDC) (CDC, 2022). The NHIS dataset was compiled between January and December 2021, encompassing responses from all 50 states and the District of Columbia in the USA. The survey employed stratified cluster sampling techniques to ensure that the data collected is nationally representative and provides a comprehensive overview of health-related variables.

Participants

The study sample comprised a total of 29,482 participants who were involved in a face-to-face or telephone interview. This data collection method was adapted due to the prevailing pandemic and other logistical constraints. Participants included household residents, individuals in noninstitutional group quarters such as shelters for homeless people, and temporary residents living in places like student dormitories, rooming houses, and group homes. Excluded from the study were children, homeless individuals not residing in shelters, military personnel on duty, civilians residing on military bases, individuals living in care homes or receiving terminal care, prisoners, persons in detention centers, halfway houses, and US citizens living outside of the USA.

Data Analysis

The data was analyzed using SPSS version 26.0 (SPSS, Chicago, IL, USA). Prior to analysis, data cleaning procedures were performed to ensure data accuracy and completeness. Data normality was checked to confirm that the assumptions for statistical tests were met. Descriptive statistics were employed to present the socio-demographic distribution of health coverage for residents of the USA, using tabular representations. Inferential analyses (Chi-square test) and regression models were then employed to assess relationships and differences among key variables. These variables included socio-demographic factors such as the age of respondents, sex, education, race, and citizenship status, as well as health insurance coverage and reported cancer diagnoses. Data cleaning also involved the elimination of outliers and extreme values to mitigate potential concerns related to data disclosure.

Ethical Approval

The National Center for Health Statistics (NCHS) Research Ethics Review Board (ERB) approved the data

collection process for the NHIS sample adult interview in 2021. The analysis of restricted data through the NCHS Research Data Center was also conducted with the approval of the NCHS ERB.

Results

Table 1 shows the distribution of health coverage and reported diagnosis of cancer by sociodemographic factors. Approximately 7.8% of the total adult population lacked health insurance, while 12.4% had at least one type of cancer reported. A substantial portion (63.6%) had private coverage, (31.8%) had Medicare coverage, and 11.6% had Medicaid. Certain differences were observed in health insurance coverage and cancer diagnosis across different age groups. Young adults (aged 18-39) exhibited the highest uninsured rate at 13.1%, while older adults had the lowest (0.5%). In contrast young adults are the group with lowest percentage of reported cancer (1.7%) and older adult had the highest (27%). The elderly population (65 and older) had a substantial 46.1% covered by Medicare. Middle-aged individuals (40-64) had a 9.6% uninsured rate, with 9.1% of total reported cancer. This disparity overall could be largely related to nature of the delayed onset of cancer.

Table 1. Sociodemographic and clinical characteristics of participants

Health Insurance n (%)					
	Not Covered		Covered		Diagnosis of at least one type of cancer
	Uninsured	Medicaid	Medicare	Private	n (%)
Age					
Total	2312(7.8%)	3413 (11.6)	9384 (31.8)	18757(63.6)	3654(12.4)
Young Adult (18-39)	1124(13.1)	1061(12.3)	1996(23.2)	5603(65.2)	148 (1.7)
Middle age (40-64)	1146(9.6)	1386(11.6)	3259 (27.3)	7743(65)	1086(9.1)
Older age (65 and older)	42(0.5)	966(10.8)	4129 (46.1)	5411(60.4)	2420(27)
p value	0.000	0.005	.000	0.000	.000
Sex					
Total	2312(7.8)	3413(11.6)	9384(31.8)	18757(63.6)	3654(12.4)
Male	1274(9.5)	1499(11.2)	4180 (31.2)	8548(63.9)	1546(11.6)
Female	1038(6.4)	1914(11.9)	5204 (32.3)	10209(63.4)	2108(13.1)
P value	0.000	0.069	.049	0.38	0.000
Citizenship					
Total	2312(7.8)	3413(11.6)	9384(31.8)	18575(63.6)	3654(12.4)
Citizen	1592(6)	3016(11.3)	8702(32.6)	17099(64.1)	3520(13.2)
Non-Citizen	720(25.7)	397(14.1)	682(24.3)	1658(59.1)	134(4.8)

Health Insurance n (%)

	Not Covered	Covered			Diagnosis of at least one type of cancer n (%)
	Uninsured	Medicaid	Medicare	Private	
P value	0.000	0.000	0.000	0.000	0.000

Education

Total	2283(7.8)	3390(11.6)	9338(31.8)	18669(63.7)	3640(12.2)
<High school	591(18.6)	583(18.3)	1103(34.7)	1588(50)	349(11)
High school graduate and above	1318(8.9)	1858(12.6)	4796(32.5)	9126(61.9)	1821(12.3)
Bachelor and above	374(3.3)	949(8.3)	3439(30.2)	7955(69.8)	1470(12.9)
P value	0.000	0.000	0.000	0.000	0.014

Race

Total	2312(7.8)	3413(11.6)	9385(31.8)	18758(63.6)	3654(12.4)
White	1251(6.4)	1585(8.1)	7310(37.2)	13433(68.4)	2678(13.6)
Hispanic	561(13.7)	763(18.7)	651(16)	1959(48)	381(9.3)
Black	322(10.2)	683(21.6)	940(29.7)	1626(51.5)	327(10.3)
Other	178(6.9)	382(14.8)	484(18.7)	1730(67)	268(10.4)
P value	0.000	0.000	0.000	0.000	0.000

Note. Data presented as n (%) (χ^2 test) for categorical variables

Gender also played a role in health insurance coverage. Males had a higher uninsured rate (9.5%) compared to females (6.4%). Inversely, the reported cancer percentage is higher in female (13.1%) than male (11.6). Private insurance covered about 64% of both males and females. U.S. citizens had a lower uninsured rate (6%) compared to non-citizens, who faced a significantly higher uninsured rate of 25.7%. Citizen had the higher reported cancer (13.2%) than non-citizens (4.8%). This disparity could be attributed to large sample differences.

Among education categories (see Figure 1), individuals with less than a high school education exhibited the highest uninsured rate at 18.6%, and 11% of total reported cancer. Conversely, those with a bachelor and above showed the lowest percentage of uninsured rate (3.3%) and the highest percentage of being diagnosed with at least one type of cancer (12.9). White individuals had the lowest uninsured rate at 6.4%, while Hispanic individuals had a relatively high uninsured rate at 13.7%, followed by black (10.2%) as demonstrated in Fig. 2. In contrast, white population has the higher (13.6%) prevalence of reported cancer than the Hispanics (9.3%).

An inverse relationship was observed among the socio-demographic variables of interest between health insurance coverage and cancer diagnosis. Those who lacked insurance coverage were less likely to be diagnosed with cancer. This underscores the critical role of health insurance in facilitating timely cancer diagnosis and

treatment. Individuals with insurance coverage, particularly Medicare and private insurance, had higher rates of cancer diagnosis, ensuring more favorable prospects for early intervention and improved health outcomes.

DISPARITY IN HEALTH COVERAGE BY LEVEL OF EDUCATION

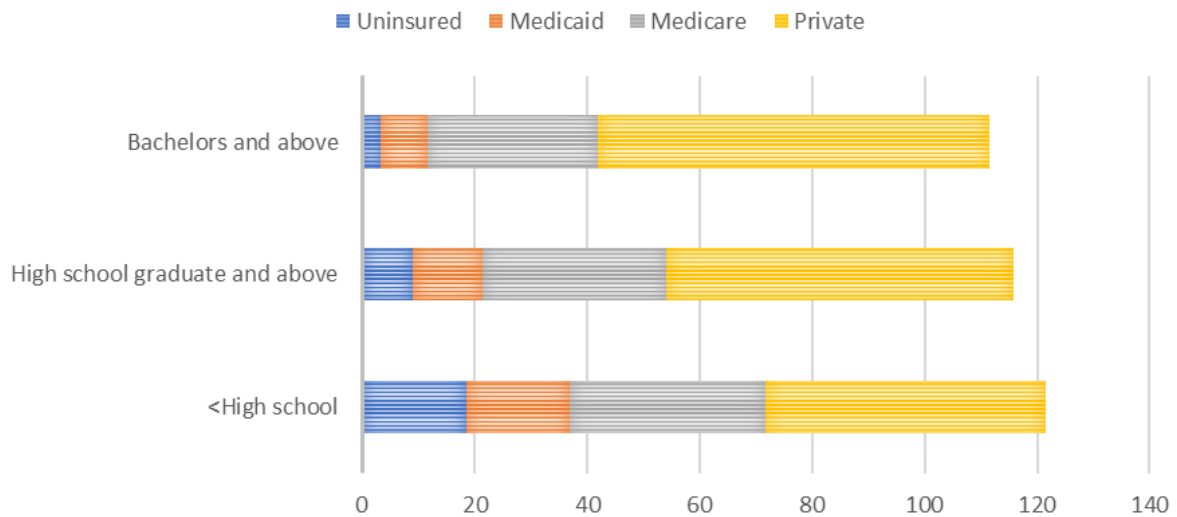


Figure 1. Healthcare coverage disparity by education

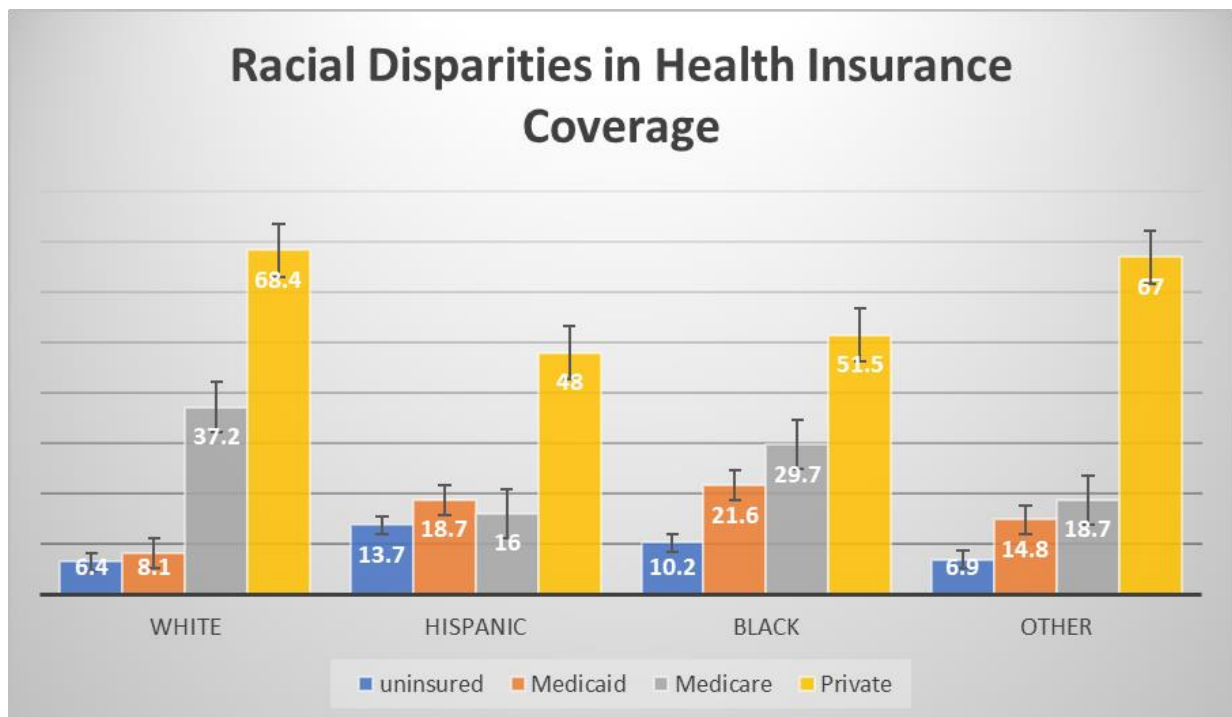


Figure 2. Healthcare coverage disparity by Race

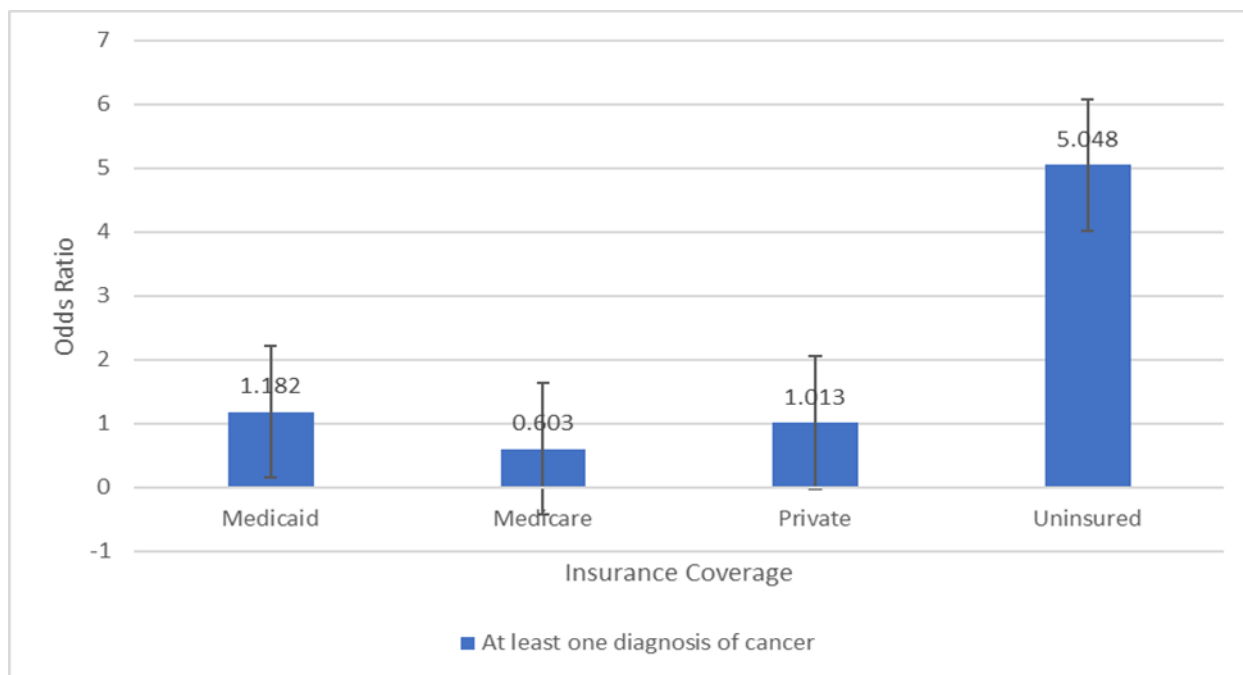


Figure 3. Association between Health insurance and reported diagnosis of any cancer

Table 2 demonstrates that individuals covered by Medicare had a significantly lower likelihood of receiving a cancer diagnosis, as indicated by an odds ratio (OR) of 0.603, with a 95% confidence interval (CI) between 0.559 and 0.651. This suggests that those with Medicare coverage were approximately 0.603 times less likely to be diagnosed with cancer compared to those without this coverage, and the associated p-value of 0.000 underscores the statistical significance of this relationship. Conversely, individuals with Medicaid coverage exhibited a slightly elevated likelihood of cancer diagnosis, with an OR of 1.18 and a 95% CI ranging from 1.04 to 1.34, signifying that they were about 1.18 times more likely to be diagnosed with cancer than those without Medicaid, a statistically significant association as indicated by the p-value of 0.011.

Private insurance coverage, while showing a minor increase in likelihood with an OR of 1.013, did not reach statistical significance, as the associated p-value was 0.765. However, the much higher likelihood finding emerged for the uninsured group, with an OR of 5.048 and a 95% CI spanning from 3.932 to 6.481, indicating that individuals without any health insurance were approximately 5.048 times more likely to be diagnosed with cancer compared to those with insurance, and this relationship was highly statistically significant, with a p-value of 0.000.

Figure 3 represents the visual demonstration of aforementioned findings. These findings reveal the crucial role of health insurance coverage in the likelihood of cancer diagnosis, with Medicare showing less likelihood, Medicaid showing a slightly elevated risk, and being uninsured significantly increasing the probability of cancer diagnosis, emphasizing the need to address disparities associated with different health coverage options in the context of cancer care.

Table 2. Likelihood of cancer diagnosis by health coverage, logistic regression

	Diagnosis of at least one type of cancer	
	OR (95%CI)	P
Medicare	0.603(0.559-0.651)	0.000
Medicaid	1.18(1.04-1.34)	0.011
Private	1.013 (0.931-1.102)	0.765
Uninsured	5.048(3.932-6.481)	0.000

Discussion

The findings presented in the tables above shed light on critical aspects of healthcare access and cancer diagnosis in the United States. Current state of art has reported healthcare and health outcome disparities as well (Goldstein et al., 2019; Ratnapradipa et al., 2023; Scaglione et al., 2020; Smith et al., 2021; Zavala et al., 2021). Our findings indicate that the absence of health insurance is strongly associated with an increased risk of cancer diagnosis. This research also uncovered a number of sociodemographic factors that are substantially associated with the prevalence of cancer. Having a bachelor or higher, citizen, White, and females were seen to be high in cancer diagnosis and these factors are associated with greater access to healthcare services. On the other hand, Hispanics, males, those with less than a high school education, and non-citizens were disproportionately uninsured. In line with our study, Lee et al. (2021) reported that race is independently linked to health insurance coverage and healthcare access in the US, showing disparities in health outcomes among minorities. Conversely, a study spanning four African countries revealed that in three of them, females had lower health coverage than males, contrasting with our findings in the US (Amu et al., 2018). Another study, using National Health and Nutrition Examination Survey (NHANES) data from 2011-2016, identified increased healthcare access challenges and treatment disparities among noncitizen adults (Guadamuz et al., 2020). These findings, derived from an extensive dataset collected from the National Health Interview Survey (NHIS), offer valuable insights into the relationships between sociodemographic factors, health insurance coverage, and the likelihood of being diagnosed with cancer. In this discussion, we will explore the implications of these findings and their significance for healthcare policy and practice.

Healthcare Access and Demographics

The first table provides a detailed breakdown of health coverage and cancer diagnoses by sociodemographic factors, such as age, sex, citizenship status, education, and race. It is evident that disparities exist across these factors. Notably, age plays a crucial role, with a higher prevalence of cancer diagnoses among older individuals. The data also highlights disparities by sex, citizenship status, education level, and race. These findings underline the importance of considering these sociodemographic variables when addressing cancer care and access to healthcare. Tailored interventions and outreach strategies are essential to ensure equitable access to cancer

diagnosis and treatment for different segments of the population.

Health Insurance and Cancer Diagnosis

The second table explores the relationship between health insurance coverage and the likelihood of receiving a cancer diagnosis. The findings suggest that the type of health insurance coverage has a significant impact on cancer diagnosis. Notably, individuals with Medicare coverage exhibit a lower likelihood of cancer diagnosis, whereas those with Medicaid coverage show a slightly elevated risk. In contrast, individuals without any health insurance (uninsured) face a significantly higher likelihood of being diagnosed with cancer. These findings underscore the vital role of health insurance in cancer care, with Medicare providing lower risk, Medicaid demonstrating higher risk than Medicare, and being uninsured significantly increasing the probability of cancer diagnosis.

Implications for Policy and Practice

Understanding the disparities in cancer diagnoses by sociodemographic factors and health insurance coverage is crucial for informed policy and practice. Tailored approaches are needed to address the unique needs of different population groups. For instance, programs that promote cancer screenings and awareness should consider age-specific campaigns, with a focus on older adults. Additionally, efforts to increase access to Medicaid should be coupled with strategies to ensure timely and high-quality cancer care for this population like incorporating screening services for age specific cancer. Strategies to improve Medicaid's effectiveness in cancer care, especially for underserved populations, are essential. Lastly, addressing the high risk associated with being uninsured is a priority. Comprehensive healthcare reform and measures to expand insurance coverage can play a vital role in reducing this risk and improving overall healthcare access.

Conclusion

In conclusion, these findings emphasize the complex interplay between sociodemographic factors, health insurance coverage, and cancer diagnosis. While access to healthcare is a crucial step toward achieving equitable health outcomes, it is only one piece of the puzzle. A multidimensional approach to healthcare access and equitable cancer care is required. Timely access to screenings, early diagnosis, and specialized treatment centers can significantly impact the success of cancer diagnosis and treatment. Addressing healthcare access disparities, expanding insurance coverage, increasing healthcare infrastructure, and promoting public health initiatives are crucial steps in ensuring that all individuals have equitable access to quality healthcare.

Study Limitation and Future Scope

At this point, we would like to acknowledge the limitation of this study. Firstly, it is important to recognize that

the age disparities observed in cancer diagnoses could be influenced by the varying age of onset for different types of cancer. Similarly, disparities in cancer incidence among different racial groups may be attributed to genetic factors, which were not explicitly examined in this study. Additionally, as this research involved secondary data analysis using a publicly accessible anonymized dataset, there may have been certain variables of interest that were not included due to limited accessibility. Studies have shown that genetic factors together with employment and income explain over 40% of the variation in health insurance coverage (Wehby & Shane, 2018). Some potential confounding factors thus might have been missed. The study's findings should be considered within the context of these limitations, and future research could explore these variables in greater detail to provide a more comprehensive understanding of the complexities surrounding healthcare access, sociodemographic factors, and cancer diagnosis. Studies have reported disparities in being diagnosed with cancer at different stage with uninsured and Medicaid beneficiaries often diagnosed at an advanced stage of cancer (Halpern et al., 2008). Additional research to investigate the onset and diagnostic delay of various malignancies among the populations are needed. The insurance system should integrate screening services that are specifically designed to meet the requirements of these populations. Research to understand the unique barriers encountered by underinsured or insured population with low coverage in gaining access to cancer screening and early detection services is crucial.

References

- Amu, H., Dickson, K. S., Kumi-Kyereme, A., & Darteh, E. K. M. (2018). Understanding variations in health insurance coverage in Ghana, Kenya, Nigeria, and Tanzania: Evidence from demographic and health surveys. *PLOS ONE*, *13*(8), e0201833. <https://doi.org/10.1371/journal.pone.0201833>
- Aziz, N., Liu, T., Yang, S., & Zukiewicz-Sobczak, W. (2022). Causal relationship between health insurance and overall health status of children: Insights from Pakistan. *Frontiers in Public Health*, *10*, 934007. <https://doi.org/10.3389/fpubh.2022.934007>
- Bullock, J. B., & Bradford, W. D. (2016). The differential effect of compensation structures on the likelihood that firms accept new patients by insurance type. *International Journal of Health Economics and Management*, *16*(1), 65–88. <https://doi.org/10.1007/s10754-015-9182-0>
- Goldstein, J. S., Switchenko, J. M., Behera, M., Flowers, C. R., & Koff, J. L. (2019). Insurance status impacts overall survival in Burkitt lymphoma. *Leukemia & Lymphoma*, *60*(13), 3225–3234. <https://doi.org/10.1080/10428194.2019.1623884>
- Guadamuz, J. S., Durazo-Arvizú, R., Daviglius, M. L., Calip, G. S., Nutescu, E. A., & Qato, D. M. (2020). Citizenship Status and the prevalence, treatment, and control of cardiovascular disease risk factors among adults in the United States, 2011–2016. *Circulation-cardiovascular Quality and Outcomes*, *13*(3). <https://doi.org/10.1161/circoutcomes.119.006215>
- Halpern, M. T., Ward, E., Pavluck, A. L., Schrag, N. M., Bian, J., & Chen, A. Y. (2008). Association of insurance status and ethnicity with cancer stage at diagnosis for 12 cancer sites: a retrospective analysis. *Lancet Oncology*, *9*(3), 222–231. [https://doi.org/10.1016/s1470-2045\(08\)70032-9](https://doi.org/10.1016/s1470-2045(08)70032-9)

- Lee, D. H., Liang, H., & Shi, L. (2021). The convergence of racial and income disparities in health insurance coverage in the United States. *International Journal for Equity in Health*, 20(1).
<https://doi.org/10.1186/s12939-021-01436-z>
- Ratnapradipa, K. L., Jadhav, S., Kabayundo, J., Wang, H., & Smith, L. C. (2023). Factors associated with delaying medical care: Cross-sectional study of Nebraska adults. *BMC Health Services Research*, 23(1), 118. <https://doi.org/10.1186/s12913-023-09140-0>
- Scaglione, S., Adams, W., Caines, A., Devlin, P., Mittal, S., Singal, A. G., & Parikh, N. D. (2020). Association Between Race/Ethnicity and Insurance Status with Outcomes in Patients with Hepatocellular Carcinoma. *Digestive Diseases and Sciences*, 65(6), 1669–1678. <https://doi.org/10.1007/s10620-019-05890-2>
- Sedney, C. L., Khan, U., & Dekeseredy, P. (2020). Traumatic spinal cord injury in West Virginia: Disparities by insurance and discharge disposition from an acute care hospital. *The Journal of Spinal Cord Medicine*, 43(1), 106. <https://doi.org/10.1080/10790268.2018.1544878>
- Siegel, R. L., Miller, K. D., Fuchs, H. E., & Jemal, A. (2021). Cancer Statistics, 2021. *CA: A Cancer Journal for Clinicians*, 71(1), 7–33. <https://doi.org/10.3322/caac.21654>
- Smith, J. M., Jarrín, O. F., Lin, H., Tsui, J., Dharamdasani, T., & Thomas-Hawkins, C. (2021). Racial Disparities in Post-Acute Home Health Care Referral and Utilization among Older Adults with Diabetes. *International Journal of Environmental Research and Public Health*, 18(6), 3196. <https://doi.org/10.3390/ijerph18063196>
- Terlizzi, E. P., & Cohen, R. A. (2022). *National Health Statistics Reports*, Number 168, February 11, 2022.
- The Center for Disease Control and Prevention. (2022, August 8). *National Center for Health Statistics (NCHS): National Health Interview Survey (NHIS) 2021*. <https://www.cdc.gov/nchs/nhis/2021nhis.htm>
- Wehby, G. L., & Shane, D. M. (2018). Genetic variation in health insurance coverage. *International Journal of Health Economics and Management*. <https://doi.org/10.1007/s10754-018-9255-y>
- Zavala, V. A., Bracci, P. M., Carethers, J. M., Carvajal-Carmona, L., Coggins, N. B., Cruz-Correa, M. R., Davis, M., de Smith, A. J., Dutil, J., Figueiredo, J. C., Fox, R., Graves, K. D., Gomez, S. L., Llera, A., Neuhausen, S. L., Newman, L., Nguyen, T., Palmer, J. R., Palmer, N. R., ... Fejerman, L. (2021). Cancer health disparities in racial/ethnic minorities in the United States. *British Journal of Cancer*, 124(2), Article 2. <https://doi.org/10.1038/s41416-020-01038-6>
- Zhao, J., Han, X., Nogueira, L., Fedewa, S. A., Jemal, A., Halpern, M. T., & Yabroff, K. R. (2022). Health insurance status and cancer stage at diagnosis and survival in the United States. *CA: A Cancer Journal for Clinicians*, 72(6), 542–560. <https://doi.org/10.3322/caac.21732>

Axiomatic Theory of Economics, Epistemology Chapter

Victor Aguilar

Independent Researcher, USA,  orcid.org/0009-0007-4646-9890

Abstract: This is a sample chapter from the book, *Axiomatic Theory of Economics*. It lays the epistemological foundations for science in general and for economics in particular. Indeed, there is no difference between how new scientific theories are invented in the social and in the natural sciences. In both cases, it requires the invention of synthetic *a priori* knowledge as described by Immanuel Kant. But Kant provides little instruction on how to invent synthetic *a priori* knowledge and no practical examples. Not everybody today believes that it is possible! This chapter provides two examples of synthetic *a priori* knowledge with step-by-step instructions. The remainder of the book presents a new economic theory based on three axioms: that people's value scales are totally ordered; that the value of individual items diminishes as more are acquired; and the law of proportionate effect, which is equivalent to the established practice of calculating interest with the exponential function.

Keywords: Economics, Economic Methodology, Immanuel Kant, Epistemology, Methodenstreit

Citation: Aguilar, V., (2023). Axiomatic Theory of Economics, Epistemology Chapter. In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023-- International Conference on Social and Education Sciences* (pp. 256-280), Las Vegas, NV, USA. ISTES Organization.

Epigraph

Reason, holding in one hand its principles... and in the other hand the experiment which it has devised according to those principles, must approach nature in order to be taught by it; but not in the character of a pupil who agrees to everything the master likes, but as an appointed judge who compels the witnesses to answer the questions which he himself proposes.

— Immanuel Kant, *Critique of Pure Reason*,

1781

Preface

Chapter One is titled "Agnosticism." I define the terms noumena and phenomena and I make the latter the object of our study – no God talk allowed. I take a Kantian view of human minds organizing phenomena into the spatiotemporal dimensions, except that I include a fifth transcendental dimension, quality. Kant preceded

Lobachevski, but he never cited any theorems beyond Euclid's 27th proposition (if alternate interior angles are equal, the two lines crossed by the transversal are parallel), so this ignorance does not hurt him, unlike Descartes, whose Fifth Meditation compares God to proposition 32 (angle sum theorem), which cites postulate 5 (a line and a point not on it fully define the parallel through that point), which is only one of three possible postulates.

Section 3

The Three Senses of the Term "Truth"

Whereas noumena can only be thought of, phenomena may be known, for all phenomena conform to one's *a priori* definitions. A true definition is not one which conforms to experience but rather one to which experience itself conforms. Furthermore, theories cannot be arbitrary but must be possible according to the Principle of Contradiction, independent of all experience. In another sense, however, a theory cannot be called true in reference to a certain experience if it does not apply to that experience. Hence, there are three senses of the term "truth":

1. The observation that a phenomenon exists which conforms to a certain definition, or the observation that no phenomena exist which conform to that definition;
2. The applicability of a theory to a situation so that the relations or the characteristics to which those phenomena conform can be predicted by their conformance to the other, or the contingency of that theory's application on the conformance of phenomena not yet observed; and
3. The ability of a theory to apply without contradiction to some situation, or the impossibility of that theory to apply to any situation because its every alternative contains a contradiction.

While the nominal definition of truth (the agreement of a cognition with an event) does not change, the nature of that agreement and its proof does as one crosses from an *a posteriori* sense to an *a priori* sense of the term. First, let us consider truth in its most common sense, that of empirical verification of phenomena. If one is without doubt that phenomena conform to a definition, that definition is true in the first sense. There are two criteria of first-sense truth, characteristics and relations, either of which is enough to establish a definition's truth. First-sense truths are reliable only as far as one's senses can be trusted. As one's senses are limited, no phenomenon can ever conform to an *a priori* definition with absolute certainty but always with some degree of error. Appropriate precautions should be taken to avoid being deceived by an illusion. Whenever an observation is crucial to determining the truth of a theory in the second sense, that observation should also be predicted by other theories independently of the theory in question. If a theory is considered false in the second sense because a certain phenomenon has not been observed, it is best if that phenomena is also shown not to exist by other theories, for lack of observation carries no more certainty than observation. These precautions are especially important for observations recalled from memory or hearsay. Nevertheless, first-sense truths are never certain but always entail an error. This error may be negligible, or it may be significant, depending on the

situation. While it is best that crucial phenomena be predicted by several theories independently, each of these is subject to error in their application. Some theories are inherently inaccurate in their predictions, not because the theories themselves are incorrect, but because they define phenomena which are hard to verify in the first sense.

The second sense of the term “truth” is of applicability of a particular theory to observed phenomena. If all the intensions (characteristics and relations) conjoined in a definition or alternative are known from observation to be either true or false in the first sense, it is idle to determine if the theory is applicable to a given situation, for, even if it is, no new knowledge is gained. If a theory, in either all its characteristics or all its relations, applies to a situation, however, that situation is also known to conform to the other intensions (relations or characteristics, respectively) of the theory, thus supplying knowledge which cannot be had from observation. If the phenomena that might conform to some of the characteristics is concealed, the necessity of that situation conforming to the relations is contingent on an experiment forcing the concealed phenomena to show themselves as conformant to those characteristics. Conversely, if the phenomena that might conform to some of the relations is concealed, the necessity of that situation conforming to the characteristics is contingent on an experiment forcing the concealed phenomena to show themselves as conformant to those relations. Some of the characteristics are referenced by the relations of a theory, so phenomena’s conformance to the relations implies conformance to these characteristics. The non-referent characteristics are the part of the theory in need of prediction.

The third sense of the term “truth” is applied to a theory abstract from all phenomena. Having defined, *ad libitum*, certain postulates which appear to be useful, justified only in terms of their elegance and convenience (legislative postulation), a theory is then invented entirely *a priori*, though in such a way that it is possible according to the Principle of Contradiction. To test the Principle of Contradiction, a theory is progressively transformed so that each step is equivalent to the others (they all have the same extension or are true in exactly the same situations and no others) and the last step is in the form of alternational normal schemata. This form partitions into one or more disjunctive groups the conjunctively joined definitions representing each situation to which that theory might apply. If, in any alternative (clause), an intension is at once affirmed and denied, that alternative is contradictory and may be dispensed with, as the Principle of Contradiction states that phenomena never both conform to an intension and not conform to that intension. A theory is possible (true in the third sense) if not all its alternatives are contradictory. If they are all contradictory, it is nonsensical to concern oneself with whether the theory applies to a certain situation, as it has already been proven to apply to no possible situation.

If a theory contains n definitions with each one having phenomena either conform to it or not, there are 2^n possible situations to which one may consider applying the theory. Phenomena can at once conform to one and only one of these 2^n alternatives; phenomena cannot conform to more than one without at once conforming to the affirmation and the denial of a definition. If a theory has been invented in such a way that one or more of these 2^n possible situations can conform, even if they have never been observed, the theory is true in the third or

abstract sense. It cannot be refuted in this sense by contradictory phenomena for the contradiction would be caused by factors not defined by the theory. This would only prove that the theory in question is inappropriate for the particular phenomena and is thus untrue in the second sense but not in the third. If a characteristic is implicit in a definition, the ontological question, “Is there a phenomenon conformant to that definition which does not have this characteristic?” is idle for, by definition, if a phenomenon does not have that characteristic, it does not conform to the definition. A theory may be proven untrue in the third sense only if, after all traces of empirical phenomena are abstracted from the *a priori* definitions, a contradiction remains in the definitions themselves. If this is the case, new definitions must be sought with at least one alternative that contains no contradiction. While such definitions should have applicability to observed phenomena to be useful in practice, it is not a necessary criteria. A theory, however clearly and distinctly it is conceived, may be true in the third sense and yet be academic and have no applicability to observed phenomena and thus have no observed instances of truth in the second sense, but only possible ones. Phenomena cannot be forced into the procrustean bed of a theory merely to give it applicability.

The Intension of a Definition or Alternative

Every definition contains intensions (characteristics or relations) to which phenomena must conform to make that definition true in the first sense. Characteristics are anything that can be used to distinguish one phenomenon from another. Every characteristic conjoined in a definition is self-contained and does not refer to any other characteristics outside itself. If phenomena (whatever their position, size, or quantity) conform to all the characteristics in a definition, that definition is true in the first sense. Other intensions of a definition do not define characteristics, however, but refer to the relations of characteristics with other independently defined characteristics. These are called the relations of a definition and, because they refer to something not contained in the characteristics (other characteristics), they independently verify first-sense truth. Relations may take three forms, each of which have a different sense when a definition is thought of on the spatial, temporal, or qualitative dimensions. They are as follows:

Table 1. The Three Forms of Relations

relation	space	time	quality
position	distance	date	importance
size	length	duration	vagueness
quantity	mass	frequency	potency

Position is the relation of a definition situated at a particular place on a dimension with the position of another that is arbitrarily defined as the origin. There is no inherent reason why one definition or another should be thought of as the origin, for the characteristic of origination is not contained in the definition of the transcendental aesthetic dimensions. This choice is made regarding convenience only. To be useful in practice, an origin must be such that the phenomenon that conforms to it is very stable, never conforming to definitions at other positions on that dimension. While distance and date can contain the intension of magnitude, the

importance of a phenomenon can be known only as greater than or less than another. For importance, exact spatiotemporal magnitudes are replaced with vague terms such as “a lot more” or “a little more.”

Size is the number of units along a dimension from where a definition first appears and where it leaves off, the unit being the same as the one that measures position. As such, there are phenomena that can be used to measure length and duration but not vagueness. As the name implies, the vagueness of a definition is determined by one’s inability to determine the exact multiple of a unit (of money, for instance) which is equivalent to the definition in question. Such knowledge is essential if one proposes to exchange a phenomenon that conforms to that definition with phenomena that conform to a number of those units so that, relative to one’s own value scale, what one acquires conforms to a higher definition than what one surrenders. Relative to one’s trading partner’s value scale, the other has more value. That two people might have such opposite valuations is not surprising when one considers the instability that diminishing utility gives to all phenomena.

Quantity is not measured in the same units as position and size, though potency is unstable for the same reasons that importance and vagueness are. The unit of quantity is the stime or the smallest bit of phenomena which still conforms to a definition. Multiples of this unit determine the mass, frequency, and potency of phenomena. Potency, like distance, duration and the others, is transcendental and can thus be defined at infinity if one wishes, for the phenomenal world is no constraint at all on theoretical knowledge. Defining potency at infinity, a step that is needed to dispute certain arguments for the existence of God, is equivalent to affirming the existence, but not necessarily the uniqueness, of parallel lines. The existence of parallels depends on the exact definition of the term “transcendental.”

As with position and size, a definition need not imply quantity; that is, there may be no other characteristic whose relation to the given one is stated. Where there is such a characteristic, it must be contained in each definition or alternative of a theory so that the theory is self-supporting. Relations are usually only between the characteristics of a theory, though sometimes a characteristic common to many theories such as origin, unit, or stime is used for measurement.

Section 4

Linguistics and Rhetoric in Theoretical Writing

If a theory is to be used by more people than the author, its definitions must be expressed in words common to all literate people. The vocabulary of a society is nothing more than the definitions of phenomena observed and predicted by its theories, and grammar is the means to make clear the logical connections between the definitions. It is important in all theoretical writing to import no unexplained meaning to words that they do not ordinarily contain and to use grammar that is consistent with the precepts of formal logic. What distinguishes formal logic from the vocabulary and grammar of rhetoric is the complexity of individual terms (both definitions and logical relations) relative to the complexity of statements containing those terms.

Discourse in a language is made easier by using terms that contain much meaning, for it allows shorter statements to convey a particular thought. Discourse about a language is made easier by using very simple terms, though they produce statements that are too lengthy and complex to be used for communication. This duality of purpose is solved by the simultaneous use of two languages. Formal logic fulfills the purpose of facilitating analysis but fails as a device for casual communication. Rhetoric has the perspicuity to fill this need while proving ambiguous regarding analysis. Each is translated into the other whenever the purpose at hand requires it, so neither can be considered the foundation to which the other is reducible or from which it derives its true meaning.

The problem of translating between rhetoric and logic is the subject of linguistics, which must find ways for people to express their *a priori* definitions and theories in words whose meaning can only be communicated through ostension. One does not think in words. One's *a priori* definitions are just visions and images in one's mind's eye that do not necessarily have any words or phrases associated with them. Understanding is not a function of one's ability to explain what one knows.

Explanation is just something people do who are inclined to teach. Whoever is accomplished in an art or science probably consults a lexicographer when naming his definitions so that he may be assured that as many people as possible sympathize with his understanding. If he has no concern for communication, he may dispense with the whole of rhetoric, his theory remaining true or false, as it were, though people must judge it by its effects and not by its explanation. Simply consulting a lexicographer, however, does not assure that people will understand one's definitions, for a lexicographer can only point out what phenomena conform to those definitions and only rarely do phenomena conform with such accuracy as to conjure up the image of each intension of a definition and with such austerity that no other intensions are suggested.

Clear writing should not be construed to mean simple writing. Some readers have no talent for abstract thinking and blame all their difficulties on the writing style of scientists, comparing it to that of bureaucrats, which is admittedly opaque. It goes without saying that to write down to such people can produce nothing but mediocrity, both in thought and in exposition.

Many people are not very adept at inventing theories to which their environment conforms, and which make useful predictions about that environment and the effect of actions taken in it. They are, however, skilled in manipulating words and have endeavored to elevate linguistics above understanding. "Whatever cannot be explained in our language is not true" proclaims dialecticians, and then they quiz an accomplished individual for an explanation of his science. This is a trap, for it is a game that cannot be won while one can easily become ensnared in one's own words, at which point the dialectician will say, "I was only asking questions – if this sophist could not answer them, he must be an imposter." Conversation, especially with intellectuals, tends to make small of its subject and is something to be avoided.

The Definition of the Term "Abstract"

Conceptus abstractus, the most common use of the word, denotes, as a verb, the act of removing from a series of perceptions that which is similar or, as a noun, the characteristic thus removed. This abstract intension is considered the essence of the phenomena; a part of the whole is substituted for the whole, the whole being concrete. Even though no pure phenomena may ever be found, and in fact may be known not to exist, the intension (characteristic or relation) remains empirical as it is derived *a posteriori*. One may believe oneself to possess knowledge of what is essential, though not necessarily knowledge of what actually is, that remaining to be described as accurately as possible from direct observation.

If similarity is thought of as residing in phenomena so that one may know the essence of phenomena by describing what is similar in them and disregarding all that is dissimilar, one must assume that the Principle of Similarity entails the distinguishing mark of what is meaningful. This assumption is based on a confusion between the techniques of rhetoric and epistemology. Because so much of what people know is learned from the rhetoric of others who have already proven their choice of definitions to be meaningful and their theories to be sound, students associate rhetoric with original thinking as well. In teaching an established theory, one who is accomplished in it gives many examples and analogies so that students can learn the meaning of his definitions through induction, by noting what is similar or indiscernible, and then forming their own definitions by identification of the indiscernibles. This method of learning, however, when applied to nature, proves false, for there is no guarantee that, because some phenomena are similar in one respect and also conform to a certain definition, other similar phenomena also conform to that definition. Even with an accomplished individual demonstrating a well-established theory with examples of what phenomena conform to its definitions and analogies of how they are related, it is a difficult task for a student to make the theory his own. How much more difficult, even impossible, the task when there is no such instructor, for nature is no *deus ex machina* that sends us prepackaged observations that we need only take note of and watch converge into a coherent theory. Such an explanation attempts to explain knowledge, which is only problematical, with God, Who is conjectural.

One cannot idly observe and wait for indiscernibles to identify themselves as meaningful definitions; one must force nature to reveal itself by performing experiments that leave it no option but either to conform or not conform to a particular theory that one has established beforehand. The identification of indiscernibles can never produce original theory for, as each intension is dropped from a description, presumably making it describe a more essential nature of phenomena by broadening its application, more things are disregarded for being dissimilar. Thus, the most general description, which should describe the most essential nature of phenomena, in fact disregards all intensions of those phenomena. Such a general description is meaningless, for to have meaning one must be able to deduce specific cases from the general rule. One cannot do that here, however, for to arrive at such a general description all specifics have been successively forgotten. Reliance on the Principle of Similarity to reveal the common and crucial elements of phenomena can produce no other result, for it is entirely dependent on a certain forgetfulness that allows one to disregard some intensions of phenomena but not others. If phenomena are remembered, not in mere outlines but in their entirety, they cannot

be considered exactly similar without *a priori* knowledge of what can be considered nonessential and thus forgotten. To reason by analogy is to note that several phenomena conform to a certain definition and to forget their other characteristics. Then, when those other characteristics become important, to assume that they are also similar because the phenomena are similar in their remembered characteristic. People who equate understanding with their ability to analogize every event with one from their past tend to be less than wise. And, if understanding cannot grow out of similarity, the verisimilitude of storybooks is an even more barren ground.

What is really meant by the Principle of Similarity is not that intensions are found *a posteriori* in phenomena by noting what is similar, but rather that a theory is tacitly assumed to be meaningful (as one can usually do with established theories) and then phenomena are observed to see if any of them conform to the theory. All that do conform are deemed similar, giving the theory second-sense truth in those cases. Such similarity only has meaning because the *a priori* definitions do, and their meaningfulness is derived, not from the Principle of Similarity, but because they were invented to be meaningful. The advantage of age and experience is that past events may have prompted the invention of correct theories that can be used again and again throughout life. Newcomers may not yet have had occasion to invent the needed theories for their program and must stop and think their way through problems before proceeding, where more experienced people have memorized the solution. But simply analogizing current events with past ones is meaningless; nothing prevents young fools from growing into old fools.

Conceptus abstrahens, the use of the term “abstract” employed in this book, is not something induced out of phenomena but is rather something pure, in the abstract, untainted with empirical observation. A theory is abstract for, while it may apply to many different situations, it does not derive its possibility from any of their existences. It is not disturbed by any other characteristics to which the several situations might conform and by which they distinguish themselves from one another, provided those characteristics are not defined as mutually exclusive with that theory’s definitions. Phenomena are similar only by virtue of their general conformance to what is already known in the abstract. This abstract knowledge cannot emerge from a cauldron of empirical observations but must be invented *a priori*. If the theories that one uses derive their truth from nothing but previous experience, how could one speak with certainty concerning experience without falling into a *regressus in infinitum* in which each statement is derived from previous statements of a similar kind? If a theory is to be used in practice to support the truth of statements in the second sense concerning phenomena whose relations are concealed from the senses and cannot be directly verified in the first sense, it must have certainty in all situations where phenomena conform to the characteristics (or vice versa, where one tests the relations to predict the characteristics). This certainty, that where one (characteristics or relations) proves true the other is known, must be entirely abstract and untainted with empirical observation. If it were derived from a finite set of empirical data, namely what has already been observed, how could it have certainty concerning concealed phenomena, which is where it is needed the most, as such phenomena cannot be directly verified in the first sense? Only when a theory is invented *a priori* in such a way that it is confirmed by the Principle of Contradiction can it have certainty over all phenomena that conform to it in the prescribed manner. Truth in the

second sense is often confused with that in the third sense, leading some to believe that a theory's possibility is not entirely *a priori* but rather relies, at least in part, on empirical data. The operation of determining whether a theory is true in the third sense by finding at least one of its alternatives that contains no contradiction must be kept strictly separated from determining whether it is applicable to phenomena and thus true in the second sense. For people immersed in practical affairs, an academic theory that is true in the third sense yet has no observed instances of truth in the second sense and thus no applicability, is as good as false. This leads to the belief that a theory is not possible until it is tested against phenomena. While empirical observation is often used during the invention of a theory to help guide its construction into areas of immediate practical use in cases where an empirical problem arises before a theory is fully developed, this does not mean that its invention is dependent on those observations.

Observations of whether or not phenomena conform to the definitions of a theory are normally taken as they are needed during the process of determining the applicability of the theory. It may happen, however, that an observation has already occurred (for whatever reason) and need only be recalled from one's memory or hearsay; indeed, some observations can only have been taken in the past or by other people and cannot be repeated. The fact that observations occurred before their need arose can in no way be construed to suggest that a theory was induced from them or from "experience" in general. The development of theories is never a finite process; more and more subtle implications can always be discovered. As this requires effort, it is often new empirical problems which prompt such invention. This should not detract from the *a priori* nature of what is learned, however.

The confusion between the different senses of truth is partly due to the ambiguity of certain words. The term "truth" is one such word. Another is "existence." A common use of the word "existence" refers to first sense truth, that is, the observation that a phenomenon exists which conforms to a certain definition. Indeed, the definition of first-sense truth (see section 3.1) includes the word "exist." However, if a book is concerned only with phenomena that conform to a certain definition p , the author may write " q exists" to affirm the third-sense truth of p and q , that is, the ability of p and q to apply without contradiction to some situation. Whether or not this ability is realized and the theory has second-sense truth is a strictly separate question. This use of the term "existence" is particularly common in mathematical books where p defines a number system. In general, mathematical books, including this one, are about the real numbers unless they explicitly state otherwise. Thus, when I say, "Now, the existence of a saturation point for every phenomenon will be proven," I intend to prove only that real numbers and saturation points are not inconsistent. That my theory of economics has second-sense truth and the term "saturation point" means anything at all depends on if the reader accepts the theory's three axioms. For that matter, the reader may not accept the existence of real numbers. Real numbers include irrational numbers, whose very name recalls an age when people did not believe that the phenomenon called "number" conformed to such a definition. There will certainly be people who do not believe that the phenomenon called "value" conforms to the definitions of total ordering, marginal utility, and proportionate effect, which is all that my three axioms assert. Either way, it still makes sense to prove that saturation points

exist and other theorems as well. Real analysis and economics are both variations of a game called “Prove it!” and this game can be enjoyably played by everyone, whether they accept the existence of the phenomena in question or not.

A Three-Term System of Formal Logic

A new system of formal logic will now be introduced. The three terms of this system of logic are *P* for possible, *I* for impossible and *M* for maybe (similar to Zen Buddhism’s *mu*). Following are eleven logical relations concerning the definitions *p* and *q*. These statements are followed by a truth table which shows, in each of the four situations with which one could be presented when observing phenomena’s conformance to *p* and *q*, whether the statement affirms its possibility, impossibility, or says nothing about that situation. Except for the last one which is usually not reversed (its reversal is reversal), they are listed in pairs so that what an odd-numbered statement affirms and denies, the following even-numbered statement denies and affirms, respectively. This list does not exhaust all possible logical relations, only the most common ones.

Table 4.3.1 Logical Relations

Do phenomena conform to alternative <i>p</i> ?	<i>T</i> <i>T</i> <i>F</i> <i>F</i>
<u>Do phenomena conform to alternative <i>q</i>?</u>	<u><i>T</i> <i>F</i> <i>T</i> <i>F</i></u>
1. <i>p</i> is possible	<i>P</i> <i>P</i> <i>M</i> <i>M</i>
2. <i>p</i> is impossible	<i>I</i> <i>I</i> <i>M</i> <i>M</i>
3. the possibility of <i>p</i> implies the possibility of <i>q</i> all phenomena that conform to <i>p</i> conform to <i>q</i> if <i>p</i> is possible then <i>q</i> is possible <i>p</i> is possible only if <i>q</i> is possible <i>p</i> is not possible unless <i>q</i> is possible <i>p</i> is not possible except where <i>q</i> is possible <i>p</i> is a sufficient condition that <i>q</i> is possible <i>q</i> is a necessary condition that <i>p</i> is possible	<i>P</i> <i>I</i> <i>M</i> <i>M</i>
4. the possibility of <i>p</i> implies the impossibility of <i>q</i> all phenomena that conform to <i>p</i> do not conform to <i>q</i> if <i>p</i> is possible then <i>q</i> is not possible	

	p is possible only if q is not possible				
	p is possible unless q is possible				
	p is possible except where q is possible		<i>I</i>	<i>P</i>	<i>M</i> <i>M</i>
5.	p and q are compatible (possible together)				
	some p are q (some q are p)				
	it is possible that a phenomenon can conform to p and also to q		<i>P</i>	<i>M</i>	<i>M</i> <i>M</i>
6.	it is impossible that a phenomenon can conform to p and also to q				
	no phenomenon can conform to p and q together				
	p and q are mutually exclusive		<i>I</i>	<i>M</i>	<i>M</i> <i>M</i>
7.	p and q are both possible				
	either p or q is possible		<i>P</i>	<i>P</i>	<i>P</i> <i>M</i>
8.	p and q are both impossible				
	neither p nor q are possible		<i>I</i>	<i>I</i>	<i>I</i> <i>M</i>
9.	p and q are only possible together				
	p (q) is possible if and only if q (p) is possible				
	p (q) is a necessary and sufficient condition of q (p)				
	all phenomena that conform to p conform to q , and				
	all phenomena that conform to q conform to p		<i>P</i>	<i>I</i>	<i>I</i> <i>M</i>
10.	p and q are both possible, but not together				
	either p or q is possible, but not together		<i>I</i>	<i>P</i>	<i>P</i> <i>M</i>
11.	p and q are equivalent				
	p and q are synonymous		<i>P</i>	<i>I</i>	<i>I</i> <i>P</i>

By marking a *P* or an *I* only where one positively states that an alternative is possible or impossible, one never has to make assumptions about what is meant. Where mainstream logicians have to guess at the meaning of “if p is possible then q is possible” in cases where it is known that p is impossible (they guess *P*), this system leaves those alternatives at *M*. This is as it should be since no statement has been made concerning their possibility. Furthermore, “unless,” which mainstream logicians translate as synonymous with “or,” is translated more naturally by the new system. Other ambiguities are also cleared up, but more importantly, the great crack

in the foundation of mainstream logic where first-sense and third-sense truth are confused has been resolved. Whenever mainstream logic speaks of affirmation, they refer to phenomena having been observed that conform to a definition (truth in the first sense) and whenever they speak of negation they refer to the impossibility of phenomena conforming to a definition (falsity in the third sense). The three senses of truth must be strictly separated; there is no direct connection between what people assert and what exists in reality. People often lie and, when they do, they try to be consistent. Figure 4.3 (the four on the left) (Quine, 1982, p. 98) illustrates the problem. Here, whiteness signifies lack of information, shading signifies impossibility (falsity in the third sense), and a cross signifies observation of conformant phenomena (truth in the first sense).

Now let us consider the case (Figure 1, on the right) where p is entirely impossible. Comparing this diagram to Figure 1 (the four on the left), it is apparent that the statement “some p are q ” is false while the statement “all p are q ” is true. This is an absurdity; if one were to take the witness stand in a court of law and state that all p are q while knowing full well that there are no p, q or otherwise, one would be committing perjury. Most people would take one’s statement to imply that p is possible.

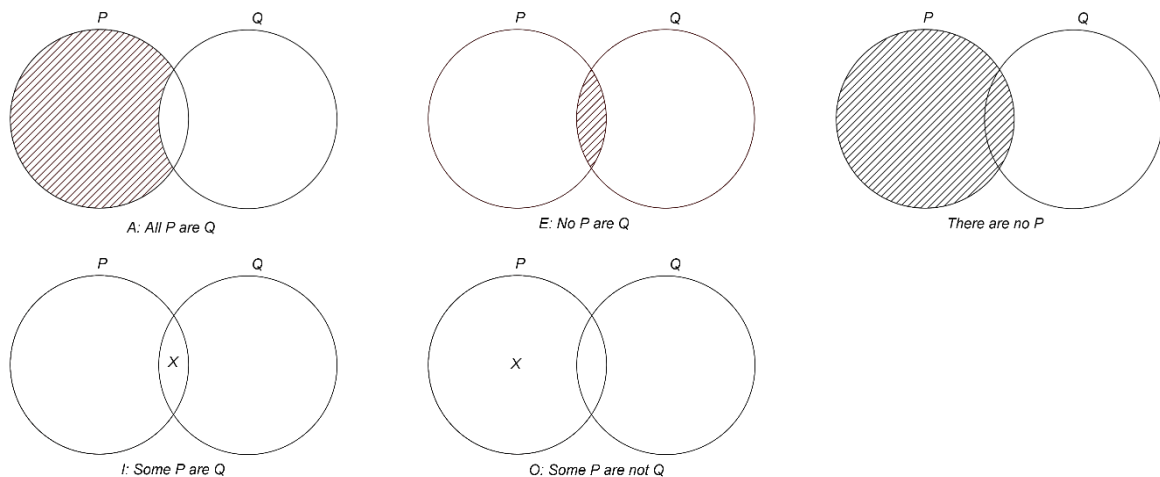


Figure 1. Logical Relations

A more mathematical example is the statement, “If x is a real number such that $x^2 + 1 = 0$, then $x = 0$.” Most people take this to mean that zero is the only real number such that $x^2 + 1 = 0$. This is not true because zero squared plus one is one, not zero. In fact, there is no real number such that $x^2 + 1 = 0$. However, in mainstream logic, any conclusion can be attached to a false premise and the implication is still considered to be true. In general, let the conclusion be $x = c$ with c any (fixed) real number.

$$x^2 + 1 = 0$$

Given

$$(x - c)(x^2 + 1) = 0$$

Multiply both sides by $(x - c)$

$$(x - c) = 0$$

Divide both sides by $(x^2 + 1)$. Because x is real, $x^2 + 1 \neq 0$

$$x = c$$

Add c to both sides.

This is absurd. We are told that x is real and we prove that x is an arbitrary real number c . In other words, $x^2 + 1 = 0$ imposes no restrictions on x whatsoever. But, in fact, this relation excludes all real numbers. Now let us consider a relation that is only slightly less restrictive, $x^2 = 0$, which excludes all real numbers except zero. The proof given above does not work because division by x^2 is not allowed. However, taking the square root of both sides proves that zero is the only real number such that $x^2 = 0$, which is true and is what most people take this statement to mean. Thus, in mainstream logic, as a relation shifts from virtually exclusive to completely exclusive, the result jumps from one true answer to an infinity of false ones.

The new system introduced here resolves this problem by making the statement “all p are q ” synonymous with “if p then q ” (see #3 above), a route that mainstream logic could not take, as it separates truth-functional statements (of which “if p then q ” is one) from quantificational statements (of which “all p are q ” is one). To illustrate the ease of using a system where truth-functional and quantificational statements are resolved with the same method, I will use the crowning example of Quine’s own treatise (1982, p. 196):

- Premises
1. The guard searched all who entered the building except those who were accompanied by members of the firm.
 2. Some of Fiorecchio’s men entered the building unaccompanied by anyone else [unaccompanied by non-Fiorecchio men].
 3. The guard searched none of Fiorecchio’s men.

The following definitions will be used, all of which tacitly contain the characteristic of concerning only people who enter the building:

- f people who work for Fiorecchio,
- m members of the firm,
- s members of parties that were searched,
- u members of parties of only f (Fiorecchio men).

With four definitions, there are $2^4 = 16$ possible alternatives, each of which is represented by a column in the following truth table. T stands for truth in the first sense and F stands for falsity in the first sense. This means whether the phenomenon is realized in the real world or not.

While in this example each row questions phenomena’s conformance to only one definition, it is sometimes useful to conjoin definitions on a row so that a T signifies that phenomena conform to all the definitions and an F signifies that phenomena fail to conform to some of them. Which definition phenomena fail to conform to is

not implied by the negation of that conjunction, however. It is incorrect to assume that denying a conjunction is to say that the verb fails, thus indirectly implying that the noun does not.

Table 2. Truth Table for Fiorecchio Problem

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Is <i>f</i> realized?	<i>T</i>	<i>T</i>	<i>T</i>	<i>T</i>	<i>T</i>	<i>T</i>	<i>T</i>	<i>T</i>	<i>F</i>	<i>F</i>	<i>F</i>	<i>F</i>	<i>F</i>	<i>F</i>	<i>F</i>	<i>F</i>
Is <i>m</i> realized?	<i>T</i>	<i>T</i>	<i>T</i>	<i>T</i>	<i>F</i>	<i>F</i>	<i>F</i>	<i>F</i>	<i>T</i>	<i>T</i>	<i>T</i>	<i>T</i>	<i>F</i>	<i>F</i>	<i>F</i>	<i>F</i>
Is <i>s</i> realized?	<i>T</i>	<i>T</i>	<i>F</i>	<i>F</i>	<i>T</i>	<i>T</i>	<i>F</i>	<i>F</i>	<i>T</i>	<i>T</i>	<i>F</i>	<i>F</i>	<i>T</i>	<i>T</i>	<i>F</i>	<i>F</i>
Is <i>u</i> realized?	<i>T</i>	<i>F</i>	<i>T</i>	<i>F</i>	<i>T</i>	<i>F</i>	<i>T</i>	<i>F</i>	<i>T</i>	<i>F</i>	<i>T</i>	<i>F</i>	<i>T</i>	<i>F</i>	<i>T</i>	<i>F</i>

First, note that, while definitions *f*, *m* and *s* contain only characteristics, definition *u* contains a relation with *f*, so immediately we can fill in an *I* at alternatives 9, 11, 13, and 15 for we know that, if one does not work for Fiorecchio, one cannot be in a party of only Fiorecchio men. The remaining alternatives are still *M*, for nothing has yet been said about them. The first premise conforms to the #4 statement in the list of logical relations given above with *s* in place of *p* and *m* in place of *q*. Therefore, we fill in an *I* at alternatives 1, 2, 9, and 10, a *P* at alternatives 5, 6, 13, and 14, and an *M* everywhere else, as the first premise does not mention whether any of the other alternatives are possible or impossible. The second premise conforms to the #5 logical relation, so we fill in a *P* at alternatives 1, 3, 5, and 7, the rest being *M*. The third premise conforms to statement #6 and hence we fill in an *I* at alternatives 1, 2, 5, and 6, with the remainder unmentioned and thus left at *M*. The first four rows of the following chart displays *P*, *I*, and *M* for the relation and each premise.

Table 3 Fiorecchio Problem Solutions

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Relations	<i>M</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>I</i>	<i>M</i>	<i>I</i>	<i>M</i>	<i>I</i>	<i>M</i>	<i>I</i>	<i>M</i>
1 st Premise	<i>I</i>	<i>I</i>	<i>M</i>	<i>M</i>	<i>P</i>	<i>P</i>	<i>M</i>	<i>M</i>	<i>I</i>	<i>I</i>	<i>M</i>	<i>M</i>	<i>P</i>	<i>P</i>	<i>M</i>	<i>M</i>
2 nd Premise	<i>P</i>	<i>M</i>	<i>P</i>	<i>M</i>	<i>P</i>	<i>M</i>	<i>P</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>M</i>
3 rd Premise	<i>I</i>	<i>I</i>	<i>M</i>	<i>M</i>	<i>I</i>	<i>I</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>M</i>
Result	<i>I</i>	<i>I</i>	<i>P</i>	<i>M</i>	<i>I</i>	<i>I</i>	<i>P</i>	<i>M</i>	<i>I</i>	<i>I</i>	<i>I</i>	<i>M</i>	<i>I</i>	<i>P</i>	<i>I</i>	<i>M</i>

To get the result, recall that *M* signifies a lack of knowledge, so any statement about the possibility or impossibility of an alternative is stronger than a “maybe.” Furthermore, hearing from one source that an alternative is possible cannot redeem it if one knows it to be impossible for another reason, so *I* is stronger than *P* if they both appear in the same column. Now, filling in an *I* wherever we see one, a *P* wherever we see one that is not dominated by an *I*, and an *M* only where no statement is made either way, we get the result. The entire process is algorithmic; at no point did we have to guess or use our intuition. A computer can do it!

From the result, one can test the truth of any conclusion one is interested in. In this case, we want to know if the statement “Some of Fiorecchio’s men are members of the firm” is implied by the premises. As it conforms to the #5 logical relation given in the list above, we must find a P among alternatives 1, 2, 3, or 4 to prove it. As the third alternative is possible, the conclusion is proven. If we were interested in knowing whether the statement “All of Fiorecchio’s men entered the building unaccompanied by non-Fiorecchio men” is implied by the premises, we would need a P among alternatives 1, 3, 5, and 7 and all of the alternatives 2, 4, 6, and 8 to be impossible, as this statement conforms to the #3 logical relation. We find that alternatives 3 and 7 are possible, fulfilling the first part of the requirement, but alternatives 4 and 8 are still unknown, so the conclusion is not proven; it is a maybe. This is a more insightful “maybe” than we had before analysis, however, as we now know where our investigation must lead. If further information can be found that shows alternatives 4 and 8 to be impossible without also showing alternatives 3 and 7 to be impossible, this conclusion may yet be proven. It is contingent on an experiment forcing the concealed phenomena to show themselves as conformant to these characteristics. If alternatives 1, 3, 5, and 7 were all impossible from the information given, no further information could help us, as nothing redeems an impossibility.

For contrast to this method of logic, I will now give the method of mainstream logic (Quine, 1982, p. 199).

Quine has five definitions:

- Fx x is a person that entered the building,
- Gx x was searched by the guard,
- Hxy x was accompanied by y ,
- Jx x is a member of the firm,
- Kx x is one of Fiorecchio’s men.

Briefly, the premises are the three given and the negation of the conclusion being tested. $\forall x$ is read “for all x ,” $\exists x$ is read “there exists x such that,” and \rightarrow is read “implies.” \neg is negation. Thus, the first premise is read, “For all x there exists y such that Fx but not Gx implies Hxy and Jy .” The negation of the conclusion, “There exists x such that both Kx and Jx ,” is “For all x , it is not true that both Kx and Jx .” The dots help clarify grouping. Quine (1982, pp. 29-30) writes, “They may be thought of as a systematic counterpart of the practice in ordinary language of inserting ‘else,’ ‘also,’ etc.... Any group of dots alongside any of these connectives [\rightarrow , \leftrightarrow , etc.] represents a greater break than is represented by the same number of dots standing alone as a sign of conjunction, but a lesser break than is represented by any larger group of dots.” The several instances combine these premises until one arrives at a contradiction and thus proves the conclusion in question or, more precisely, disproves its negation. Try it before turning the page! But be aware that this is Quine’s masterpiece – it brings together everything learned in the first 199 pages of *Methods of Logic* – and I cannot explain all of that here.

Notice that the method of mainstream logic only proves one conclusion at a time while, with the result of my method, one can test the truth of any conclusion one is interested in. In mainstream logic, if one is interested in drawing further conclusions from the premises given, one must repeat the entire process. Furthermore, in

mainstream logic, if one fails to prove one's particular conclusion, one neither knows where one's investigation must lead, nor can one be certain that it is impossible, for one may only have been blind to the proof. The method of mainstream logic is not algorithmic, and one is blind to this type of proof quite often as it is more than a little opaque. My method has more general application (it can answer multiple questions about the same premises) and it is algorithmic. If you already have the chart formatted for three or four definitions, it is an easy algorithmic process to fill it out and then create another row for the result. But filling it out by hand is for school exercises; for real-life problems, especially ones with more than four definitions, you would use a spreadsheet. Spreadsheets existed at the time of writing, so I have no excuse for not mentioning them in my book.

Quine's method of logic:	Premises:	$\forall x \exists y (Fx \cdot \neg Gx \rightarrow Hxy \cdot Jy)$ $\exists x \forall y (Kx \cdot Fx \cdot Hxy \rightarrow Ky)$ $\forall x (Kx \rightarrow \neg Gx)$ $\forall x \neg (Kx \cdot Jx)$
	Instances:	$\forall y (Kz \cdot Fz \cdot Hzy \rightarrow Ky)$ $\exists y (Fz \cdot \neg Gz \rightarrow Hzy \cdot Jy)$ $Fz \cdot \neg Gz \rightarrow Hzw \cdot Jw$ $Kz \cdot Fz \cdot Hzw \rightarrow Kw$ $Kz \rightarrow \neg Gz$ $\neg (Kw \cdot Jw)$

Section 5

Methods of Analytic Deduction and Proof

Analytic deductions are all that are contained in the definitions of a theory, though they are stated to emphasize one intension or another. Analysis is the method used to form a new theory that is implied by an existing theory, but perhaps with greater extension. A syllogism is analytic because it only restates the intensions in another way than they were originally stated. There are usually several ways that an instructor can originally state his intensions, and these are called discursive postulates. For the benefit of his students, the implications of the theory are then deduced from the discursive postulates. These several deductive systems are called interpretive as they can be translated into one another. In reality, there is only one system, and it is not originally stated in any way, for it is timeless. Discursive postulation is a rhetorical technique and interpretive theories are identical. Any declarative sentence may be taken by linguists as synthetic or analytic as it is related to discursive postulates from which it can be deduced.

2023 note. I am here introducing the overbar as a symbol of negation. This is typesetting that was not available to me when I published *Axiomatic Theory of Economics*.

The statement “ p implies q ” is synonymous with the statement “if p then q ,” the only difference being in rhetorical usage. When speaking of theories implying other theories, the one in the p position is called the premise, and the one implied by it in the q position is called the conclusion. Wherever the premise is possible, the conclusion is also, though it can be possible in other situations too. Because the only time that p does not imply q is when p is possible and q is not, the conjunction of p with the negation of q shows in each of its alternatives the several instances where q is impossible while p is possible, which thus prevents p from implying q . If $p\bar{q}$ is inconsistent (each of its alternatives contains a contradiction such as $r\bar{r}$), there is no situation where q is impossible while p is possible and so the implication of q by p is proven by the contradiction method. This is useful whenever q is a more nebulous concept than its negation; infinity, large or small is like this. Another method of proving that p implies q is the contrapositive method. Because, whenever q is impossible, p is also impossible ($p\bar{q}$ falsifies the statement “ p implies q ”) but p may be impossible at other times too, the denial of q implies the denial of p ; that is, the statements “ p implies q ” and “ \bar{q} implies \bar{p} ” are synonymous. If it is more convenient to deal with “ \bar{q} implies \bar{p} ” rather than “ p implies q ,” its proof also proves the implication of q by p . One lists all the instances where the conclusion is impossible and then sees if the premise is also impossible in those situations.

“ p implies q ” is not impossible whenever p is not observed or q is observed, so to prove that $\bar{p}vq$ (v means “vel” or “inclusive or”) is tautological (it is possible in all 2^n situations) proves that p implies q . This proof may take two forms: A check of whether $\bar{p}vq$ is possible in each of the 2^n situations to which it could be applied, or an analysis of $\bar{p}vq$ showing that it contains the disjunction of the affirmation and the denial of a definition (such as $r\bar{v}\bar{r}$).

From the definition of implication, the conclusion, q , is possible in each instance where the premise, p , is possible, so another method of proving implication is to list all the instances where the premise is possible and then see if the conclusion is also possible in those situations. If it is, the implication is proven. When the premise is possible in one and only one instance and it can be shown that the conclusion is also possible in that instance, the proof is called a fell swoop. This term also applies to the contrapositive method when the conclusion is impossible in one and only one instance and it can be shown that the premise is also impossible in that instance. This is rhetorically opposed to the full sweep, that is, testing whether the disjunction of the denial of the premise with the conclusion is tautological. This makes four proofs of implication. For p implies q , they are:

1. $p\bar{q}$ is inconsistent,
2. p is impossible whenever q is impossible,
3. $\bar{p}vq$ is tautological, and
4. q is possible whenever p is possible.

A fifth proof is deduction. Deduction is the most straightforward but often the most involved method of proving implication. When a theory is in the form of alternational normal schemata, an implication is formed by either removing (deducting) superfluous definitions from an alternative to give it more extension (the fewer definitions that phenomena must conform to in an alternative, the more phenomena conform) or by adding new alternatives. If an alternative contains n definitions, there is a finite number $(2^n - 1)$ of theories that can be implied by the deduction of definitions from that alternative. n , however, may be increased to enumerate not just the definitions but all the intensions in an alternative. Each definition contains a finite number of intensions which are conjoined so that the truth of a definition depends on the truth of each of its characteristics or each of its relations and the truth of an alternative depends on the truth of each of its definitions. Thus, the truth of an alternative depends on the truth of each of its characteristics or each of its relations. How they are grouped in definitions is immaterial; pq might imply r if r is composed of some of the intensions of pq .

The Possibility of Synthetic A Priori Knowledge

While there are a finite number of theories implied by a given one, there are an infinite number of theories that could have implied a given theory. These theories are found by adding definitions (which are always available) to an alternative of the given theory. If, out of this infinity of theories, the analysis of one of them yields an alternative that contains only the characteristics of the given theory (which is implied by the one under analysis) and yet imply a relation that is not contained in that given theory, this relation is synthetic *a priori* knowledge. As the infinity of theories is defined by anti-implication of the given theory, any one of them can yield an alternative through deduction (implication) that contains only the characteristics of the given theory merely by stating that the given theory is implied by the one under analysis. This alternative, however, is only the given theory itself, which naturally contains no other relations than was in it to begin with, and so it is not synthetic *a priori* knowledge. To synthesize a new theory from a given one so that the new theory contains only the characteristics of the given one (and thus has the same extension) but in a new and synthetic relation, one of the infinity of theories that imply the given theory must have additional definitions that are productive. They must be so constituted that, in the analysis of that theory, these additional definitions are conjoined with the given ones in such a way that the characteristics re-form into only those of the given definitions (the superfluous ones being dropped by deduction) but in a different relation than they were in when arranged in the definitions of the given theory. Conversely, if the analysis of an anti-implication yields an alternative that contains only the relations of a given theory and yet imply a characteristic that is not contained in that given theory, this characteristic is called synthetic *a priori* knowledge.

Unfortunately, there is no algorithmic method for finding such a theory out of the infinity of anti-implications of a given theory. What superficially seems to be the most difficult part of scientific research, thinking of hypothesis, is the easiest because there is an infinity of them. The difficult part is recognizing the one that can have its superfluous characteristics analyzed out of it and still leave synthetic *a priori* relations. This is where quality enters science. An anti-implication that can yield synthetic *a priori* knowledge is productive. It

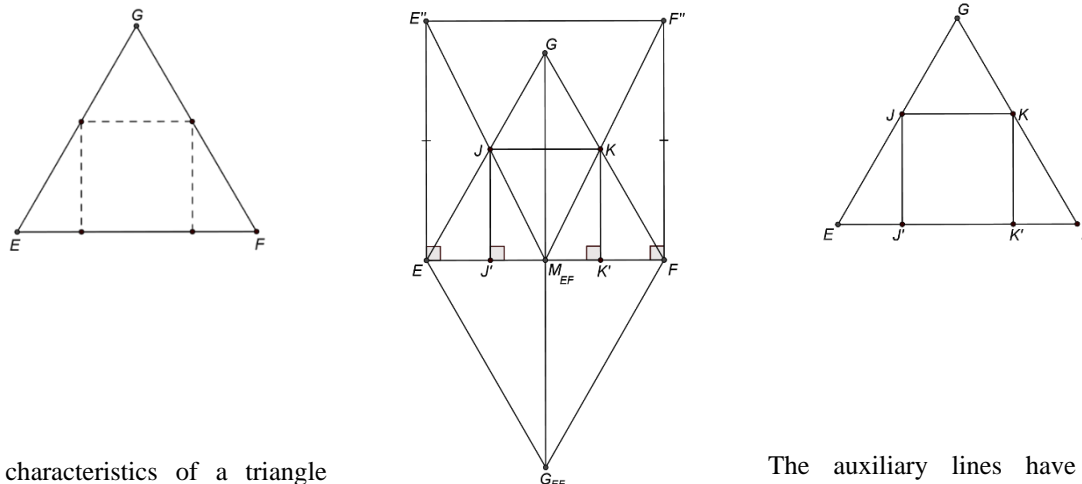
conforms to a definition at a high place on one's value scale, and that is how it is recognized. Successful recognition of an anti-implication that yields synthetic *a priori* knowledge is hampered by a subject-object dualism which makes a researcher see only the infinity of possibilities, while whoever is at one with his work goes directly to a solution. A researcher with a dualistic attitude about his work goes through the same motions of searching but does not see what he looks at.

The use of additional definitions which are then deducted after a solution has been found is often forgotten, leading people to believe that synthetic *a priori* knowledge is impossible and that all understanding is analytic. That synthesis is a passing event which leaves no mark on its creation and that all declarative sentences are analyzable from discursive postulates has led many linguists to take this stand. As linguists deal with theories whose creation has been forgotten and which have turned into statements that could have as easily been handed down from a mountain as synthesized, it is not surprising that they should regard these as cases of analytic knowledge. They need only ask, "What do the words mean in this configuration?" and they know the meaning of the theory. They forget that at one time the theory was unknown but a simpler one was known without certain relations. Then people noticed that, whenever they used the theory, the phenomena that conformed to it had those relations, but they were hesitant to risk anything on the assumption that future phenomena would have those relations also, for they could not be sure that it was not a coincidence. Then someone found an anti-implication of the theory which, when analyzed, yielded those relations as synthetic *a priori* knowledge, so people no longer had to wonder if the next phenomenon that conformed to their theory would have those relations but could relax and say, "Whatever phenomena conform to these characteristics has these relations." Or it might have happened another way and it was some of the characteristics which people were unsure of, and someone found an anti-implication of the known relations that, when analyzed, yielded those characteristics as synthetic *a priori* knowledge. But that has all been forgotten and now linguists only see a theory with certain characteristics and certain relations, so they analyze it and then proclaim that synthetic *a priori* knowledge is impossible. An illustration of synthetic *a priori* knowledge will now be given.

If definition p is of a given equilateral triangle \overline{EFG} and definition q is of a square, what additional definition(s) r must be added to pq so that the analysis of pqr leaves only the characteristics of p and q (there are no superfluous lines) but with the square given definite size and position so that it is inscribed in triangle \overline{EFG} , as shown in figure 5.2 on the left? (The dashed lines indicate its rough position, but we do not yet know how to draw it in.)

Neither the definition of p (three equal sides of definite length) nor the definition of q (a square with four equal sides of indeterminate length) contains any information about where the vertices of the square touch \overline{EG} and \overline{FG} . Additional characteristics are needed (auxiliary lines must be drawn) to locate these points and find the length of the square's sides. But these additional characteristics must be deducted again for the new theory to keep the same extension. It is easy to delude oneself in this sort of exercise by assuming that the additional definitions needed are contained in the "full" meaning of the given definitions, even though they are not strictly expressed

in them. It is the mark of an immature science to rely on such assumed meaning; only when a science defines its terms in the strictest way possible can it truly be called a science.



The characteristics of a triangle and of a square are known, but their relation to each other is not yet known.

The auxiliary lines have been erased, but the relation of the triangle and the square remains. Synthetic *a priori* knowledge!

Figure 2. Illustration of Synthetic *A Priori* Knowledge

The first additional definition needed is of another equilateral triangle $\overline{EFG_{EF}}$ on the opposite side of \overline{EF} as G . Next, connect G and G_{EF} so that $\overline{GG_{EF}}$ bisects \overline{EF} at M_{EF} . Then, construct a square $\overline{EFF''E''}$ on the same side of \overline{EF} as G . (Additional triangles must be constructed to locate E'' and F'' , but they are not shown.) Finally, draw lines from M_{EF} to E'' and F'' . These lines cut \overline{EG} and \overline{FG} at J and K , respectively. Drop perpendiculars from J and K to \overline{EF} with feet J' and K' , respectively. (Additional triangles must be constructed to locate J' and K' , but they are not shown.) By homothety, $\overline{J'K'KJ}$ is square because $\overline{EFF''E''}$ is square. Aguilar (2023, pp. 243-245) has more on homothety, if you need it; also, you may want to read page 14 of *Geometry–Do* regarding notation. Overbars denote segments, triangles, and quadrilaterals. (Overbars mean negation in logic, but geometry has its own notation.) Double subscripts denote reflection except for M , where they mean midpoint. Single apostrophes denote perpendicular feet.

pqr , is an anti-implication of pq , as it can imply pq by deducting the auxiliary lines, r , which were just added. (The auxiliary lines are the big square, the construction locating M_{EF} , the segments $\overline{M_{EF}E''}$ and $\overline{M_{EF}F''}$, and the triangles needed to raise and drop perpendiculars, which are not shown.) These auxiliary lines are not needed for phenomena to conform to the square inscribed in a given equilateral triangle. After their deduction, however, the relation of J and K to \overline{EG} and \overline{FG} , which was not known before, is still there. This relation is synthetic *a priori* knowledge.

The 2023 preface mentions Descartes and I will here point out that the angle sum theorem is an example of synthetic *a priori* knowledge. It has long been known that the exterior angle of a triangle is greater than either remote interior angle. It looks like it is equal to their sum, but people could not be sure when taking measurements off of clay tablets. Then, some smart guy drew a line parallel to the base through the apex, proved the angle sum theorem, and erased his line. Descartes would later say this theorem is in the “essence” of a triangle; *i.e.* analyzed from its definition. No. Triangles have the same definition in hyperbolic geometry, but the angle sum theorem is not true for Lobachevskians, so that auxiliary line could not have been tucked away in the “full” definition of a triangle. Descartes was wrong; he did not understand that the angle sum theorem is synthetic *a priori* knowledge.

A more algebraic example is the integration of $\frac{1}{\ln x}$. The first three steps establish the needed anti-implication.

$$\int \frac{dx}{\ln x} = \int \frac{1}{x \ln x} + \frac{x}{x \ln x} - \frac{1}{x \ln x} dx$$

Multiply by $\frac{x}{x}$, add and subtract $\frac{1}{x \ln x}$.

$$= \int \frac{1}{x \ln x} + \frac{e^{\ln x} - 1}{x \ln x} dx$$

Substitute $e^{\ln x}$ for x in the numerator.

$$= \int \frac{1}{x \ln x} + \frac{1}{x \ln x} \sum_{n=1}^{\infty} \frac{\ln^n(x)}{n!} dx$$

Substitute for the numerator its Taylor series expansion.

$$= \int \frac{dx}{x \ln x} + \int \sum_{n=1}^{\infty} \frac{\ln^{n-1}(x)}{x n!} dx$$

Separate and bring $\frac{1}{x \ln x}$ into the summation.

$$= \int \frac{du}{u} + \int \sum_{n=1}^{\infty} \frac{u^{n-1}}{n!} du$$

Substitute $u = \ln x$ and $du = \frac{dx}{x}$.

$$= \ln(\ln x) + \sum_{n=1}^{\infty} \frac{\ln^n(x)}{n n!} + c$$

Anti-differentiate and put $\ln x$ back.

Mathematicians will confirm that much of what they do involves finding a “trick,” usually an identity, which transforms a given equation into one which superficially seems more complicated but which in fact easily implies what they are trying to prove. Almost invariably, once this trick is discovered, the rest of the proof is just a matter of algebraic manipulation.

The ICONSES conference includes many educators, so I will here add a paragraph about high-school trigonometry. High-school students whose last math class was trigonometry may be left wondering why they learned all those identities. If it is just a matter of aesthetics, $\sin \alpha \cos \beta$ is compact and easy to read while $\frac{\sin(\alpha+\beta) + \sin(\alpha-\beta)}{2}$ is complicated, so why convert? Because the latter can be integrated while the former cannot.

It is a rabbit that integral calculus students will pull out of their hats three years hence. But American high-school math teachers have degrees in education, not math, so they have never studied calculus and do not know

this. They teach it alongside $\sin \alpha + \sin \beta = 2 \sin \frac{\alpha + \beta}{2} \cos \frac{\alpha - \beta}{2}$ and then they just shrug when students ask, “Why are we learning this?” The former will become useful when the students study calculus; the latter will never be used.

General Theories and Universality

All phenomena conform to definitions on the transcendental aesthetic, so their conformance is a definition to which they all conform. There may be other definitions, however, to which all phenomena conform. A definition to which all phenomena conform has the characteristic of universality. This characteristic is only implied by the definition of conformance to definitions on the transcendental aesthetic; with any other definition, its having that characteristic is a conjecture. But some theories have such universal application that it is easy to imagine that all phenomena conform to them. Such theories are called general theories, and their existence is credited to divine teleology.

The conjecture of there being purpose in noumena (a Creator) arises from the existence of general theories not implied by the definition of the transcendental aesthetic. The conservation laws of physics are not sufficient, for they can be implied by the symmetry of the transcendental aesthetic. For instance, if an object isolated from external forces begins to rotate, it must do so about an axis, but the choice of that axis selects a direction in space, which would otherwise be symmetrical. Hence, the Law of Conservation of Angular Momentum is implied by the spatial dimensions having no natural orientation. Similarly for the Law of Conservation of Linear Momentum, because, without violating the Law of Conservation of Energy, the object discussed above could only acquire its spin by exchanging linear momentum for angular momentum. But the Law of Conservation of Energy is implied by the symmetry of the temporal dimension. Suppose that gravity is systematically weaker on certain days. Then one could pump water uphill on those days and let it generate more energy by flowing down on the other days, in violation of the Law of Conservation of Energy and of the symmetry of time.

But there may be other, equally general laws for which no anti-implication can be found such that, when added to the definition of the transcendental aesthetic, imply that law, but which can still be deducted so as not to import any new meaning to the five transcendental dimensions. Possible candidates for this anti-implication are infinite, however, so it is impossible to prove the existence of the Creator based on one’s failure to synthesize an apparently general theory from the definition of the transcendental aesthetic. Yet, ultimately, anyone who believes in a Creator can trace his belief back to a general theory which seems to require “something more” than the transcendental aesthetic for its universality. Arguments such as those presented in the first chapter of this book may strip that person’s beliefs of their institutional trappings and their anthropomorphic caricatures. He may even quit praying for guidance and donating money to evangelists, but his basic belief cannot be shaken.

Because the Creator is thought of only in conjunction with divine teleology, It cannot be regarded as synonymous with noumena but only as a part of noumena, for It could only have created those laws that were discovered as general theories out of something. This noumenal something is the opponent which the Creator had to overcome to display Its omniscience in such a way that people might think they see it in general theories. As far as the Creator is thought of in connection with divine teleology (and there is no other way to think of It), It is conceived of only as bringing order to noumena and not as the material of noumena, this function belonging to that something. If this is true, general theories that have held without exception might yet break down in observation of the extremely small – the very matrix of all creation. For, while the Creator has erected its edifice out of matter and energy, the nature of this matrix is of that something. That something, however, is also a noumena and is thus as unknown to people as the Creator is. It is a confusion to think that people can break through the limit which separates phenomena from noumena merely by changing the scale of their observations. The fact that atomic particles are known at all implies that they are not noumena. The fact that they do not have position in the usual sense of always being at a definite place implies that they are not phenomena either. In a sense, nothing is, as the spreading out of position is not limited only to atomic particles, it just becomes noticeable at that level. Thus, the definition of phenomena, like most definitions, requires some tolerance to admit any application. Atomic physics requires more tolerance than other sciences and, hence, the transcendental aesthetic is less useful to atomic physicists than it is to other scientists. This just means that books about atomic physics have fewer pictures. The transcendental aesthetic is not the only tool available to scientists, though phenomena must have a position, however spread out, to be known at all. To have position is to be real and scientists in all fields concern themselves only with what is real, not imaginary.

Extension in the Three Senses of Truth

If no phenomena conform to a definition, either in all its characteristics or all its relations, phenomena are unobserved, and that definition does not have first-sense truth. If some phenomena conform, they are observed, and the definition is true in those cases. If no phenomena have ever been observed that did not conform, that definition is not only true but might have the characteristic of universality.

Table 4. Extension in the Three Senses of Truth

extension	none	some	all
first sense	unobserved	observed	universal
second sense	contingent	applicable	general
third sense	inconsistent	consistent	tautological

If no phenomena conform to all the characteristics or all the relations of a theory, that theory’s application is contingent on such conformance. Whenever phenomena conform, that theory is applicable and may predict the relations if it is to the characteristics that the phenomena conform, or the characteristics if it is to the relations

that the phenomena conform. If all phenomena that have ever been observed have conformed to all the characteristics or all the relations of a theory, its predictions might be general.

If no phenomena could possibly conform to a theory because all of its 2^n alternatives contain contradictions, that theory is inconsistent. If some of those alternatives could conceivably have phenomena conform to them (even if none has), that theory is consistent. If phenomena cannot do anything but conform to a theory (it takes phenomena any way they come to it), that theory is tautological.

2023 Appendix: How Logical Deduction Got Its Name

When I wrote *Axiomatic Theory of Economics*, I thought everybody understood how logical deduction got its name, but apparently this is not the case, so I will explain. Willard Quine (1982, p. 69) gives an example:

$$-\{p \rightarrow \bar{s}q. \rightarrow -(sq \rightarrow p): -[-(rp) - (p \rightarrow \bar{s})]\}$$

Through various machinations (1982, pp. 69–71), he converts this into alternational normal schemata:

$$\bar{p}\bar{s} \vee \bar{p}\bar{q} \vee \bar{p}p \vee \bar{s}q\bar{s} \vee \bar{s}q\bar{q} \vee \bar{s}qp \vee \bar{r}ps \vee \bar{p}ps$$

Quine writes, “We can quickly shorten this result by deleting the patently inconsistent clauses ‘ $\bar{p}p$ ’, ‘ $\bar{s}q\bar{q}$ ’, and ‘ $\bar{p}ps$ ’. We then have:

$$\bar{p}\bar{s} \vee \bar{p}\bar{q} \vee \bar{s}q\bar{s} \vee \bar{s}qp \vee \bar{r}ps$$

Such deletion is a case of the procedure explained in Chapter 6 of *Methods of Logic*: each of the patently inconsistent clauses may be thought of as supplanted by ‘ \perp ’, which afterwards drops by resolution.” (In logic, \perp means inconsistent; unlike geometry, where it means perpendicular.)

This is how logical deduction gets its name; the logician is deleting (deducting) the inconsistent clauses.

Much of the criticism of my epistemology seems motivated by people – including self-described philosophers – thinking that “deduction” is just a name. Deduction establishes third-sense truth by deleting the inconsistent clauses; if they all get deducted, then the statement is untrue in the third sense; that is, it is inconsistent. Quine (1982, pp. 74–75) presses simplification further by using the seven forms of simplification from Chapter 9 of *Methods of Logic*. This deduction results in:

$$\bar{p}\bar{s} \vee \bar{p}\bar{q} \vee \bar{s}q \vee \bar{r}ps$$

Quine continues, “The initial clause is in fact redundant; it is equivalent to:

$$\bar{p}\bar{q} \vee \bar{s}q \vee \bar{r}ps$$

“There is a quick way of testing any clause of an alternational normal schema to see if it can be thus dropped as redundant. The law (vii) of Chapter 9 tells us how: just check, by fell swoop, whether the clause implies the rest of the schema. The clause ‘ $\bar{p}\bar{s}$ ’ is found by fell swoop to imply the remainder, and this marks ‘ $\bar{p}\bar{s}$ ’ as redundant.”

Quine (1982, pp. 76-78) then presents a more difficult challenge and solves it with the consensus method that was invented by two electrical engineers, Samson and Mills (1954), because logical deduction is equivalent to simplifying electrical circuits. (Quine mentions a nine-letter schema with 1,698 prime implicants!) “Two good ways are now before us for simplifying alternational normal schemata. We can test a clause for redundancy, and we can test a literal for redundancy, in each case by fell swoop. An alternational normal schema can, however, resist both redundancy tests and still admit of simplification in more devious ways. An example is:

$$p\bar{q} \vee \bar{p}q \vee q\bar{r} \vee \bar{q}r$$

“By twelve fell swoops the reader can test each clause and each literal for redundancy and draw a blank every time. Yet it has a simpler equivalent, ‘ $p\bar{q} \vee \bar{p}r \vee q\bar{r}$.’”

It is absurd that logical positivists illustrate deduction with ridiculous examples like, “all bachelors are unmarried men.” Ayer (1952) sneers at the work of mathematicians as being trivial, giving the example $91 \times 79 = 7,189$ as something that we are capable of, unlike the common man, who is only capable of calculating $7 + 5 = 12$. Logician, does Ayer’s description of your accomplishments have you just busting out with pride? Not. Ayer should never have used the word “logic” in the title of his book. Logical positivists know nothing about logic!

References

- Aguilar, V. (1999). *Axiomatic Theory of Economics*. Hauppauge, NY: Nova Science Publishers
- Aguilar, V. (2023). *Geometry–Do*. Self-Published
www.researchgate.net/publication/291333791_Volume_One_Geometry_without_Multiplication
- Ayer, A. J. (1952). *Language, Truth, and Logic*. New York, NY: Dover Publications
- Descartes, R. (2021). *Meditations on First Philosophy*. London, England: Arcturus Holdings Limited
- Euclid. (2013). *The Elements*. Thomas Heath, trans. Santa Fe, NM: Green Lion Press
- Kant, I. (1966). *Critique of Pure Reason, 2nd Ed.* Garden City, NY: Doubleday and Company
- Quine, W. V. (1982). *Methods of Logic*. Cambridge, MA: Harvard University Press
- Samson, E. W., & Mills, B. E. (1954). Circuit Minimization: Algebra and Algorithms for New Boolean Canonical Expressions. *ARCRC Technical Report 21*

Preparing STEM Students for Peer Mentoring: Lessons Learned and Future Directions

Jillian L. Wendt

University of the District of Columbia, USA,  <https://orcid.org/0000-0002-4142-178X>

Vivian O. Jones

Bethune-Cookman University, USA

Abstract: Efforts to broaden participation in science, technology, engineering, and mathematics (STEM) have remained at the forefront of initiatives across the United States (U.S.) and elsewhere. The importance of creating a STEM workforce that is reflective of the cultural, ethnic, and racial diversity of the overall population has been recognized. Peer mentoring has been demonstrated to be one effective method for encouraging and sustaining STEM participation. Studies have also demonstrated the importance of training peer mentors and mentees in best practices and arming them with the skillsets necessary for creating and maintaining effective peer mentoring relationships. This proceeding paper examines one such program, eSTEM, which was implemented across three historically Black institutions within the U.S. across two federally funded grant awards. In this proceeding: a) the structure of the virtual peer mentor and peer mentee training modules will be described, b) the overall outcomes of peer mentor and peer mentee training on undergraduate and graduate STEM students will be summarized, c) lessons learned from the implementation of the eSTEM program across multiple historically Black institutions will be shared, and d) future directions for refining, scaling, and providing public access to the peer mentor and peer mentee training resources will be discussed.

Keywords: STEM, Peer Mentoring, Historically Black Colleges and Universities, eSTEM

Citation: Wendt, J. L. & Jones, V. O. (2023). Preparing STEM Students for Peer Mentoring: Lessons Learned and Future Directions. In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023--International Conference on Social and Education Sciences* (pp. 281-286), Las Vegas, NV, USA. ISTES Organization.

Introduction

As global innovations move forward at unprecedented speed, it is of utmost importance that the science, technology, engineering, and mathematics (STEM) workforce keep pace with such growth. Within the United States (U.S.), the National Center for Science and Engineering Statistics (NCSES) reports that, while participation in STEM among historically underrepresented populations (e.g., women, minorities, and persons with disabilities) has increased in the past decade, the pace of such increase has not yet led to equitable

representation within STEM degree programs or the STEM workforce (NCSES, 2023). Of great concern is whether the current STEM workforce is representative of the diverse cultural, ethnic, racial, and gendered population (National Science Board [NSB], 2022).

If the U.S. intends to remain competitive within the STEM arena and socio-scientific issues that impact the overall world population are to be properly attended to (e.g., global warming, unprecedented climate change), then the STEM workforce must encompass the diverse pool of talent that is inherent within the overall population. The problem is, though, that women and those who identify as ethnically and/or racially non-White have been historically underrepresented within STEM degree programs and within the STEM workforce (National Academies of Sciences, Engineering, and Medicine [NASEM], 2019; NSB, 2022). “A diverse workforce provides the potential for innovation by leveraging different backgrounds, experiences, and points of view” (NCSES, 2023, para. 1).

While many initiatives have been explored to broaden the participation of diverse populations within STEM, peer mentoring is one intervention that has demonstrated benefits (NASEM, 2019). Peer mentoring is defined as “a reciprocal, dynamic relationship between or among peers where one peer is usually more skilled or experienced than the other” (Rockinson-Szapkiw, Herring Watson et al., 2021, p. 174). Peer mentoring has been shown to lead to enhanced student outcomes, ranging from academic achievement to psychosocial outcomes (see NASEM, 2019). Thus, peer mentoring is one method for supporting the participation of those who have been historically underrepresented in STEM.

The eSTEM Peer Mentoring Program

The eSTEM Peer Mentoring Program was the product of two federally funded grant awards (NSF Award No. 1717082 and 1912205). The program was first implemented at two historically Black institutions (e.g., Historically Black Colleges and Universities [HBCUS]) in the 2019/2020 academic year. For the initial pilot implementation, the online peer mentor training was developed, implemented, and tested, with a specific focus on a) the impact of the online peer mentor training on graduate student mentors and b) peer mentoring relationships on both graduate student mentors and undergraduate student mentees.

The second implementation of the program occurred at two HBCUS—one of which was included in the original pilot project and the second of which was new to the implementation—in the 2020/2021 academic year. For the second implementation, the online peer mentor training was revised, and the online peer mentee training was developed. The peer mentor and peer mentee trainings were then implemented and tested, with a specific focus on a) the impact of the online peer mentor training on graduate and undergraduate student mentors, b) the impact of the online peer mentee training on undergraduate student mentees, and c) the impact of the peer mentoring relationships on both mentors and mentees.

Structure

For each of the respective training programs (e.g., peer mentor training and peer mentee training), 8 total modules were ultimately created, implemented, and tested. Each module consisted of three main components: a) a topical discussion, b) a case study, and c) a personal reflection. These components attended to the major guiding theory undergirding the research—Social Cognitive Career Theory (SCCT; Lent et al., 1994; see Rockinson-Szapkiw, Wendt et al., 2021 for further discussion on the alignment of the training with theory). The training modules were offered and completed as online asynchronous ‘courses’. Participants in each implementation of the program were asked to complete the online peer mentoring training depending on their assigned role in the program—either mentor or mentee. In general, those who were graduate students or more experienced undergraduate students were assigned the role of mentor. Those who were undergraduate students were assigned the role of mentee.

After completing the training, peer mentors and peer mentees were assigned mentoring ‘communities’ (e.g., groups) within which they then participated in reciprocal peer mentoring. While the structure, frequency (minimum of twice per month), and mode (e.g., online, face-to-face, phone) of such peer mentoring was largely left up to individual groups, participants were encouraged to utilize the structure and skills developed through completion of the peer mentoring training. This flexibility was key to allowing peer mentoring communities to craft goals and methods of reaching those goals tailored to their specific experiences and needs.

Simultaneously, guest speakers were made available to participants through STEM Luncheons (face-to-face, held in academic year 2019/2020) and STEM Webinars (virtual, held in academic year 2020/2021). During the STEM Luncheons and STEM Webinars, the guest speakers—women who demonstrated a record of success in a STEM career field—shared their experiences and recommendations for success with participants. Guest speakers also engaged in a question-and-answer session with participants and provided participants with opportunities to tap into the speakers’ professional networks.

Overall Outcomes

Throughout the program, participants engaged in a series of pre- and post-surveys as well as individual interviews and focus groups. The specific results of each implementation separated by role (e.g., peer mentor or peer mentee) and gender (e.g., female and male) are reported in detail elsewhere (see Rockinson-Szapkiw, Herring Watson et al., 2021; Rockinson-Szapkiw & Wendt, 2020; Rockinson-Szapkiw, Wendt et al., 2021a; Wendt et al., 2021b). Overall, the first implementation demonstrated that peer mentors and peer mentees experienced increases in STEM self-efficacy, sense of belonging, interest in STEM, and intent to persist in STEM. The second implementation demonstrated that peer mentors demonstrated increases in STEM self-efficacy, sense of belonging, interest in STEM, and STEM identity. While peer mentors in the second implementation did not report increases in intent to persist in STEM, they did report that their intent to persist in STEM was maintained. In the second implementation, peer mentees reported increases in STEM self-efficacy,

sense of belonging, interest in STEM, intent to persist in STEM, and STEM identity.

Lessons Learned

The overall outcomes of the two implementations of the eSTEM Peer Mentoring Program have demonstrated the benefits of students' participation in the peer mentoring training, peer mentoring communities, and STEM Luncheons/STEM Webinars. The findings are significant as they attend to the experiences of historically underrepresented groups while enrolled in STEM degree programs situated within HBCUs—a severely under-researched and historically under-supported context. The findings shed insight into one intervention that can be utilized to better support students as they traverse their STEM degree programs and prepare to enter the STEM workforce. Importantly, the findings also attend to the benefits of peer mentoring that exists outside of the research laboratory, focusing not only on academic outcomes, but psychosocial outcomes as well.

Participants did offer suggestions for further revising the program. For instance, while geographic location (first and second implementation) and the advent of the COVID-19 pandemic (second implementation) presented challenges for participants engaging in the face-to-face environment, most participants reported a desire to have opportunities to meet with peers and supporting faculty members face-to-face. Simultaneously, participants reported the benefits and flexibility afforded by online participation. They desired more of a balance between the two. Further, participants appreciated the flexibility in crafting mentoring experiences that met their particular needs with guiding structures in place. Finally, participants reported the benefits of engaging with peers, but also expressed the desire to have regular check-ins with supporting faculty. Thus, they appeared to desire a balance between peer mentoring and faculty mentoring.

Remaining Questions and Future Directions

As mentioned earlier, the pace of the increase in participation in STEM among historically underrepresented populations has not yet led to equitable representation within STEM degree programs or the STEM workforce (NCSES, 2023). As HBCUs remain under-researched and historically under-supported, continuing efforts to implement peer mentoring programs around the country at HBCUs improves the chances of eliciting equitable representation in STEM degree programs and the STEM workforce. Research has shown that peer mentoring programs, including the eSTEM Peer Mentoring Program, have the potential to play a crucial role in increasing underrepresented populations in STEM fields. By continuing to support skilled peer mentors who share similar backgrounds, experiences, and identities to peer mentees, peer mentoring programs can help create a sense of belonging that leads to increased engagement and persistence in STEM degree programs and the STEM workforce. Additionally, implementing peer mentoring programs at predominantly white institutions (PWIs) and targeting underrepresented populations could potentially provide similar results as those experienced by students at HBCUs. Having role model representation at PWIs for underrepresented populations can ensure that minoritized and marginalized students can be inspired by creating a sense of possibility and increasing STEM self-efficacy, along with interest in STEM and STEM identity.

Future research should consider implementation at PWIs as well as other minority serving institutions. Future research should explore the longitudinal impact of participation in the eSTEM Peer Mentoring Program. It may also be beneficial to explore the potential impacts of implementing a peer mentoring model that connects peer mentors in higher education to peer mentees in K-12 (specifically, high school). Continuing the implementation, revision, and testing of peer mentoring programs gives hope that the problem of persisting inequitable representation in STEM can eventually be solved.

Conclusion

It is important to recognize that there is not a single one-size-fits-all approach to supporting diverse representation within STEM degree programs and the STEM workforce. While peer mentoring and, more specifically, the eSTEM Peer Mentoring Program, has demonstrated positive outcomes among the HBCUs at which it was implemented and tested, other contexts and other populations may require their own unique supports. Peer mentoring is one potential intervention for supporting equitable representation in STEM, however, and should be further tested and examined. If we are to collectively embrace the myriad perspectives, skills, and talents needed to attend to pressing global needs, though, it is essential that the overall STEM workforce be appropriately prepared and supported.

Acknowledgements

This material is based upon work supported by the National Science Foundation under Grant Nos. 1717082 & 1912205. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

References

- Lent, R., Brown, S., & Hackett, G. (1994). Toward a unifying social cognitive theory of career and academic interest, choice, and performance. *Journal of Vocational Behavior, 45*(1), 79-122.
- National Academies of Sciences, Engineering, and Medicine. (2019). The science of effective mentorship in STEM. *The National Academies Press*. <https://doi.org/10.17226/25568>
- National Center for Science and Engineering Statistics. (2023). Diversity and STEM: Women, minorities, and persons with disabilities. <https://ncses.nsf.gov/pubs/nsf23315/report>
- National Science Board. (2022). The state of U.S. science and engineering 2022. <https://ncses.nsf.gov/pubs/nsb20221/preface>
- Rockinson-Szapkiw, A., Herring Watson, J., Gishbaugher, J., & Wendt, J. L. (2021). A case for a virtual STEM peer mentoring experience: The experience of racial and ethnic minority women mentees. *International Journal of Mentoring and Coaching in Education, 10*(3), 267-283. doi: 10.1108/IJMCE-08-2020-0053
- Rockinson-Szapkiw, A., & Wendt, J. L. (2020). The benefits and challenges of a blended peer mentoring

program for women peer mentors in STEM. *International Journal on Mentoring and Coaching in Education*, 10(1), 1-16. <https://doi.org/10.1108/IJMCE-03-2020-0011>

Rockinson-Szapkiw, A., Wendt, J. L., & Stephen, J. S. (2021). The efficacy of a blended peer mentoring experience for racial and ethnic minority women in STEM pilot study: Academic, professional, and psychosocial outcomes for mentors and mentees. *Journal for STEM Education Research*, 4, 173-193. <https://doi.org/10.1007/s41979-020-00048-6>

Wendt, J. L., Jones, V., & Bruewer, A. (2021a). BIPOC males' experiences in a structured virtual peer mentee training program. *The Chronicle of Mentoring and Coaching*, 5(14), 482-486.

Wendt, J. L., Jones, V., & Bruewer, A. (2021b). Understanding the peer mentoring experiences of STEM mentees at two HBCUs. *The Chronicle of Mentoring and Coaching*, 5(14), 487-491.

Knowledge in Project Management by Community Action Board Leaders - Case of the Township of Suba (Bogotá - Colombia)

Jhony Alexander Barrera Liévano

Corporación Universitaria Minuto de Dios (UNIMINUTO), Colombia  <https://orcid.org/0000-0002-2274-2297>

Abstract: The population covered by this study are the community leaders elected as board members of Community Action Boards in the township of Suba of the city of Bogotá DC (Colombia) for the 2017-2020 legal term. The Community Action Boards are civil organizations; however, the terms in office of their governance bodies are established by law. The objective is to identify the level of knowledge of the community leaders elected as board members of the Community Action Boards under study regarding project management, according to the proposed measurement criteria. To this end, a quantitative study was carried out with an exploratory-descriptive design, of the non-experimental and longitudinal type. We worked with a statistically representative probabilistic sample, using simple random selection, which allows the generalization of the results. The primary data collection tool was a survey questionnaire. According to the survey results, more than 94% of the population has a “low” level of knowledge in terms of project management. New lines of research on the matter are proposed.

Keywords: community organizations; knowledge; management; project; social

Citation: Barrera Liévano, J. A. (2023). Knowledge in Project Management by Community Action Board Leaders - Case of the Township of Suba (Bogotá - Colombia). In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023-- International Conference on Social and Education Sciences* (pp. 287-303), Las Vegas, NV, USA. ISTES Organization

Introduction

Project management is a field of knowledge that is currently in high demand by companies, (Pastor, 2009) which is not surprising given its instrumental value (McElroy, 1996). Organizations implement it with the aim of achieving their objectives (Söderlund, 2004), usually nested in their planning and strategic processes (Arto & Wikström, 2005).

Even though projects have been present in the development of all major civilizations (González, et al. 2014), project management was not developed as a field of knowledge until the mid-1950s (Stretton, 1994), with major milestones such as building the atom bomb (Wallace, 2014), which demonstrated the instrumental value of project management and its impact in achieving the objectives.

The above, however, does not imply that all companies and organizations recognize the importance of project management, which, among other aspects, proposes the definition and achievement of objectives in terms of time, cost, performance, safety, and reasonable risk (Miranda, 2004).

In Colombia, the civil society organizations known as Community Action Boards, CAB (*Juntas de Acción Comunal*) are legally recognized institutions with a clearly defined legal framework that establishes their scope of action within the communities they are part of (Barrera and Ibáñez, 2022). The law grants them powers that range from entering into contracts to creating companies (Law 2166/2021), among other activities that are generally allowed for any type of legally recognized organization.

However, what makes the CAB unique is their history, because they have been at the center of the development of the territories of numerous communities (Castañeda and Prieto, 2017). In 2020, there were approximately 70,000 CABs in Colombia (UPAIV, n.d.). This makes them strategic organizations for the achievement of the Sustainable Development Goals (SDGs) at the local level. At the same time, they have also become platforms for furthering private interests and political patronage (Cubides *et al.*, 2018; Leal and Dávila, 1990; Borrero, 1989), notwithstanding their specified legal nature (Gómez, 2015).

According to the National Council for Economic and Social Policy (2018), one of the problems faced by CABs is that their representatives have a low level of knowledge on how to develop projects that would have a favorable impact on their communities, which is only one of several of their operating challenges (Otero, 2012). In view of the above, the proposed research objective is to determine the level of knowledge on project management and development among the CAB board members (elected for the 2017-2020 term) of the Township of Suba (Bogotá DC – Colombia).

The Township of Suba (Bogotá DC – Colombia) was selected as case study due to its characteristics, including the fact that it is the most populous township of the country's capital (Office of the Mayor of Bogotá, n.d.), it faces high levels of violence (District Office of the Ombudsman, 2018), all socioeconomic levels are present (National Administrative Department of Statistics, 2018), and it faces numerous issues related to social inequality, lack of a citizenship culture, coexistence problems, informal origin of certain territories in the community (Office of the Local Mayor of Suba, 2016), among others, which make the role of the CAB highly relevant for the area.

The Project

A project can be defined as a vehicle that organizations implement to produce internal changes aimed at increasing their competitiveness in an environment that poses ever increasing challenges, as well as opportunities (Rodríguez *et al.*, 2002). By their nature, projects link a series of interrelated actions aimed at achieving specific objectives (Miranda, 2004).

According to Sapag and Sapag (2008), a project starts out with the identification of a problem or need that is possible to resolve and is created and developed with the aim of producing adequate and relevant solutions. On their part, Gray and Larson (2009) describe it is a coordinated effort that is complex by nature because it is undertaken within a specific time frame; involves non-routine activities for the organization; that has its own budget and specific resources to achieve the specifications of a requesting party or a person with a need that must be satisfied.

Toro (2010) states that a project is a minimum unit to which resources are assigned, which are committed to a set of activities focusing on specific goals that are always related to generating solutions to existing problems, and that once they are implemented, transform the reality of the context. Hurtado (2011) says in this regard that a project consists of a set of interrelated activities with specific start and end dates, which are structured to achieve specific goals and are assigned limited resources and defined timelines.

Gido and Clements (2012) define a project as a specific effort aimed at efficiency that is undertaken to achieve a specific objective through a set of activities that are interrelated and that consume resources. On their part, González et al. (2014) state that a project combines both human and non-human resources in an organization within a defined time frame to achieve a given goal, and whose result is something unique. Moreno et al. (2016) mention that a project is a set of activities focused on a specific goal. Institutions such as PMI (2017) define a project as a temporary endeavor undertaken to create a unique result.

From the above literature, in general we can say that a project is created to achieve unique specific and defined goals to generate a solution to a problem or unsatisfied need, and that has several characteristics, such as complexity, the temporary combination of efforts represented in resources that are consumed by interrelated activities within a given time frame. However, as explained by Marco and Crespo (2011, p. 1) “the definition of project varies depending on the intended purpose for its performance.”

Given their importance, projects have been formally studied by several disciplines, which have addressed their structure and components. As mentioned by Gray (2010), a turning point in the study of how to plan and develop or perform project was the approach proposed by Henry Gantt, known as the Gantt Chart. Even though it was designed in the first decade of the 20th century, it was “validated” in the United States of America during the construction of the Hoover Dam in the 1930s.

In general, projects are developed under a standard process called the “project life cycle.” According to Estrada (2015), this cycle represents a relationship between cost and time. Marco and Crespo (2011) claim that there is no consensus on what is meant by “project cycle” or “project life cycle” and indicate that some authors speak of three phases (design, implementation, and evaluation), whereas others speak of four (identification, formulation, performance and monitoring, and evaluation).

Lledó and Riverola (2015) say that projects involve different phases that facilitate their efficient management and control. According to the PMI (2017), these phases are known as the project life cycle, which are initiation, planning, performance, monitoring and control, and closing, as shown in Figure 1.

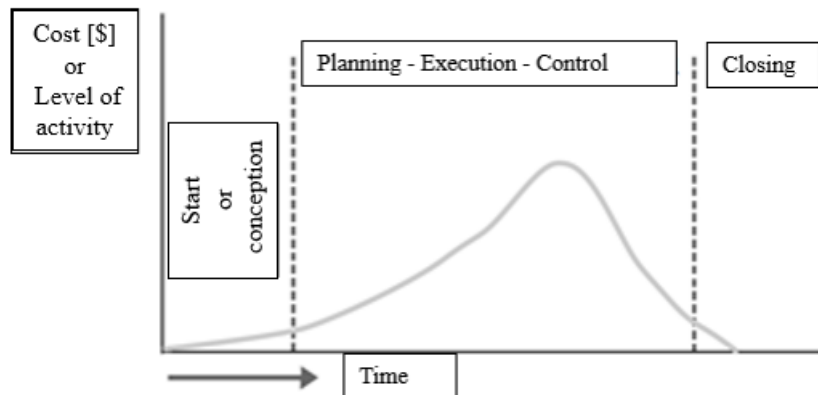


Figure 1. Project Life Cycle

Note. Source: Lledó and Riverola (2015)

As can be seen, the project life cycle moves forward continuously over time in a single-directional straight line, over which the project phases are developed with clearly identified starting and ending points.

Another way of representing the project cycle, as mentioned by Mendez (2016), is in three stages he calls pre-investment, investment, and operation. On their part, Sapag et al. (2014) mention four sequential stages, starting with an idea, followed by pre-investment, investment, and lastly operation, as shown in Figure 2.

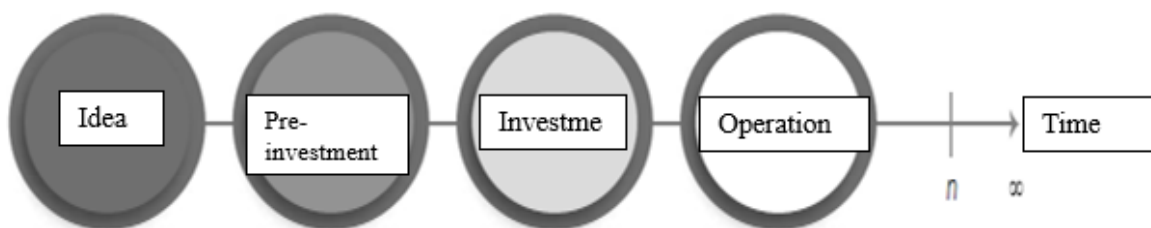


Figure 2. Project Cycle

Note. Source: Sapag et al. (2014)

Project Management

To talk about project management is in a way to talk about the history of humankind because, even though it was only formally studied in the 20th century, it is clear that project planning and performance has been a constant since the birth and consolidation of the great works of ancient times (González, et al. 2014). We cannot

assign the invention of project management to a single group, science, technique, or field of study (Wallace, 2014). However, business administration, engineering, and even education have undertaken the study of project management as a tool to achieve goals.

One of the key characteristics of projects at present is their complexity, in terms of the interdependence of the processes involved throughout their life cycle. Undoubtedly, the increase in project complexity, and every greater resource restriction, have created the need to create new ways to plan and perform them (Wallace, 2014).

Given the contemporary importance of project management, since the second half of the 20th century organizations from all over the world have undertaken its study, addressed its various components and searching for the best way to perform them. Some certify the skills that qualify individuals to engage in project management, such as the Project Management Institute (PMI), an association of project management professionals (PMI, n.d. a); the International Project Management Association (IPMA), a confederation based in Switzerland devoted to project management, whose members are professional associations from different countries (IPMA, s.f.); the Project Management Association of Japan (PMAJ), an association whose objective is to educate and train project management professions and to promote P2M (PMAJ, n.d.); among others.

Defining what project management is implies acknowledging that there are limitations in the field of knowledge, in that research in this area is based on concepts such as risks and equipment (Montero, et al., 2020). According to the PMI, project management can be defined as “the use of specific knowledge, skills, tools, and techniques to fulfill the project’s requirements.” (s.f. b, par. 5). As Wallace (2014) mentions, according to the definitions of several authors, project management focuses first on defining (planning) to later achieve (as a result of performance) a process within a specific context (that includes variables such as risk).

Project management is performed throughout the project life cycle, with a close relationship between the cost and time of performance (Estrada, 2015). It should be pointed out that there is no consensus on the specific components of a project life cycle (Marco and Crespo, 2011). However, the existing literature clearly identifies, on the one hand, three phases, which are design, implementation, and performance; and on the other hand, four phases, namely, identification, formulation, performance and monitoring, and lastly, evaluation, even though institutions such as the PMI speak of phases or groups of processes, namely: initiation, planning, performance, monitoring and control, and closing (2017).

The value of project management is that it is a means or instrument to achieve organizational objectives (Barrera and Ibañez, 2022), which makes it ideal for strategic effects (Grundy, 1998) within organizations.

Community Civilian Organizations - the Colombian Community Action Boards

The community movement in Colombia enjoys an institutional legal framework for community action, given its historic and present importance. The start of community action as an institution can be traced back to 1958

through the enactment of Law 19/1958, specifically in the provisions of articles 22 and 24 (Barrera Liévano, 2019). The term “institution” refers to its formal recognition, but this does not imply that community action did not take place before that time in history (Valencia, 2010).

The community action movement, also called the “*comunero*” movement, dates back to colonial times, as a resistance movement of indigenous peoples in the region against the colonists (Valencia, 2009). There is evidence of colonial and post-colonial community actions undertaken by communities for specific purposes, under different names including the *pasanacu*, *convite*, *mano prestada*, *minga*, *faena*, *waki*, and *ayni* (Valencia, 2009).

The *minga* is defined as an organization that provides assistance for equivalent compensation; *convite* refers to an invitation to work in exchange for food (food and drink), *mano prestada* is to lend a hand to support work, *faena* refers to performing activities or work that require physical effort (IDPAC, 2014). The *waki* refers to a form of collective work organization to plant seeds on community property, the *ayni* is based on mutually beneficial loan agreements related to agricultural workdays that must be subsequently repaid, and the *pasanacu* is a community fund to which members make equal contributions to cover serious family emergencies (Chaverra & Benavides, 2019).

At present, community action in Colombia refers to the Community Action Boards, which are comprised of members of a community made up of the neighbors of a specific territory who voluntarily create the organization. It should be noted that there are other community action bodies, as defined in articles 6 and 7 of Law 2166/2021, as shown in Figure 3.

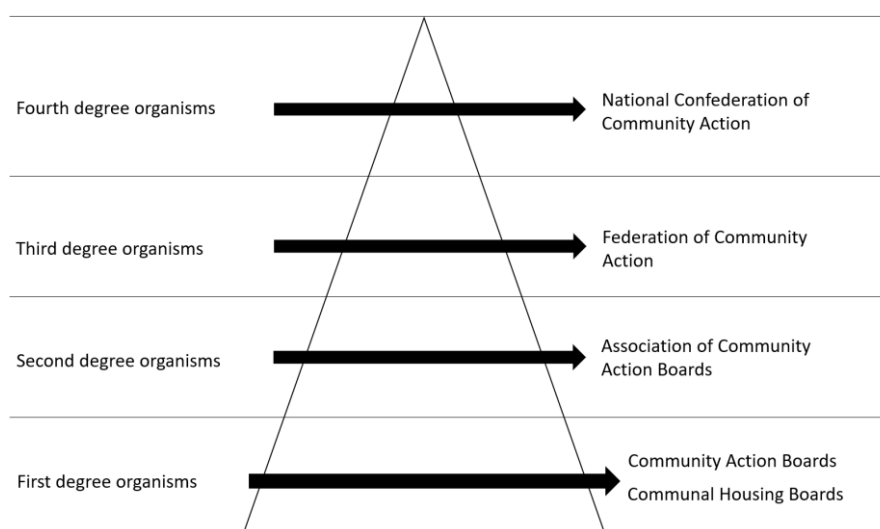


Figure 3. Community Action Bodies

Note. Adapted from Law 2166/2021

The Associations of Community Action Boards are comprised of first-tier community boards; the Federations of

Community Actions Boards are comprised on Associations of Community Action Boards, and lastly, the Confederation of Community Action Boards is comprised of third-tier federations. In view of the above, we can say that the CABs are grassroots organizations.

Since they were first formalized as institutions, the CABs have 65 years of history, during which they have experienced exponential growth, among other reasons thanks to the legal framework provided by the government, which has enacted over 30 pieces of legislation, including laws, decrees, resolutions, and notices, which have granted them legal stability (Barrera and Ibañez, 2022). According to Valencia (2010), in Colombia there were 3 legally incorporated CABs in 1960; 1,607 in 1963; 3,019 in 1964; 3,837 in 1965; 21,554 in 1982; 24,773 in 1985; 42,582 in 1993; 44,736 in 1999, and a total of 53,865 in 2008. In 2020 it is estimated that close to 70,000 CAB exist nationwide (UPAIV, n.d.).

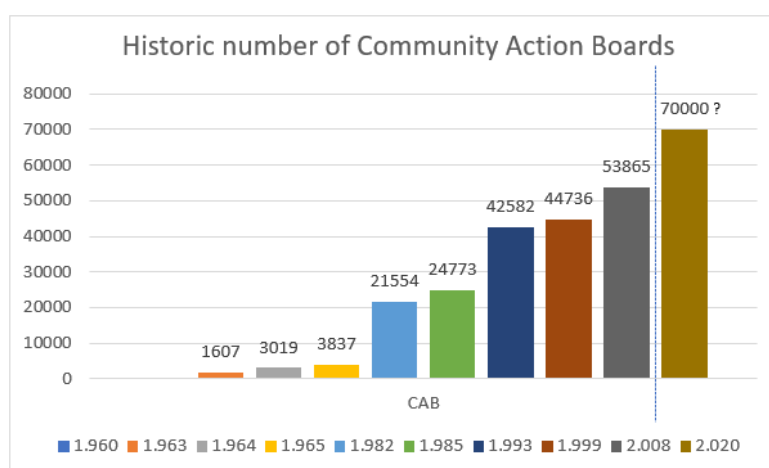


Figure 3. Historic number of Community Action Boards

Note. Adapted from Valencia (2010) and UPAIV (n.d.)

The history of CABs in Colombia is uneven across the national territory, which reflects the different realities of the country’s various regions, many of which were affected by the armed conflict (Fundación Ideas Para la Paz, 2013), which limited, in the past and at present, the activities undertaken by these organizations and their access to different types of resources. The above is compounded by specific geographic, sociological, and cultural conditions (Valencia, 2009).

When the CABs were first formally institutionalized, following the publication of Law 19/1958, the country was subject to a wave of political violence involving the two traditional parties of the time (Rehm, 2014), in addition to widespread poverty, different forms of violence and generalized corruption (Valencia, 2009).

At first, most of the CABs’ efforts focused on developing infrastructure projects, which was a pressing need at the time (Otero, 2012). The CABs were created to offer public goods and services that were not provided by the government. However, they were often sponsored or financed by politicians, which led to widespread political

patronage, at least until the enactment of the Political Constitutions of 1991 (Cubides et al., 2018), a phenomenon that has been pointed by several authors, such as Borrero (1989), and Leal and Dávila (1990). Even though the CAB were created in Colombia for a clear purpose, research has shown that community action has been subject to substantial intervention, with manipulation of their autonomy, independence, and freedom (Valencia, 2009), and that in some cases private interests have prevailed over community interests (Moreno, 2014).

A CAB, as stated in Law 2166/2022, is a civic, community, social management organization of a cooperative and not-for-profit nature, that is voluntarily comprised of the neighbors of a specific territory, created with the intention of joining efforts between its members to achieve comprehensive and sustainable development of the territory, on the basis of democratic decision-making.

Methodology

A quantitative, exploratory - descriptive study was carried out (Hernández et al., 2014), of the non-experimental, cross-sectional type (Liévano et al., 2022). The studied population was the Community Action Boards (CABs) whose board members were elected for the 2017-2020 term, from the Township of Suba, in the city of Bogotá DC (Colombia). A probabilistic sample was taken using the statistical approach proposed by Aguilar-Barojas (2005), based on the following parameters: total population: 149 CAB ($N = 149$), heterogeneity of 50% ($p = 0.5$; $q = 0.5$); confidence level of 95% ($z = 1.96$), and an admissible margin of error of 5% ($e = 0.05$) (Barrera and Parra, 2020). The sample size was determined based on the following calculation:

$$\text{Equation 1. Sample calculation } n = \frac{N * Z^2 * p * q}{e^2 * (N - 1) + Z^2 * p * q}$$

$$n = \frac{149 * 1,96^2 * 0,5 * 0,5}{0,05^2 * (149 - 1) + 1,96^2 * 0,5 * 0,5} = \frac{149 * 3,8416 * 0,25}{0,0025 * (148) + 3,8416 * 0,25}$$

$$n = \frac{143,0996}{0,3725 + 0,9604} = \frac{143,0996}{1,3329} = 107,36 \approx 107$$

Simple random sampling was used, in which each population unit of the study had the same probability of being elected. The procedure was performed through a lottery system (Hernández et al., 2014).

The information gathering instrument was a survey questionnaire, which was filled out directly with the board members of the CABs selected for the sample. This study followed the guidelines of the Declaration of Helsinki (AMM, 1964) on ethical principles. Each participant signed an informed consent stating them of their rights as voluntary participants in the study.

To cover the planned research objective, the survey was structured into 20 questions, the first set of which focused on validating that the participant met the requirements to be included in the population of the study, followed by a second set to gather demographic information, and a third set focused on covering the research objectives.

The following weighting model was used to treat the individual results, which was subsequently used to qualitatively assess the responses given by the participants related to the research objectives.

Table 1. Individual response weighting model

Question	Answer / score	Weighting factor	Weight
Do you have knowledge on the formulation, evaluation, performance and monitoring of projects?	Yes: 10 No: 0	1.6	Multiplication of score depending on the answer by the weighting factor
Have you ever participated in the formulation of a project of the Community Action Board of which you are a board member?	Yes: 10 No: 0	1.6	Multiplication of score depending on the answer by the weighting factor
Have you ever participated in the evaluation of a project of the Community Action Board of which you are a board member?	Yes: 10 No: 0	1.6	Multiplication of score depending on the answer by the weighting factor
Have you ever participated in the performance of a project of the Community Action Board of which you are a board member?	Yes: 10 No: 0	1.6	Multiplication of score depending on the answer by the weighting factor
Have you ever participated in the monitoring of a project of the Community Action Board of which you are a board member?	Yes: 10 No: 0	1.6	Multiplication of score depending on the answer by the weighting factor
Would you say your level of knowledge on the formulation, evaluation, performance and monitoring of projects is?	Expert: 10 Advanced: 7.5 Basic: 5 Low: 2.5 None: 0	2.0	Multiplication of score depending on the answer by the weighting factor

Note. Taken from Barrera (2022)

The results of each participant according to the individual response weighting model are within a scale from 0 to 100, which are interpreted in qualitative terms as indicated below.

Table 2. Individual results qualitative valuation scale

Qualitative description	Weighted score range
High level of knowledge	81 to 100
Medium level of knowledge	49 to 80
Low level of knowledge	0 to 48

Note. Taken from Barrera (2022)

The aggregate results obtained from the selected sample according to the valuation scale are presented in Table 2. The working hypothesis was that over 80% of the CAB board members included in the survey would have a “low level of knowledge.” The SPSS statistical package was used to organize, analyze and process the data.

Results

In the field, a total of 107 surveys were taken in the studied population, 57% of which were men and 43% women; none of the participants indicated a different gender. All participants were over 18 years old (it should be noted that the minimum age to be a CAB member is 14); 1% were young adults (between 18 and 27 years old), 83% adults (between 28 and 59 years old), and 16% were senior citizens (60 years or older). In terms of highest education level completed, 3.7% only completed grade school, 58.8% high school, 36.5% technical, technological or professional school, and the remaining 1% completed graduate level education. The socio-demographic data are summarized in Figure 4.

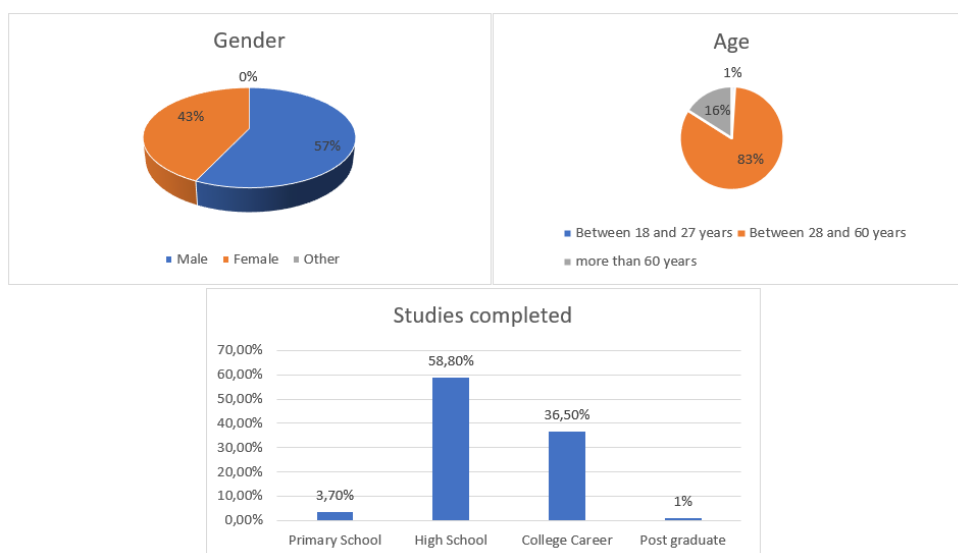


Figure 4. Sociodemographic data of survey participants

Note. Developed by the authors.

Regarding the participants' knowledge on the formulation, evaluation, performance and monitoring of projects, 18.7% claimed to have knowledge; only 6.5% indicated that they had participated in the formulation of a project of the CAB of which they are board members, and 4.7% replied that they had participated in the evaluation of a project of the CAB of which they are members, as shown in Figure 5.

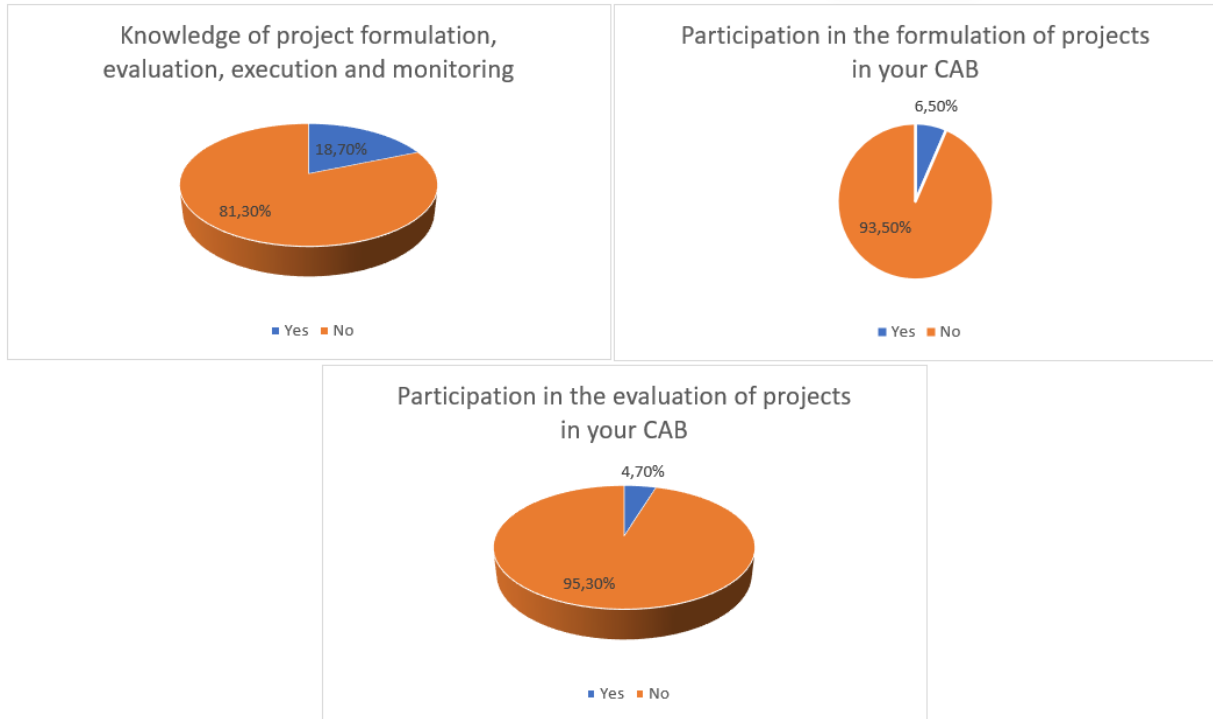


Figure 5. Survey participants' knowledge on project management (1)

Note. Developed by the authors.

Regarding the participants' participation in the performance of a project of the CAB of which they are board members, 3.7% said they had done so, and 4.7% replied that they had participated in monitoring of a project of the CAB of which they are members, as shown in Figure 6.



Figure 6. Survey participants' knowledge on project management (2)

Note. Developed by the authors.

Lastly, in terms of the self-assessment of the level of knowledge on the formulation, evaluation, performance and monitoring of projects, it was found that none consider themselves “experts;” 1% claimed to have an “advanced” knowledge level; 9.3% claimed to have a “basic” level; 65.4% reported having a “low” level, and 24.3% had “no knowledge,” as displayed in Figure 7.

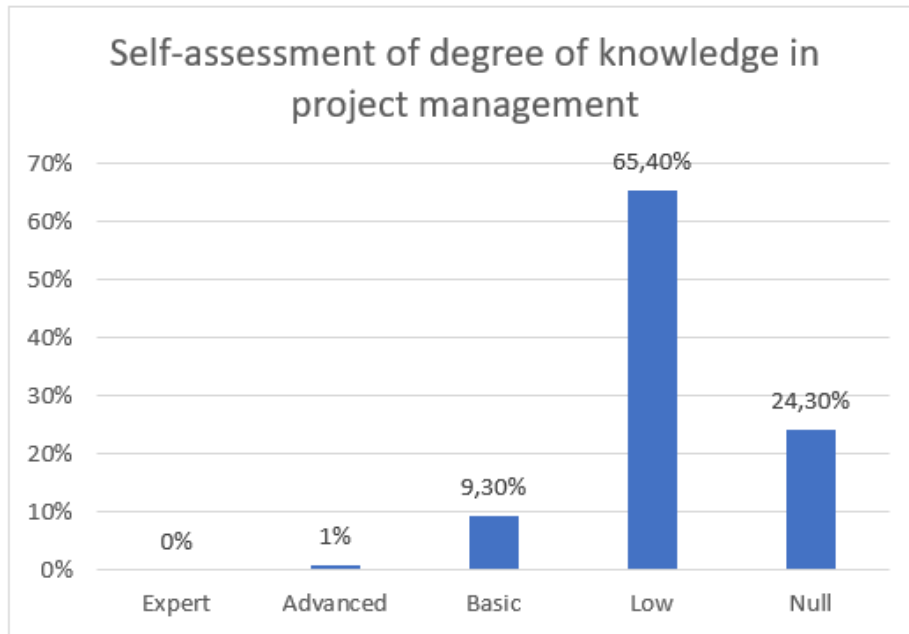


Figure 7. Self-assessment of the level of knowledge on project management

Note. Developed by the authors.

The findings of the individual response weighting model applied to the participants’ answers, based on the individual results qualitative valuation scale, are displayed in Table 3.

Table 3. Aggregate qualitative results

Valuation scale variable 1	Cases
High level of knowledge	3
Medium level of knowledge	3
Low level of knowledge	101
Total	107

Note. Developed by the authors.

As can be seen, based on the measurement model used, 94.4% of the surveyed population as a low level of knowledge on project management and development; 2.8% have a medium level, and the remaining 2.8% have a high level, as displayed in Figure 8.

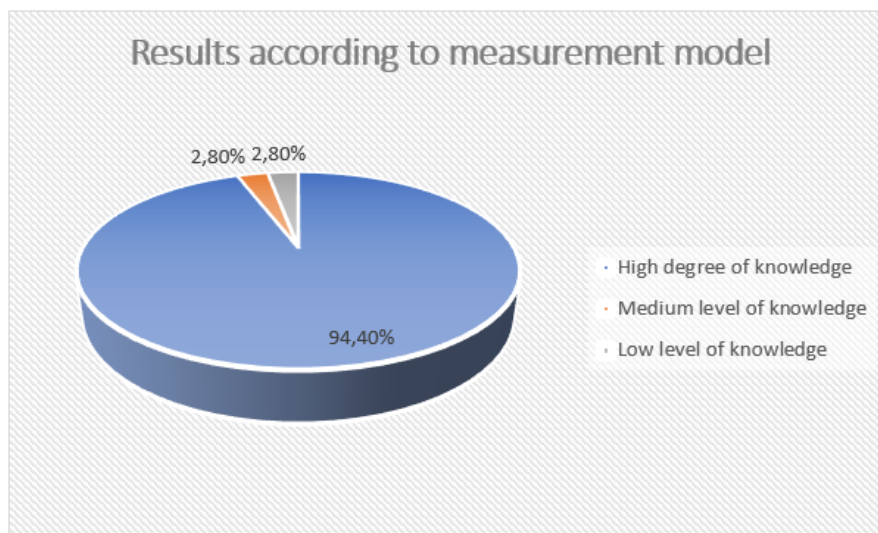


Figure 8. Level of knowledge of board members according to the measurement model

Note. Developed by the authors.

Conclusion

In Colombia, the CABs are civil organizations that are present throughout the territory, which are organized to carry out activities in favor of the well-being of their communities. This makes them strategic organizations for the achievement of the Sustainable Development Goals (SDGs) at the local level.

However, for these organizations to make a significant contribution both to the well-being of their communities and the achievement of the SDGs, their members, and especially their leaders, must have the knowledge required to carry out specific actions that are well-directed and that have a positive impact on their communities.

Project management and all the components of a project life cycle is a strategic and necessary tool for the CABs to achieve the goals and objectives that will bring well-being and development to their communities.

The results of this study, whose objective was to determine the level of knowledge of CAB board members elected for the 2017-2020 term in the Township of Suba (Bogotá DC – Colombia) regarding project management, found that 94.4% have a “low” level of knowledge, 2.8% have a “medium” level and 2.8% a “high” level of knowledge. These results validate what was identified by the National Council of Economic and Social Policy (2018) regarding the low level of knowledge of CAB representatives on how to develop projects with a positive impact on their communities. The working hypothesis was validated, since more than 80% of the CAB board members covered by this study were found to have a “low level of knowledge” regarding project management and development.

Even though, strictly speaking, the findings of this study can only be generalized for the reality of the Township

of Suba in the City of Bogotá, given the methodology that was defined and followed, they do depict a discouraging outlook on this matter for Colombia in general, because this township is in the country's capital, and therefore has the best conditions for the development of CABs.

As future lines of research, it is suggested addressing the reasons why the CAB board members do not have the knowledge they require to manage and develop projects that will have a positive impact on their communities.

References

- Aguilar-Barojas, S. (2005). Fórmulas para el cálculo de la muestra en investigaciones de salud. *Salud en tabasco*, 11(1-2), 333-338. Retrieved from: <https://www.redalyc.org/articulo.oa?id=48711206>
- Alcaldía local de Suba (2016). *Acuerdo Local Número 04 de 2016 por medio del cual se adopta el plan de desarrollo económico, social, ambiental y de obras públicas para la Localidad de Suba 2017-2020*. Retrieved from: http://suba.gov.co/sites/suba.gov.co/files/planeacion/plan_de_desarrollo_local_version_impresa.pdf
- Alcaldía Mayor de Bogotá (sf). *Localidad de Suba*. Retrieved from: <https://bogota.gov.co/mi-ciudad/localidades/suba>
- AMM (1964). *Declaración de Helsinki de la AMM– principios éticos para las investigaciones médicas en seres humanos*.
- Arto, K. & Wikström, K. (2005). What is project business?. *International Journal of Project Management*, 23(5), 343-353.
- Barrera, J. (2022). *Gestión de proyectos sociales y comunitarios por Juntas de Acción Comunal* [Tesis de doctorado no publicada]. Universidad Americana de Europa.
- Barrera, J. & Ibáñez, A. (2022). Community Action Boards-Knowledge of their dignitaries regarding the scope of their actions. Juntas de Acción Comunal–Conocimiento de sus dignatarios frente al alcance de sus acciones. *Revista investigación, desarrollo educación, servicio, trabajo*, (2) 1. 124-138. <https://doi.org/10.31876/idest.v2i1.34>
- Barrera, J. & Parra, S. (2022). Factores determinantes para el acceso de las MIPYME al crédito gota a gota. *Revista republicana*, (28), 217-236. <https://doi.org/10.21017/rev.repub.2020.v28.a84>
- Barrera Lievano, J. (2019). Juntas de Acción Comunal y pequeñas y medianas empresas-articulación para el desarrollo de actividades de responsabilidad social empresarial. *Tendencias*, 20(1), 53-76. <https://doi.org/10.22267/rtend.192001.107>
- Borrero, C. (1989). *Acción Comunal y política estatal: ¿un matrimonio indisoluble?* (No. 57). Centro de Investigación y Educación Popular.
- Castañeda, J. M. S., & Prieto, A. V. (2017). Incidencia de las Juntas de Acción Comunal en el desarrollo local en áreas de influencia de proyectos de hidrocarburos. *Equidad y Desarrollo*, (27), 195-212. Retrieved from: <https://dialnet.unirioja.es/servlet/articulo?codigo=5849066>

- Chaverra, M. & Benavides, F. (2019). *Cooperativas multiactivas una solución para los migrantes: una aproximación legal*. Retrieved from: https://repository.ucc.edu.co/bitstream/20.500.12494/7339/1/2019_cooperativas_multiactivas_migrantes.pdf
- Consejo Nacional de Política Económica y Social (2018) Documento CONPES 3955 ESTRATEGIA PARA EL FORTALECIMIENTO DE LA ACCIÓN COMUNAL EN COLOMBIA.
- Cubides, P., Gómez, D. & Hernández, C. (2018). Las Juntas de Acción Comunal y la gestión pública en Colombia. *Principia Iuris*, 15(31), 141-156. Retrieved from: <http://revistas.ustatunja.edu.co/index.php/piuris/article/view/1833/1635>
- Departamento Administrativo Nacional de Estadística (2018). Encuesta multipropósito Bogotá 2011, 2014, 2017.
- Estrada, J. (2015). Análisis de la gestión de proyectos a nivel mundial. *Palermo Business Review*, (12), 61. Retrieved from: https://www.palermo.edu/economicas/cbrs/pdf/pbr12/BusinessReview12_02.pdf
- Fundación Ideas Para la Paz (2013). *Dinámicas del conflicto armado en el Catatumbo y su impacto humanitario*. Siguiendo el Conflicto. Retrieved from: <https://storage.ideaspaz.org/documents/5b72fe7f2b9d1.pdf>
- Gido, J. y Clements, J. (2012). *Administración exitosa de proyectos*. 5ª ed. México: Cengage Learning.
- Gómez, M. M. B. (2015). Las organizaciones comunitarias como instituciones intermedias: las Juntas de Acción Comunal en el municipio de Tenjo. *Revista Controversia*, (204), 121-145.
- González, M., Alba, F. y Ordieres, J. (2014). *Ingeniería de proyectos*. Madrid: Editorial DEXTRA
- Gray, C. (2010). *Project Management*. Oregon: McGraw Hill.
- Gray, C. y Larson, E. (2009). *Administración de proyectos*. 4ª ed. México DF: McGraw-Hill.
- Grundy, T. (1998). Strategy implementation and project management. *International Journal of Project Management*, 16(1), 43-50. [https://doi.org/10.1016/S0263-7863\(97\)00016-1](https://doi.org/10.1016/S0263-7863(97)00016-1)
- Hernández, S., Fernández, C. & Baptista, P. (2014). *Metodología de la investigación*. Sexta edición. México DF: McGraw Hill.
- Hurtado, J. (2011). Los proyectos y los planes de negocios. *Perspectivas*, (27), 23-45. Retrieved from: <https://www.redalyc.org/pdf/4259/425941231003.pdf>
- IDPAC (2014). *Cartilla Comunal*. Bogotá
- IPMA (s.f.) *IPMA*. Retrieved from: <http://www.apmgt.org/ipma>
- Leal, F. & Dávila, A. (1990). *Clientelismo. El sistema político y su expresión regional*. Bogotá: Tercer Mundo, Universidad Nacional, Instituto de Estudios Políticos y Relaciones Internacionales.
- Ley 2166 de 2021. Por la cual se deroga la ley 743 de 2002, se desarrolla el artículo 38 de la constitución política de Colombia en lo referente a los organismos de acción comunal y se establecen lineamientos para la formulación e implementación de la política pública de los organismos de acción comunal y de sus afiliados, y se dictan otras disposiciones. 18 de diciembre de 2021.
- Lievano, J.A.B., Méndez, E. & Parra, S. (2022). Asociación de dependencia de factores determinantes de acceso al crédito" gota a gota" en micro, pequeñas y medianas empresas. *Apuntes*, 49(91), 189-210. <http://dx.doi.org/10.21678/apuntes.91.1408>

- Lledó, P. y Rivarola, G. (2007). *Gestión de proyectos: como dirigir proyectos exitosos, coordinar los recursos humanos y administrar los riesgos*. Buenos Aires: Pearson Educación.
- Marco, A. & Crespo, A. (2011). *Guía de diseño de proyectos sociales comunitarios bajo el enfoque del marco lógico*. Caracas: Edición mimeografiada del autor.
- McElroy, W. (1996). Implementing strategic change through projects. *International Journal of Project Management*, 14(6), 325-329. [https://doi.org/10.1016/0263-7863\(95\)00060-7](https://doi.org/10.1016/0263-7863(95)00060-7)
- Méndez, R. (2016). *Formulación y evaluación de proyectos*. Enfoque para emprendedores. Novena edición. Bogotá DC: Digiprint editores
- Miranda, J. (2004). *El desafío de la gerencia de proyectos*. Bogotá: MM Editores.
- Montero, J. M. C., Gómez, H. E. G., Arocutipa, J. P. F., & Cuadros, M. J. L. (2020). Áreas de conocimiento y fases clave en la gestión de proyectos: consideraciones teóricas. *Revista Venezolana de Gerencia*, 25(90), 680-692. Retrieved from: <https://www.redalyc.org/journal/290/29063559017/29063559017.pdf>
- Moreno, J. (2014). De Centros Cívicos a Juntas de Acción Comunal. El cambio de modelo de gestión y participación barrial en Medellín en la segunda mitad del siglo XX. *Estudios Políticos*, (45), 185-203. Retrieved from: http://www.scielo.org.co/scielo.php?pid=S0121-51672014000200010&script=sci_arttext
- Moreno, N., Sánchez, L. y Velosa, J. (2016). *Introducción a la gerencia de proyectos: conceptos y aplicación*. Bogotá: Universidad EAN
- Otero, M. (2012). Diagnóstico estratégico de las Juntas de Acción Comunal. *ECONÓMICAS CUC*, 33(1), 65-80. Retrieved from: <https://repositorio.cuc.edu.co/bitstream/handle/11323/1334/4.%20Diagn%20estrat%20gico%20de%20las%20JAC.pdf?sequence=1&isAllowed=y>
- Pastor, R. A. T. (2009). Modelo conceptual para la gestión de proyectos. *Perspectivas*, (24), 165-188. Retrieved from: <https://www.redalyc.org/pdf/4259/425942160009.pdf>
- PMAJ (s.f.). The PMAJ Mission. Retrieved from: <https://www.pmaj.or.jp/ENG/about/mission.html>
- PMI (2017). *PMBOK. 6ª edición*. Pennsylvania: Project Management Institute
- PMI (s.f. a). *PMI LATAM ¿Qué es PMI?*. Retrieved from: <https://www.pmi.org/america-latina#:~:text=C2%BFQu%C3%A9%20es%20PMI%3F,a%20convertir%20ideas%20en%20realidad>.
- PMI (s.f. b). *¿Qué es la gestión de proyectos?* Retrieved from: <https://www.pmi.org/about/learn-about-pmi/what-is-project-management>
- Rehm, L. (2014). La construcción de las subculturas políticas en Colombia: los partidos tradicionales como antípodas políticas durante La Violencia, 1946-1964. *Historia y sociedad*, (27), 17-48. <http://dx.doi.org/10.15446/hys.n27.44582>
- Rodríguez, I., Sbragia, R. y González, F. (2002). Oficina de Gerencia de Proyectos: Teoría y práctica. *Espacios*, 23(2), 81-98. Retrieved from: <http://gpro.fia.com.br/wp-content/uploads/2019/09/espacios.pdf>
- Sapag, N. y Sapag, R. (2008). *Preparación y Evaluación de Proyectos*. Colombia: Ed. Mc.Graw Hill
- Sapag N., Sapag, R. y Sapag, J. (2014). *Preparación y evaluación de proyectos*. Mc Graw Hill educación.

- Söderlund, J. (2004). Building theories of project management: past research, questions for the future. *International Journal of Project Management*, 22(3), 183-191. [https://doi.org/10.1016/S0263-7863\(03\)00070-X](https://doi.org/10.1016/S0263-7863(03)00070-X)
- Stretton, A. (1994). A short history of modern project management. *PM World Today*, 10(9), 1-18. Retrieved from:
<https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=654e1911b21ec7fb33fa8476beca325d789adb44>
- Toro, F. (2010). Formulación y evaluación de proyectos de inversión. *Contribuciones a la economía*. 2-44 UPAIV (sf). Organismos de acción comunal. Retrieved from:
<https://www.unidadvictimas.gov.co/es/organismos-de-accion-comunal/14152#:~:text=Las%20Juntas%20de%20Acci%C3%B3n%20Comunal,Hoy%20existen%20aproximadamente%2070.000%20JAC.>
- Valencia, L. (2009). *Historia, realidad y pensamiento de la Acción Comunal en Colombia: 1958-2008: 50 años construyendo comunidad*. Bogotá: Escuela Superior de Administración Pública.
- Valencia, L. (2010). Hacia la modernización orgánica y el fortalecimiento democrático de la acción comunal en Colombia. *Administración & Desarrollo*, 38(52), 201-209. Retrieved from:
<https://dialnet.unirioja.es/servlet/articulo?codigo=3731310>
- Veeduría distrital (2018). Suba. Ficha local, agosto de 2018. Retrieved from:
<https://veeduriadistrital.gov.co/sites/default/files/files/NotasLocales/Ficha%20Localidad%20Suba.pdf>
- Wallace, W. (2014). Gestión de proyectos. *Edinburgh Business School*. Retrieved from: <https://www.ebsglobal.net/documents/course-tasters/spanish/pdf/pr-bk-taster.pdf>

Ready Student One! Exploring how to build a Successful Game-based Higher Education Course in Virtual Reality

Robert Jesiolowski, DSW, LCSW

Indiana Wesleyan University, United States of America

Monique Jesiolowski, MA

Indiana Wesleyan University, United States of America

Abstract: Today more than ever before, we have access to new technologies which provide unforeseen opportunities for educators to pursue new innovations in online education. Pursuing innovation is a complex process! It starts with an idea, but that needs to be coupled with the right team of experts willing to take big risks and put in the hard work to build something new. An instructional design team was empowered to reimagine an Introduction to Sociology university course as a Game-Based Learning (GBL) experience utilizing cutting edge Virtual Reality (VR) technology. The result was a innovate collaborative process that resulted in a brand-new type of learning based in Game theory, Method of Loci, and VR Immersion Simulations to promote deeper retention of core concepts. The team deconstructed the way that university courses operated, in order to rebuild the educational process in a whole new, learner-centric manner. In addition to a review of the build process, this paper will explore the results of in-course surveys completed by student participants.

Keywords: Higher Education, Innovation, Virtual Reality, Game-based Learning, Loci Method

Citation: Jesiolowski, R. & Jesiolowski, M. (2023) Ready Student One! Exploring how to build a Successful Game-based Higher Education Course in Virtual Reality. In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023-- International Conference on Social and Education Sciences* (pp. 304-320), Las Vegas, NV, USA. ISTES Organization.

Introduction

Information technology has literally changed every aspect of modern life. Higher education is no different. Game-Based Learning (GBL) research has become a key growth area in higher education over the last decade (Vodenicharova, 2022). GBL is an innovative educational paradigm where learners are placed into a theme-based environment where their decisions impact the storyline (Navarro-Espinosa, et al., 2022). The learners are drawn to the relative power of their decision-making which assigns a deeper level of meaning to information studied in the process. Students also navigate mandatory game elements such as incentive systems to motivate them to fully engage in educational tasks they might otherwise find less appealing, boring, or difficult. Instead,

placed in the role of the protagonist, these students are empowered to make choices, take on challenges, and maximize rewards in the form of badges or achievements (Aguiar-Castillo, et al., 2021).

GBL is not the same as Gamification. GBL is a subset of Gamification. GBL involves an entire gamified education course with clearly defined learning outcomes for learners (Vodenicharova, 2022). This is different than Gamification, which refers to a broader concept, used for learning through educational game play (Vodenicharova, 2022). Therefore, if a higher educational institution adds a game element as one aspect to an academic course that is considered Gamification. If the same higher education institution builds an entire course as an immersive story where all elements are gamified to help the student achieve learning outcomes that is a specific type of Gamification called Game-Based Learning (GBL).

In the past, the positive impact of GBL in higher education has been undervalued (Navarro-Espinosa, et al., 2022). Part of this devaluation comes from a resistance to new modalities of pedagogy by institutions and instructors who are comfortable in their current traditional form of teaching (Navarro-Espinosa, et al., 2022). While some resistance to new innovations is understandable and expected there are advancements in technology over the last ten years specifically which has made the use of gaming in higher education courses more potentially powerful than ever (Djeki, et al., 2020). One of these is the development of Virtual Reality systems.

The GBL approach is rooted in the concept that to facilitate a deeper understanding of course material, students need to be engaged in what they are learning and how to apply it (Vodenicharova, 2022). It is not enough, to present the student with a reading and assess their understanding through testing or papers. GBL presents an opportunity to immerse the student in the educational experience, promoting a deeper level of learning than ever before. Indicators of the impact of GBL on higher education across multiple research studies note improvement in three key areas. These include acquisition and application of course content; motivation and interest in course tasks; and confidence and satisfaction in course completion (Vodenicharova, 2022).

This paper will review the literature on GBL, as a subset of Gamification, as well as examine the use of VR simulations in higher education courses. The purpose of the literature review will be to identify potential gaps in the literature where further research would be useful. Following, the literature review, the paper will explore how the instructional design team at Indiana Wesleyan University used current research to guide its current Introduction to the Sociology course build. Finally, a proposal for future research will be offered.

Literature Review

A recent study at the University of National and World Economy into utilizing GBL in higher education business courses to improve student motivation, activity, confidence, creativity, and teamwork yielded interesting results (Vodenicharova, 2022). This study followed the impact of a higher education course in which used GBL elements including simulation games, interactive presentations, and interactive tests (Vodenicharova,

2022). The study's conclusions found that students self-reported an increase in motivation and learning in GBL courses (Vodenicharova, 2022). Students reported that the GBL system enhanced their knowledge acquisition and helped their decision-making process (Vodenicharova, 2022).

Another recent study which occurred at this time at the University of Extremadura in Spain compared students in a control group of traditional online education utilizing workshops, rubrics, and assignment to an experimental group in a GBL design of the same course utilizing badges, achievements, and leaderboards (Murillo-Zamorano, 2021). This study found that GBL favored an active learning environment where students performed better academically and felt a higher level of confidence in their skills (Murillo-Zamorano, 2021). This study went on to report that in this new modern digital society, students must be given the best opportunity to develop into flexible, confident professionals in their chosen field to compete in the job market (Murillo-Zamorano, 2021). The study challenged the whole academia to consider how it become the needed simulation field where the students as future professionals can learn to take ownership for their own education and carry that forward into their careers (Murillo-Zamorano, 2021).

Academic performance in higher education courses is generally considered to be impacted by cognitive factors and affective-motivational factors (Aguiar-Castillo, et al., 2021). Motivation is generally a difficult process for institutions to encourage (Aguiar-Castillo, et al., 2021). A research study into using GBL with higher education architecture courses showed that student motivation is directly related to learning satisfaction and academic accomplishment (Fernandez-Antolin, 2020). This study found that GBL motivated students to learn and retain course content better than traditional teaching methods (Fernandez-Antolin, 2020).

Motivation comes in two forms, intrinsic and extrinsic. Extrinsic motivation takes the form of being inspired to complete a task to earn a reward or avoid a punishment (Ryan & Deci, 2000). This may include earning a grade or completing a course seen as merely a step towards earning a degree. Learning becomes a necessary evil to push through to earn the degree for the career that one wants. Conversely Intrinsic motivation is when student's feel inspired to finish a task because it is found to be personally rewarding (Ryan & Deci, 2000). Research has concluded that intrinsically motivated learners demonstrate greater academic successes than learners who are extrinsically motivated. Intrinsically motivated learners have been found to be more dedicated to put in more effort into educational tasks, process more complex course material, and use more effective retention strategies (Reeve, 2002).

GBL in higher education strives to create a story in which the course learning makes sense and is meaningful for the student, thereby increasing their intrinsic motivation (Aguiar-Castillo, et al., 2021). Deeper learning accompanies intrinsic student motivation (Deci and Ryan, 2000). Keller's learning model known as the ARCS motivation model is a teaching approach that is proven to increase and maintain motivational learning in students (Fernandez-Antolin, 2020). It identifies four essential motivating factors for learning which include attention, relevance, confidence, and satisfaction (Fernandez-Antolin, 2020). GBL has been identified by research studies as a strong avenue to promote these four motivating factors (Fernandez-Antolin, 2020).

One way the GBL is seen as an innovative and important new higher educational tool is because it challenges learners to be more autonomous and responsible for their learning process (Aguiar-Castillo, et al., 2021). Recent generalized research into higher education indicated that GBL promotes an active learning environment where the students are encouraged to be independent and take ownership of their own scholarship (Murillo-Zamorano, 2021). The instructor is not then seen as the purveyor of course knowledge or the authority over the student's efforts, but rather as a guide or facilitator of the student's own journey to discover the knowledge, develop the skills, and apply the learning (Murillo-Zamorano, 2021). The result is a deeper internalization of the course content and a sense of personal accomplishment in the learners (Murillo-Zamorano, 2021).

One focus of a GBL course is to remove the stigma from not doing well or making a mistake on an educational task and replace this with an environment that encourages students to take risks and try their best (Aguiar-Castillo, et al., 2021). A large-scale study of GBL at Idaho State University used GBL to create a martial arts themed higher education statistics course showed that the GBL course design lowers student anxiety levels significantly (Coffland & Huff, 2022). This research study also identified that students perceived the GBL method was the cause of their lowered anxiety and increased success (Coffland & Huff, 2022).

A large-scale research study in the UK on higher education coursework that was identified to have the most significant attrition rate, yielded interesting results. The study found that all students who participated in GBL gained significant benefits (Zhao, et al., 2022). A higher retention rate was found to be a result among the participants in the GBL course (Zhao, et al., 2022). This study also found that GBL courses that utilized personalization enhanced the deep learning experience of the learners (Zhao, et al., 2022). The same study reported that GBL works best for students who are learning course content for the first time rather than review (Zhao, et al., 2022). It may be that GBL courses work better with introductory higher education classes than upper program review courses.

According to a new research study out of Europe, GBL in higher education promotes deep learning in students, as well as a desire to share their experience with friends (Aguiar-Castillo, et al., 2021). Results also show a correlation between student satisfaction in a higher education course experience and their willingness to engage in deep learning strategies (Aguiar-Castillo, et al., 2021). An interesting finding of this study is the connection between the users' satisfaction and the promotion of the academic institution to others (Aguiar-Castillo, et al., 2021). It was noted that students who had a higher degree of satisfaction in a course, were more likely to engage in word-of-mouth promotion of the higher education institution (Aguiar-Castillo, et al., 2021). Another interesting finding arising from recent research showed that GBL designed higher educational coursework is generally well accepted by the student body and results in an enhancement in the academic reputation of the institution (Aguiar-Castillo, et al., 2021).

Current meta-analysis of the use of GBL in higher educational coursework showed it can enhance student enthusiasm and performance substantially (Navarro-Espinosa, et al., 2022). The incorporation of GBL into higher education course appear to show a notable increase of student motivation, course movement, skill

development, and information retention (Buckley & Doyle, 2016). This analysis is based on the research of the perceptions of both the instructors and students in gamified courses (Buckley & Doyle, 2016).

Despite the many studies indicating the positive proponents of GBL, there do exist detractors in the higher educational field who would focus on more traditional, passive course constructions that place the instructor as the master authority of the course content with students following prescribed assignments to earn points towards a grade (Murillo-Zamorano, 2021). These detractors distrust the student having autonomy in the active learning environment of GBL (Murillo-Zamorano, 2021). Instructors may even fear losing their positions due to the proliferation of GBL, but this form of education still needs the competent instructor. The role of the instructor must though shift to come alongside the student as a humble leader and guide through the growth process, rather than someone dictating information.

In summary, current research has shown that GBL increases students' intrinsic motivation, deeper learning, decision-making skills, flexibility, confidence, knowledge retention, autonomy, and satisfaction. Research also illustrates how a secondary effect of GBL's positive impact on course retention rates, the institution's academic reputation, and word-of-mouth promotion of the university. There appears to be two gaps in the existing literature that this study can fulfill. First, an exhaustive search of GBL higher education studies shows a lack of application of GBL to sociology courses. Second, the same search found a lack of literature concerning using VR in GBL course design. These literature gaps combine in the current Introduction of Sociology VR GBL course build at IWU.

GBL Design Elements

Research shows that for GBL to have significant impact on student learning, the game elements must be designed with the expected learning results in mind and actively promote learner involvement (Guillén-Nieto & Aleson-Carbonell, 2012). It appears to be very important to identify the learning outcomes of the GBL course first and work towards them through each gamified experience.

Several research studies have proven that when learners experience fun during their studies, satisfaction increases significantly (Aguiar-Castillo, et al., 2021). It is important to keep GBL experiences engaging and entertaining. Having a strong story element that the student could lose themselves in also can aid in achieving fun. Conversely, teaching such a course may be considered fun for the instructor as well.

Perceived ease of use also positively impacts student satisfaction of the overall course (Aguiar-Castillo, et al., 2021). It is important not to overly complicate the GBL course with difficult interactions and instructions. Keeping it simple and using repetition to encourage student mastery over the course mechanics is imperative. A tutorial may be indicated to help with this process.

Studies have found that GBL factors that enhanced student learning included competence-based learning, achievement rewards, creativity opportunities, and concept challenges (Zhao, et al., 2022). In designing the GBL course, designers need to explore how to incorporate each of these elements into the flow of the class proportionately.

Research identifies that GBL elements that lower student anxiety and improve performance include storyline, achievements, personalization, segmenting, boss battles, and use of multi-media experiences (Coffland & Huff, 2022). All these elements are important to a GBL build, but the instructional team needs to keep an ongoing communication throughout the process to maintain balance and inclusion.

Tasks that seemed specifically impactful in GBL higher education courses include experiential web-based experiences resulting in a deliverable (Aguiar-Castillo, et al., 2021). Research shows these experiences result in higher student motivation and deep learning benefits (Aguiar-Castillo, et al., 2021). Effective GBL in higher educational courses incorporates cutting edge technology into the class and invites the learners to immerse themselves into the experience (Aguiar-Castillo, et al., 2021). The cutting-edge technology for immersion today is Virtual Reality (VR). The inclusion of VR into GBL has not been significant up until now, but advances in VR are making this an active field for growth.

To be most effective, GBL of higher education courses must focus on learners working towards prizes such as leaderboards, achievements, and badges rather than grades (Aguiar-Castillo, et al., 2021). Many GBL efforts utilize the PBL triad: Points, badges, and leaderboards (Murillo-Zamorano, 2021). As students accomplish the course objectives, studies show that receiving an educational badge increases their motivation (Aguiar-Castillo, et al., 2021). Best practice in this field has these earned prizes in turn impact the student's final grade (Aguiar-Castillo, et al., 2021). These GBL elements invite the student to be engaged in the story of the course and have fun with the process. This lessens anxiety over grades.

Research shows that the inclusion of a process where students complete a profile helps with commitment to the story (Aguiar-Castillo, et al., 2021). This allows students to join into the creation process with the instructional design team and enjoy their course progress on a whole new level. Studies show that feedback about a learner's game task performance in the form of status gains improve the student's sense of belonging in the course scenario (Aguiar-Castillo, et al., 2021). Evaluations by the instructor should be interwoven into the course storyline to encourage learners to feel immersed fully into the storyline. Research shows that replacing traditional instructor grading with an assessment based on a rating system like one to five stars better encapsulates the game theory into the evaluation process (Aguiar-Castillo, et al., 2021).

Another GBL task that promotes learning in higher education courses is having the learner contribute something they have designed or created to a shared online platform (Aguiar-Castillo, et al., 2021). This improves student belonging to the process and competence in the learning area.

Virtual Reality

Virtual Reality (VR) technology uses sensory devices to immerse users in 360-degree environments (Liu, 2022). VR achieves attributes of high engagement, interactivity, and creativity (Liu, 2022). This technology immerses the student in a three-dimensional simulation where they are integrated directly into the experience. New studies show using VR in higher education political science courses challenges the students to move from passive acceptance of course content to an active autonomous learning (Liu, 2022).

The use of VR has increased dramatically over the last decade as head-mounted display (HMD) units have become more affordable and available (Hagge, 2021). Researcher's note that educational trends show VR use in education is becoming more prevalent (Hagge, 2021). Modern VR simulations allow students to take part in learning opportunities not achievable in a physical classroom or home setting (Hagge, 2021).

VR allows education to enter the metaverse. The metaverse is currently considered a disconnected VR platform that can be accessed through different levels of immersion including full-immersion using head-mounted displays, semi-immersion using projection screens, and non-immersion using desktop-based VR (Stewart, 2022). Therefore, a course could be built in VR leaving it up to the student to decide which level of immersion they are comfortable with. The more immersive the experience is, the more impactful it will be to the learning that accompanies it.

A recent study at Stanford University on running a VR classroom found the benefits of VR was that it provided the learner with an immersive, interactive, experiential environment (Stewart, 2022). Participants felt that VR made education more accessible, since people could take a university course from anywhere in the world in a constructed environment that reflected the learning outcomes (Stewart, 2022). A student who underwent a 10-week course in VR at Stanford University noted this, "Learning in VR is nothing like what you'd expect. Simply existing within VR cannot be described to one who has never experienced it. The metaverse and all its features force you to think about how we understand the technology and the world around us, and the way we have come to live in a society on autopilot. In a way that can't be described and can only be felt, the metaverse shows you how to disable that autopilot and be actively aware of your presence and existence within a space. It changes your perspective on how much power we have as humans not just within a society, but within ourselves." (Stewart, 2022, p. 14).

A recent study reported that use of VR for educational purposes taps into visuospatial memory states to increase active memory training and promote learned retention (Mathes, 2021). It posits that how a student perceives and moves within a learning environment significantly impacts how they subsequently recall and retain course material (Mathes, 2021).

A research study done in a higher education geography course has shown that while students may have initial fear or anxiety concerning the use of VR in higher education coursework, surveys of the same students after

taking part in VR experiences show an increase in positive perceptions towards the technology (Hagge, 2021). These study results strengthen the case for using VR technology in a GBL course build.

Method of Loci

The Method of Loci is a memory retention technique originally posited by Cicero in his *De Oratore*. It is also referred to as the journey method, or the mind palace technique. The Method of Loci involves using visualization of spatial environments to increase deeper learning (Sims, et al., 2022). This memory technique is widely used and taught to enhance retention of learned material. With the utilization of VR technology to provide immersive environments, Method of Loci can be practiced within the confines of the online coursework providing a more intense level of learning hereto unachievable for students. Students in the GBL, VR course are challenged to seek out their learning experience in an interactive city environment called “Curios City”. The act of searching through the immersive, three-dimensional, 360 degree learning environment promotes linking key concepts to their lived experience. No longer is a student tasked with imagining the experience of identifying course material and locating it in a mind’s eye version of a palace, for now they can place on the VR hardware and freely explore those places pre-designed for just such a purpose.

IWU GBL VR Build

The effort of the build at Indiana Wesleyan University was not only to use a meta-analysis of Gamification research studies to identify the most impactful and positive elements of this course design to construct a GBL VR version of Introduction to Sociology. In doing this the instructional design team went through a series of critical analysis of the course build each time leaning more into the GBL concept until a point was reached where traditional education had to be sacrificed for the betterment of the student experience. The following list is what was identified from recent research studies to be core elements of a successful GBL build.

- Achievement prizes rather than grades (Aguiar-Castillo, et al., 2021)
- Competence-based learning (Zhao, et al., 2022)
- Concept challenges instead of traditional assignments (Zhao, et al., 2022)
- Creativity opportunities (Zhao, et al., 2022)
- Cutting edge immersion technology (Aguiar-Castillo, et al., 2021)
- Easy to use (Aguiar-Castillo, et al., 2021)
- Educational badges that impact final grade (Aguiar-Castillo, et al., 2021)
- Experiential web-based experiences with a deliverable (Aguiar-Castillo, et al., 2021)
- Feedback in the form of status gains (Aguiar-Castillo, et al., 2021)
- Fun (Aguiar-Castillo, et al., 2021)
- Instructor Evaluations interwoven into the storyline (Aguiar-Castillo, et al., 2021)
- Interactive presentations (Vodenicharova, 2022)
- Interactive tests (Vodenicharova, 2022)

Learner creation contribution to a shared online platform (Aguiar-Castillo, et al., 2021)
Learning Outcome driven (Guillén-Nieto & Aleson-Carbonell, 2012)
Multi-media experiences (Coffland & Huff, 2022)
Opportunity for Personalization (Coffland & Huff, 2022)
Rating system replacing traditional grading (Aguiar-Castillo, et al., 2021)
Remove stigma of failure (Aguiar-Castillo, et al., 2021).
Segmenting (Coffland & Huff, 2022)
Boss battles (Coffland & Huff, 2022)
Simulation games (Vodenicharova, 2022)
Strong storyline (Coffland & Huff, 2022)

With these core GBL elements in mind the Instructional Design Team (IDT) for the Introduction to Sociology (SOC 150) online GBL VR build at IWU first worked on what the Course Learning Outcomes would be. Seven Course Learning Outcomes (CLOs) were developed and scaffolded in the SOC 150 build. These learning outcomes served a guide for the rest of the course build process. Each experience of the SOC 150 build had one to three CLOs grounding it in educational value. This was designed to meet the core GBL element of being Learning Outcome driven (Guillén-Nieto & Aleson-Carbonell, 2012)

A Course Map was constructed from the initial instructional design meeting to guide the build process. The IDT would meeting weekly to advance the build. In between meetings, dozens of emails were shared back and forth serving brainstorming and critique functions. An introduction to the course was written to be delivered to the prospective student by an AI Chatbot persona that would serve as a job coach and tour guide to the learners throughout the course. We focused on making the story and resulting course flow meet the GBL element of fun and engaging.

After several sessions of the IDT, a story concept was settled on for SOC 150. Since the course was an introductory study of sociology, it was believed that the story should be grounded in the student taking part in building a community of people. That way, the sociological concepts could be learned and then applied to the community. The story evolved into a new community called Curios City that was created by the Curios City Council. The Council then hires a Community Builder (played by the student) to learn sociological concepts and apply them to the community to help it grow into a thriving society. This was designed to meet the core GBL element of strong storyline (Coffland & Huff, 2022).

The traditional Course Menu was replaced by an interactive Community Map divided into 5 Neighborhoods rather than the usual weekly workshops. The Community Builder (student) would navigate the Curios City Community Map to find and engage in VR simulations to learn sociology concepts and then apply them to the Community in an academic deliverable. This was designed the meet the GBL element of using cutting edge technology to provide experiential web-based experiences with a deliverable (Aguiar-Castillo, et al., 2021).

Challenges throughout the community build take many forms including Tutorial, Avatar Creation, Case Study Video Interviews, Experiential Project Report, Social Change Paper, Praying in Color Spiritual Forums, VR Experience with Memo Reviews, and Conversational Essays. This meets the GBL element of interactive presentations, creativity opportunities, Learner creation contributions to a shared online platform, and simulation games (Zhao, et al., 2022).

The Community Builder begins the game by creating an Avatar that can be moved around the Community Map. This meets the core GBL element of opportunity for personalization (Coffland & Huff, 2022). The Community Builder then undergoes a tutorial to acclimate the learner to the game elements and course mechanics. This meets the design GBL element of making the system easy to understand and use (Aguiar-Castillo, et al., 2021).

In the story, the Curios City Council also hires a renowned master Sociologist (instructor) to monitor the Community Builder's progress and make sure each sociology concept is applied in an effective and healthy manner. This was designed to meet the core GBL element of instructor evaluations interwoven into the storyline (Aguiar-Castillo, et al., 2021). SOC 150 was designed to have four levels of nontraditional academic evaluation to engage the learner. These included Competence Scales, Educational Badges, Title Achievements, and a Community Completion Award to best maximize learning (Fischer, et al., 2016). This met the core GBL element of achievement prizes rather than grades (Aguiar-Castillo, et al., 2021). All 4 levels of evaluation combine for a Final Growth Report instead of a grade. This met the core GBL element of educational badges that impact the final grade (Aguiar-Castillo, et al., 2021)

There are no linear workshops in the SOC 150. Instead, the Neighborhood areas were designed to each reflect a different part of Curios City that be accessed in whatever order the Community Builder sees fit. This empowers the learner to control the course flow for her/himself and direct her/his own educational experience. This meets the GBL element of segmenting the course (Coffland & Huff, 2022). There are five Neighborhoods in total including Town Square, the Suburbs, Downtown, Uptown, and Campus town. Each Neighborhood was designed to have 3 Points of Interest and 1 Key Person. Each Point of Interest is a different building. Every Point of Interest is a gateway to a Challenge simulation. This meets the core GBL element of concept challenges instead of traditional assignments (Zhao, et al., 2022).

When the Community Builder successfully attempts a Challenge, s/he does this by guiding the Avatar to enter a VR simulation of a relevant Concept Challenge environment. For example, if the learner enters the Library Point of Interest, her/his Avatar appears in the hall before the Circulation desk with shelves of books all around them for the Library. This repeats with any Concept Challenge (i.e., enter City Hall see hallways of Office doors, enter the Park and see walking paths, etc.). If the learner completed the Library challenge and it is accepted by the Sociologist, the Point of Interest is replaced by an actual Library building Badge on the Community Map.

After the Community Builder completes all Points of Interest in a Neighborhood, then the learner can meet with

the Key Person. This meets the GBL element of Boss battles (Coffland & Huff, 2022). There are 20 Challenges across the entire community build. The Community Builder must review all resources within the environment including readings, 360 videos, and VR simulations. This meets the GBL design element of using multi-media experiences (Coffland & Huff, 2022). After that the learner submits an assigned academic deliverable for the Sociologist to review. If the Challenge is with a Key Person, the Community Builder engages in an interactive conversation with the AI Chatbot about key sociology concepts learned in that Neighborhood that is recorded for the Sociologist to review. This is designed to meet the GBL element of interactive tests (Vodenicharova, 2022).

The Sociologist reviews the Community Builder's submissions using a Competence Scale designed specifically for that Challenge. This is designed to meet the GBL element of Competence-Based Learning (Zhao, et al., 2022). The Sociologist uses a Competence Scale to determine whether a Challenge is good enough to be "Accepted". If the Challenge is "Accepted", then Community Builder earns the relevant Badge in the form of a building. So, if the learner completes the City Hall Challenge, then s/he earns a City Hall building which appears on the Community Map. This is designed to meet the GBL core element of using a rating system to replace traditional grading (Aguiar-Castillo, et al., 2021)

If the Community Builder's submission is not accepted, then the Community Builder receives a "Try Again" indicator with some Review Notes. The Sociologist will provide the Community Builder with individualized Review Notes that will help her/him be successful when the learner retakes the Challenge. The Community Builder can attempt the Concept Challenge again and resubmit for review by Sociologist until the Community Builder either passes the Concept Challenge or the SOC 150 community build 5-week timeframe ends. It is important to note, that the Community Builder does not have to wait until one Challenge submission is "Accepted" before working a different Challenge. This meets the GBL element of removing the stigma of failing and allows for learners to continue working on a concept until they master it (Aguiar-Castillo, et al., 2021).

The building Badges reflect the Community Builder completing a successful review of the sociology concepts linked to Points of Interest. These Badges include buildings on the map that include the "Welcome to Curios City!" Sign, Library, City Hall, Park, Church, Family Homes, Community Center, Welfare Department, Transportation Department, Café, Courthouse, Hospital, School, Office, and Fairgrounds. Completing a Key Person meeting also awards the Community Builder a Badge in the form of the Mayor, Pastor, Social Worker, Judge, or Dean standing in the neighborhood where they were based. Each educational Badge earns the Community Builder rewards towards the Final Growth Report.

The Community Builder starts out as a "Novice Community Builder". Every time the Community Builder completes an entire Neighborhood, s/he earns a Title Achievement which earns credit towards the Final Growth Report calculation. The Title Achievements are earned in this order no matter which Neighborhood the Community Builder finishes first, second, and so on. After the first Neighborhood completion, the Novice

Community Builder becomes a “Developing Community Builder!”. After the second Neighborhood completion, the Developing Community Builder becomes an “Outstanding Community Builder!”. After the third Neighborhood completion, the Outstanding Community Builder becomes an “Expert Community Builder!”. After the fourth Neighborhood completion, the Expert Community Builder becomes a “Master Community Builder!” After the fifth Neighborhood completion, the Master Community Builder becomes a “Legendary Community Builder!” This meets the GBL element of Feedback in the form of status gains (Aguiar-Castillo, et al., 2021).

If the Community Builder completes all Concept Challenges, earns all Educational Badges, and gathers all Title Achievements, s/he receives a Community Completion Award that gives the learner credit towards her/his Final Growth Report. All these factors combine into the Final Growth Report that the Community Builder can monitor at any time throughout the course. In addition, extra credit is built into the course in the guise of completing surveys. These appear on the Community Map as “Bridge to the Future” badges at the north, south, east, and west aspects.

IWU GBL VR Process

The instructional design approach to Gamification of SOC 150 at IWU took many stages. The first stage was to develop a shared vision of the class by the IDT. The team needed a multidisciplinary approach with different build members championing different aspects of the build whether it be story immersion, academic integrity, technology interface, or learner experience. This also involved the team member getting to know and understand each other’s perspective, strengths, and potential blind spots.

The second stage was for the team to collaborate a storyline that would capture the course learning objectives (CLOs) in a believable way to encourage student buy in. This was a dynamic process that would be returned to several times throughout the rest of the build process. It was important to the instructional design team for the course to have educational integrity overlaid with engaging fun gameplay. All traditional language was systematically removed from the GBL build.

The third stage was to utilize the developed story as a guide to design game experiences that would effectively capture course concepts in an engaging way. Many challenges were designed and reworked. Many were thrown out even after significant work had taken place if they did not fit into the story while being anchored in the CLO. Many traditional aspects of online education were deconstructed in the process. There was nothing considered off limits as conventions like workshops, rubrics, gradebooks, linear flow, and more were removed from the build to make way for new exciting GBL elements based on research.

The fourth stage was to settle on the best technology that would deliver the GBL experience in a truly immersive way. The team agreed early on that the Introduction to Sociology GBL build would work best if done using VR simulations. Research into various VR educational programs and learning management supplements

occurred with the team sharing resources. The instructional design team agreed the Engage platform would work best with this build. Engage is a leading metaverse platform founded in 2014 as an XR studio featuring educational programming (Stewart, 2022). Engage is accessible through VR, desk-top computers, tablets, and mobile devices. The platform utilizes avatars (personalized self-representations), multiple virtual locations, and IFX (3D objects) (Stewart, 2022). Engage also has teleport function to reduce instances of cybersickness (Stewart, 2022). Engage was recently used to run a 10-week Communication course at Stanford University which resulted in two case studies reviewed by the SOC 150 Subject Matter Expert.

The fifth stage was to build the mechanics of the course in a way that brought the four previous levels together in a powerful way for prospective learners. There was a continual process of editing and reworking emanating from frequent instructional team meetings and email conversations.

Indiana Wesleyan University is a Christian university. When looking at any type of class build, it was important to make sure that it is biblically sound. There was an idea early in the build to have the class to mimic the Holy Trinity and how it works within our lives. By doing this, not only are biblically sound principles introduced into the class, but the learner is also exposed to the practicalities of how God works within lives.

In traditional educational systems, the teacher is the master authority over the course and material. Conversely, the student is a passive participant absorbing the information given. Christianity breaks this mode though calling for people to be active participants in their own faith and growth, while Christ comes alongside them. This active learner and partnering teacher dynamic became the basis for the GBL course build. Instead of the instructor being the master authority, giving information to the passive student, the instructor now comes alongside the student and actively working with them to create the thriving community.

In the GBL course, the City Council is equivalent to God having created Curios City for people to live and enjoy. Despite this, issues of prejudice, conflict, and inequality have taken root in Curios City. The City Council is an entity in relationship beyond the scope of the perception of the GBL build that has called upon the Community Builder to join in the creation process. The City Council can be seen though in the reflection of its creation Curios City. It wants good things for the people of Curios City.

The Tour Guide/Job Coach (“JC”) is reflective of Jesus Christ. The Community Builder is called to be active participants in the community and JC comes alongside her/him. Even though Jesus is the master of all things, He never comes at people in such a manner. Instead, He walks with us, guides us, directs us, and provides an empathic ear. He allows us to fall and get back up and try again. In fact, He encourages to have peace amid the struggle. In the course, JC guides the Community Builder through the course and teaches her/him what the learner’s role is, as well as how to accomplish it. JC never forces his viewpoint on the Community Builder, but rather offers ways to move forward on a good and rewarding path.

The Holy Spirit is represented by the Sociologist within the GBL build. This is the role that the instructor plays in the GBL course. The Holy Spirit convicts people of what is right or wrong; good or evil; healthy or unhealthy for their walk in this life. The Sociologist, in this role, provides feedback to the Community Builder on the best approach and application of course concepts, but ultimately it is up to the Community Builder what s/he does with that feedback.

The Community Builder (student) can choose to follow or go his or her own way. The Sociologist works with the Community Builder strengthening her/his resolve, cheerleading and challenging the learner.

Conclusions

Despite detractors, GBL has been shown across multiple research studies to improve student motivation, learning, and retention if its design meets core GBL elements. These elements form a roadmap for academics to create new effective GBL learning opportunities. VR is an evolving technology that when utilized within GBL courses can take the learning opportunities to a whole new level. VR GBL has the potential to revolutionize the higher education system if enough educators and students are willing to pioneer these early courses and share their experiences. Continued research into what works and what doesn't will help develop best practices in VR GBL.

Future Research

IWU intends to run a research study with the first year of the GBL VR version of Introduction to Sociology. This would best occur using a quasi-experimental design of student experimental group within a GBL VR learning instructional course and a control student group non-GBL VR learning instructional condition. This would allow IWU to compare students in a control group of traditional online education utilizing workshops, rubrics, and assignment to an experimental group in a GBL VR design of the same course utilizing badges, achievements, and rating system.

A recent study into GBL course in higher education programming courses identified three key components of GBL. These entailed 1) usability of the game; 2) impact on knowledge acquisition; and 3) user experience (Zhao, et al., 2022). Another study into using GBL in higher education hospitality programs identified five key components to survey student's perceptions on a gamified course experience being usability, fun, usefulness, reward, and satisfaction (Aguilar-Castillo, et al., 2021). We intend to use these and other studies as a guidepost for our scholarly approach. Based on the above information, the following hypotheses have been put forward:

H1: Perceived usability of the GBL VR will positively affect student perception of the course.

H2: Perceived fun of the GBL VR will positively affect student perception of the course.

H3: Perceived value of the GBL VR will positively affect student perception of the course.

H4: Perceived motivation of the GBL VR will positively affect student perception of the course.

H5: Perceived knowledge acquisition of the GBL VR will positively affect student perception of the course.

H2: Perceived satisfaction of the GBL VR will positively affect student perception of the course.

A survey will be developed to examine each of these core GBL fundamentals and administered in the course to both the control and experimental groups. These survey questions will be charted on a 5-point Likert scale including [1] Strong Disagree, [2] Disagree, [3] Neutral, [4] Agree, and [5] Strongly Agree.

The Survey will follow these 4 key components:

Usability:

“I find it easy to navigate the course elements”

“I have no problems completing my work in the course.”

“I think the instructions for the course are easily understood.”

Fun:

“I find the course is an engaging approach to Sociology”

“I believe the class elements are fun.”

“The course experiences make these concept interesting.”

Value:

“I think the course elements are useful to study Sociology.”

“I think the information presented about Sociology is valuable to know it deeply.”

“I find the course allows me to apply my learning of Sociology.”

Motivation:

“I feel motivated by the course feedback to achieve”

“I thought that my achievements in the course were reflected well”

“I felt the use of course elements were helpful in encouraging deep learning.”

Knowledge Acquisition:

“I thought the course elements helped me understand course concepts”

“I felt I learned a lot in this course.”

“I believe I will retain this information after the course is over.”

Satisfaction:

“I found the course to be a positive experience.”

“I would recommend the course to others.”

“I would choose a course like this again in the future.”

All data from the surveys across 1 year of coursework will be evaluated to determine whether the relationships between the variables of the IWU research study adequately reflect the correlations observed in the literature review.


References

- Aguiar-Castillo, L., Clavijo-Rodriguez, A., Hernandez-Lopez, L., De Saa-Perez, P., Perez-Jimenez, R. (2021). Gamification and deep learning approaches in higher education. *Journal of Hospitality, Leisure, Sport & Tourism Education* 29. 100290. Retrieved from <https://doi.org/10.1016/j.jhlste.2020.100290>
- Buckley, P., Doyle, E. (2016). Gamification and Student Motivation. *Interact. Learn. Environ.* 24, 1162–1175.
- Coffland, D., & Huff, T. (2022). Stats Kwon Do: A Case Study in Instructional Design, Multimedia and Gamification of Instruction. *TechTrends* 66, 945–956. <https://doi.org/10.1007/s11528-022-00793-y>
- Djeki, E.; Dégila, J.; Bondiombouy, C.; Alhassan, M.H. (2020). E-Learning Bibliometric Analysis from 2015 to 2020. *J. Comput. Educ.*
- Fernandez-Antolin, M., Manuel del Río, L., Gonzalez-Lezcano, R., (2020). The use of gamification in higher technical education: perception of university students on innovative teaching materials. *International Journal of Technology and Design Education.* 31:1019–1038. Retrieved from <https://doi.org/10.1007/s10798-020-09583-0>
- Fischer, H., Heinz, M., Schlenker, L., Follert, F., (2016). “Gamifying Higher Education. Beyond Badges, Points and Leaderboards”. International Forum on Knowledge Asset Dynamics. Technische Universität Dresden, Media Center. Retrieved from https://www.researchgate.net/publication/306038063_Gamifying_Higher_Education_Beyond_Badges_Points_and_Leaderboards
- Guillén-Nieto, V.; Aleson-Carbonell, M. (2012). Serious Games and Learning Effectiveness: The Case of It’s a Deal! *Computer Education*, 58, 435–448.
- Hagge, P., (2021). Student Perceptions of Semester-Long In-Class Virtual Reality: Effectively Using “Google Earth VR” in a Higher Education Classroom. *Journal of Geography in Higher Education.* 45, NO. 3, 342–360. Retrieved from <https://doi.org/10.1080/03098265.2020.1827376>
- Liu, D., (2022). Research on the Application of VR Technical Ability in Political Education in Colleges and Universities. *Scientific Programming.* Article ID 7587820, Retrieved from <https://doi.org/10.1155/2022/7587820>
- Mathes, D., (2021). Efficacy of Virtual Reality Learning. *Librarium Research and Learning.*
- Murillo-Zamorano, L., Bueno Muñoz, C., Ángel, J., Sánchez, L., Godoy-Caballero, A., (2021). Gamification and active learning in higher education: is it possible to match digital society, academia and students’ interests? *International Journal of Educational Technology in High Education.* 18:15. Retrieved from <https://doi.org/10.1186/s41239-021-00249-y>
- Navarro-Espinosa, J., Vaquero-Abellán, M., Perea-Moreno, A., Pedrós-Pérez, G., Martínez-Jiménez, M., and Aparicio-Martínez, P., (2022). Gamification as a Promoting Tool of Motivation for Creating


- Sustainable Higher Education Institutions. *Int. J. Environ. Res. Public Health* 2022, 19, 2599.
Retrieved from <https://doi.org/10.3390/ijerph19052599>
- Reeve, J. (2002). *Self-determination theory applied to educational settings*.
- Ryan, R. M., & Deci, E. L. (2000). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology*, 25(1), 54–67.
- Simonds, J., E. Behrens, and J. Holzbauer (2020). Competency-based education in a traditional higher education setting: a case study of an introduction to psychology course. *International Journal of Teaching and Learning in Higher Education* 29: 412-428.
- Sims, R., Chang, B., Bennett, V., Krishnan, A., Aboubakar, A., Coman, G., Bahrami, A., Huang, Z., Clarke, C., & Karnik, A. (2022). Step into My Mind Palace: Exploration of a Collaborative Paragogy Tool in VR. In A. Dengel, M-L. Bourguet, D. Pedrosa, J. Hutson, K. Erenli, D. Economou, A. Pena-Rios, & J. Richter (Eds.), *Proceedings of 2022 8th International Conference of the Immersive Learning Research Network, iLRN 2022* [9815936] IEEE. <https://doi.org/10.23919/iLRN55037.2022.9815936>
- Stewart, N., (2022). Virtual reality, metaverse platforms, and the future of higher education. University of Ottawa. Media Development.
- Townsley, M. and D. Schmid (2020). Alternative grading practices: An entry point for faculty in competency-based education. *Competency-based Education* DOI: <https://doi.org/10.1002/cbe2.1219>.
- Vodenicharova, M., (2022). Gamed-based Learning in Higher Education. *TEM Journal*. Volume 11, Issue 2, pages 779-790, ISSN 2217-8309, DOI: 10.18421/TEM112-35, May 2022.
- Zhao, D., Muntean, C. , Chis, A., Rozinaj, G., Muntean, G. (2022). Game-Based Learning: Enhancing Student Experience, Knowledge Gain, and Usability in Higher Education Programming Courses. *IEEE Transactions on Education*, 65 (4).

Examining the Pros and Cons of Resuming Face-to-Face Teaching: A Case Study of the Leveling Course at Universidad de las Fuerzas Armadas - ESPE Sede Latacunga


Víctor Rubén Bautista Naranjo

Universidad de las Fuerzas Armadas- ESPE, Ecuador,  <https://orcid.org/0000-0002-2803-8225>


Ivonne Angélica Jiménez Vinueza

Universidad de las Fuerzas Armadas- ESPE, Ecuador,  <https://orcid.org/0009-0009-2955-7922>

Iván Ricardo Bautista Naranjo

Universidad de las Fuerzas Armadas- ESPE, Ecuador,  <https://orcid.org/0009-0006-5194-3588>

David Raimundo Rivas Lalaleo

Universidad de las Fuerzas Armadas- ESPE, Ecuador,  <https://orcid.org/0000-0001-5958-6606>

Abstract: The aim of this study is to conduct a situational analysis of the benefits and drawbacks of returning to face-to-face courses in the Leveling Courses of the Universidad de las Fuerzas Armadas ESPE Sede Latacunga during the post-COVID-19 era. This will be done by comparing the virtual study mode in 2022 to the face-to-face mode in 2023. The results of this analysis will assist higher education institutions in creating interventions that promote resilience in students who are transitioning from high school to undergraduate education and reducing dropout rates. The study employs prospective methods that include historical-logical empirical methods and a review of relevant documents. The findings of the study indicate that face-to-face attendance has a positive impact on students' classroom experience. The study also highlights the need for a paradigm shift in higher education based on this experience. The proposed solution involves updating the curricula, embracing the expanded use of information and communication technology (ICT), enhancing students' soft skills, improving pedagogical training, and reinforcing hybridization to provide a defense against constant crises.

Keywords: Classroom Education, Distance Education, Virtual Education

Citation: Bautista Naranjo, V. R., Jiménez Vinueza, I. A., Bautista Naranjo, I. R., & Rivas Lalaleo, D. R. (2023). Examining the Pros and Cons of Resuming Face-to-Face Teaching: A Case Study of the Leveling Course at Universidad de las Fuerzas Armadas - ESPE Sede Latacunga. In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023-- International Conference on Social and Education Sciences* (pp. 321-330), Las Vegas, NV, USA. ISTES Organization.

Introduction

The COVID-19 Coronavirus pandemic has accelerated many changes in society, defines our time and is the greatest challenge humanity has faced so far this century. Higher Education is not exempt from the psychological and academic effect it caused in university students (Martínez-Rivera, 2022; Zapata-Ospina et al., 2021), due to the digitalization of human activities and relationships, the economy and the health system, causing uncertainty about the future and impeding their academic performance and personal well-being (Rodríguez-Alarcón et al., 2022) and was evident in the change from virtuality to the current normality in classrooms.

Since March 2019, universities have adopted remote or virtual modalities for their educational processes, using online platforms (Roque et al., 2021) to provide both synchronous and asynchronous learning opportunities via smartphones with internet access, laptops, or tablets. However, this new education model, which involves self-learning, has caused many students to drop out (Prince, 2020). Limited access to technological devices and the internet connection (Oloris & Fernández, 2021) has played a determining role in the learning competence of students (Carabantes et al., 2021).

In a scale measuring academic repercussions from 13 Latin American countries, other factors contributing to student dropout include poor adaptation, low GPA, and the possible accelerated pace of classes (Rodríguez-Alarcón et al., 2022). COVID-19 has also had a significant impact on university teachers, with economic, emotional, and social effects due to the pressure to adopt new methodological structures and develop pedagogical and technological competencies in response to the health emergency (Burbano et al., 2020; Cevallos et al., 2023). The pandemic has also presented new challenges for teaching practices and policies in the development of digital learning (Shah et al., 2021).

Ecuador's higher education system consists of universities, polytechnic schools, technical and technological institutes, and other higher education centers recognized by the State. The system is divided into two main levels: the Higher Technical Level and the Third Level. The Higher Technical Level comprises technical and technological training programs of short duration (ranging from 1 to 3 years) that are taught in technical and technological institutes. On the other hand, the Third Level includes undergraduate programs (bachelor's degrees) and graduate programs (master's and doctoral degrees) offered by universities and polytechnic schools. Leveling Courses system serves as a preparatory stage for higher education and is crucial in ensuring that students have the necessary skills and knowledge to excel in their studies. Leveling courses, while not formally considered part of higher education, are a prerequisite for admission and play a vital role in reducing student dropout rates due to academic difficulties (Altamirano & Alarcón, 2020).

In this study, we aim to analyze the academic progress of students enrolled in the leveling course of various programs at the Universidad de las Fuerzas Armadas ESPE, Latacunga campus, who have recently transitioned

from virtual to face-to-face classes after three years. The Universidad de las Fuerzas Armadas ESPE is a public higher education institution with a century-long history, located in Sangolquí, Ecuador, with additional campuses in Santo Domingo and Latacunga. The Latacunga campus primarily serves students from middle socioeconomic backgrounds in the central region of the country, with a minority from other provinces of Ecuador.

The research begins with a thorough review of relevant literature, including research articles, reports, surveys, and testimonies of both teachers and students regarding the new reality of face-to-face teaching after the COVID-19 pandemic. The objective is to identify the advantages and disadvantages of returning to traditional classroom instruction and explore its potential correlation with student dropout rates. This is a critical issue that has been extensively studied by scholars (Acevedo Calamet, 2021) and requires endogenous solutions to transform the university system (Barrios et al., 2022). Such solutions must include a paradigm shift in higher education that emphasizes creativity and innovation.

Method

The article presented was developed using a mixed-methods approach, which allowed for a more comprehensive understanding of the phenomenon under study (Hernández-Sampieri & Mendoza, 2018). The study was theoretical in nature, as it aimed to interpret the reality of post-pandemic higher education. It had a descriptive scope, as it utilized reports, testimonies from teaching staff, and statistical data from students who completed the Leveling Course at the Universidad de las Fuerzas Armadas - ESPE sede Latacunga Headquarters, to explain how they behaved upon returning to face-to-face classes. The qualitative data collected through interviews and surveys provided an in-depth perspective of the subjective experiences of the participants, while the quantitative data allowed for a more objective analysis of the situation. The mixed-methods approach used in this study enhanced the validity and reliability of the findings, as it provided a more complete understanding of the phenomenon under study.

Study Area

The historical-logical method was used to conduct a comprehensive study of the impact of the COVID-19 pandemic on higher education, focusing on the internal issues that require further research. The objective of this research was to analyze the experiences of students and teachers in the Leveling course at the Universidad de las Fuerzas Armadas ESPE Sede Latacunga SII 2022. The study aimed to compare the remote and face-to-face modalities, with university professors providing insights into the transition. Simple random sampling was used to select a representative sample of students and teachers from various subjects. The study initially involved 1081 students and 44 teachers, but the equation proposed by Trujillo (2015) was used to determine a sample of 292 students for the survey. This approach enabled us to gather both objective and subjective data and obtain a deep perspective on the phenomenon.

Research Tools

The study conducted an assessment of the benefits and drawbacks of face-to-face attendance in the Leveling course based on the perceptions of teachers from the Department of Exact Sciences, which was documented in Table 1. The information was gathered from coordination reports and testimonies by study areas and then synthesized to construct surveys that categorized the advantages and weaknesses of this educational modality. Initially, the study had a large sample size of 1081 students and 44 teachers, and a sample of 292 students was selected using the equation established by Trujillo (2015) for survey administration. The questionnaires were developed in-house and consisted of demographic data, such as age and gender, and a rating scale for evaluating the strengths and weaknesses of face-to-face attendance in the Leveling course. The surveys were administered using Google Forms and comprised two dimensions with eight questions for students and nine questions for teachers, focusing on the advantages and disadvantages of face-to-face attendance. This tool enabled cross-comparison of data related to the students' and teachers' socioeconomic background, academic performance, and emotional well-being.

The survey design allowed for a detailed analysis of the benefits and drawbacks of face-to-face attendance in the Leveling course. The questions were designed to investigate multiple aspects of the academic experience, including motivation levels, interaction with peers and instructors, and overall satisfaction with the course. Furthermore, the survey aimed to gather data on the socioeconomic background of the students, including family income and educational history, to comprehend how these variables might influence students' and teachers' perceptions of face-to-face attendance.

The use of self-designed questionnaires and Google Forms was proven to be a highly effective and efficient method of data collection in the study. The insights obtained from both students and teachers' responses provided valuable insights into the advantages and disadvantages of face-to-face attendance in the Leveling course and helped to establish the impact of this educational modality on the academic performance and well-being of students. The findings from the study can be used to guide future decision-making processes related to higher education delivery, especially in the context of the ongoing COVID-19 pandemic. By comprehending the perspectives and experiences of students and teachers toward face-to-face attendance, institutions can formulate strategies to enhance the quality of education and ensure students' success.

Table 1: Teachers' perception of the advantages and disadvantages of face-to-face teaching

Advantages	Disadvantages
Direct student-teacher communication in the classroom	Economic crisis of the families (higher costs for transportation, housing, food, etc.)
Teachers and students developed skills with the use of ICTs	Distortion of values and preferences (often make them doubt the career they have chosen)
Internet connectivity on university premises	Less flexibility (specific and rigid schedules)

Advantages	Disadvantages
Equity in the use of the Wi-Fi network	Students with anxiety, stress and depression (aftereffects of the pandemic)
The capacity of the classrooms is 30 students, in the virtual classroom up to 60 students per session	Greater risk of contagion of infectious diseases
Greater interaction and social connection	Less accessible for students from remote geographic areas
Greater participation and motivation	The change of self-regulated learning skills acquired remotely
Smaller digital access gap	
Greater focus on personalized education	
Less distractions	
Facilitates understanding of topics	
Allows immediate consultation and clarification of topics	
Promotes collaboration and teamwork	
Solidarity and empathy among students	
E-learning imposes itself as a support system favoring the development of students' skills.	
Artificial intelligence appears redesigning the educational activity	

Leveling Course of the Universidad de las Fuerzas Armadas ESPE Sede Latacunga SII 2022

Results and Discussion

The surveys conducted with the teachers of the Leveling course provided valuable insights into the benefits and drawbacks of face-to-face attendance. Results showed that a majority of teachers, 81.8%, perceived higher student participation and commitment in the face-to-face modality, while 72.7% stated that they have made significant changes in their teaching methodology to ensure quality teaching. However, when asked about student desertion, opinions were divided, with 52.3% of teachers considering it to be unrelated to the disadvantages of face-to-face attendance, 36.4% believing it to be related, and 11.4% unsure. The study also identified several factors contributing to student desertion, including economic, academic, social, and university life factors.

The positive impact of face-to-face attendance was reflected in the performance of students in the Leveling course at the Universidad de las Fuerzas Armadas ESPE Sede Latacunga. The study revealed that 612 students passed the course in the first period of 2023 in the classroom mode, which was 10% more than the previous period, which was virtual, where only 550 students passed the course.

In response to the question "Why do you consider that the attendance mode is beneficial?" both students and professors of the Leveling course agreed that the interaction between students and professors in the classroom was the most important benefit of face-to-face attendance, with 84.1% of affirmative answers. This finding aligns with Figure 1, which shows the importance of direct communication between teachers and students in achieving the objective of quality teaching and creating a warm learning environment. Another significant benefit of face-to-face attendance is that it facilitates the understanding of course content, as reported by 76.20% of respondents.

Overall, the results of this study provide evidence supporting the value of face-to-face attendance in higher education. By highlighting the benefits of this modality, institutions can make informed decisions when designing and implementing courses, particularly in the context of the ongoing COVID-19 pandemic, where hybrid learning models are becoming increasingly common.

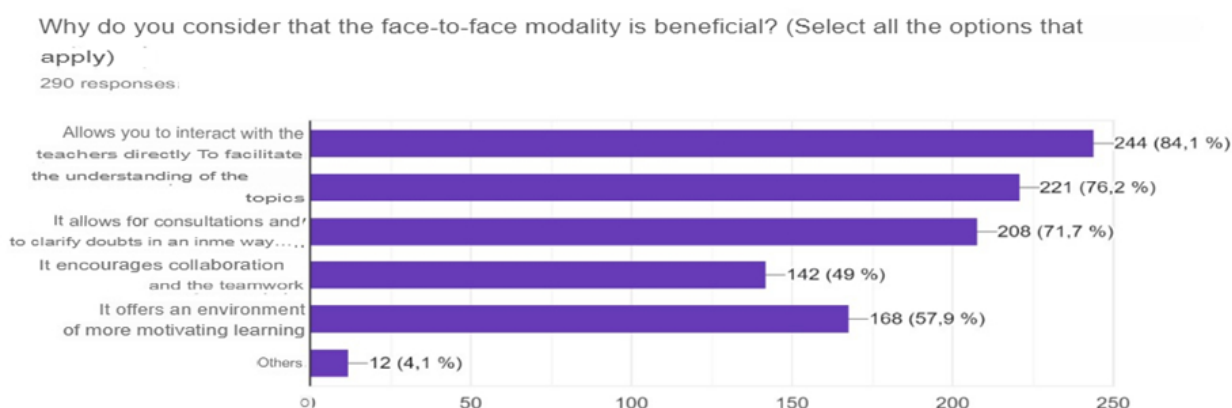


Figure 1. Student responses on the advantages of face-to-face attendance at university

The COVID-19 pandemic had a profound impact on higher education, presenting numerous challenges that need to be addressed as we transition back to face-to-face instruction. To gain insight into the perceived disadvantages of face-to-face attendance, the following question was posed to both students and teachers: "Do you believe that the face-to-face modality has disadvantages? (Select all the options that apply)." According to the research conducted, as illustrated in Figure 2, 68.3% of respondents cited the costs of transportation and accommodation as a significant disadvantage, particularly given the economic crisis and social inequality affecting the country's education sector (Ezcurra, 2022). This has resulted in high levels of absenteeism among students, leading to poor academic performance and ultimately contributing to high student dropout rates. Additionally, 54.7% of respondents noted the inflexibility of schedules and study times as another drawback of face-to-face attendance, with virtual learning offering greater adaptability in terms of study rhythms. These findings highlight the need to address issues related to accessibility and flexibility in the delivery of higher education to ensure that all students can succeed.

Do you think that the face-to-face modality has any disadvantages? (Select all the options that apply)

287 responses

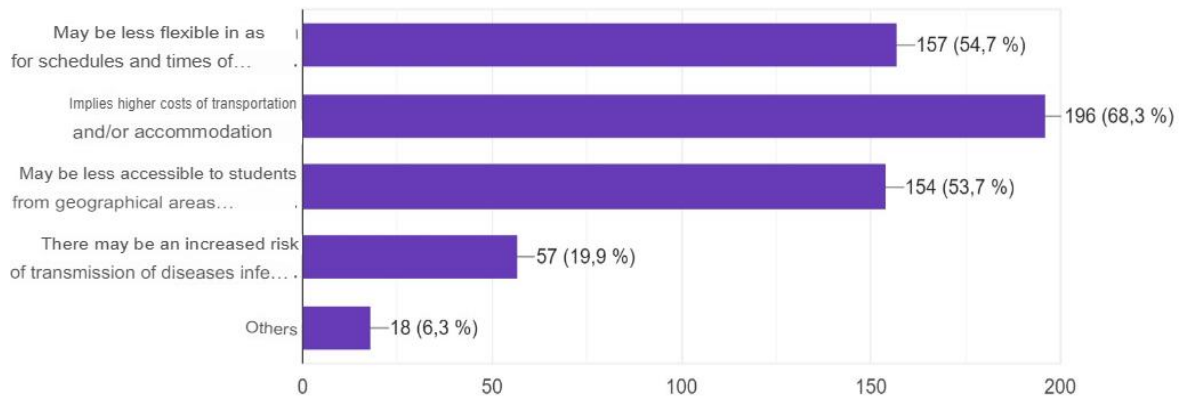


Figure 2. Student responses on the disadvantages of face-to-face attendance at university

The research on the benefits and disadvantages of face-to-face attendance was conducted on a significant sample of 250 students, which was obtained from a population of 1080 students enrolled in the leveling course at the University of the Armed Forces, as depicted in Figure 3. The survey included the question "What is your opinion about the face-to-face mode of study in higher education?" and revealed that 57.2% of the respondents believe that face-to-face attendance is very beneficial, while less than 1% believe that it is detrimental. This indicates that students faced several academic achievement problems during the time they received virtual classes. These findings demonstrate the significance of face-to-face attendance in higher education and the need to address the challenges of virtual learning to ensure quality education.

What is your opinion about the face-to-face modality of study in higher education?

250 responses

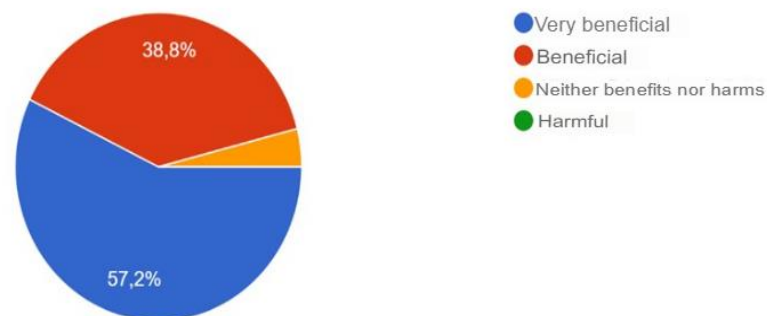


Figure 3. Student responses on face-to-face mode of study

Conclusion

Face-to-face education has traditionally been highly valued in higher education as it provides an opportunity for direct interaction between students and professors, which is especially important in hands-on learning disciplines such as engineering. Moreover, face-to-face education offers students the chance to create a network of valuable contacts, which can be crucial for their professional development. In addition, social interaction among students is vital, especially in a society increasingly disconnected by technology and social media. However, in recent years, distance education has been gaining popularity worldwide, thanks to the flexibility it offers to students who have work or family responsibilities, and the increasing importance of technology in education. The COVID-19 pandemic has brought distance education into the forefront, as many educational institutions have had to adapt to online education to ensure the safety of their students and faculty. Although distance education has many benefits, such as the flexibility to access education from anywhere, it also has some limitations, including the lack of direct interaction between students and their teachers, which may negatively impact the quality of education.

In the Ecuadorian context, higher education faces numerous challenges, such as lack of resources and limited access to adequate technology, which has led to the need to develop remedial programs to ensure that all students have the necessary skills and knowledge to succeed in higher education. Ecuador's remedial programs allow students to strengthen their foundational training and acquire the necessary skills for success in higher education. This modality also offers an opportunity for students to become familiar with the university environment and higher education in general.

In conclusion, while face-to-face education in higher education offers numerous advantages, distance education is gaining ground worldwide, including in Ecuador. The COVID-19 pandemic has accelerated this change, and educational institutions must continue to adapt to ensure that their students receive quality education, whether through face-to-face or distance education.

Recommendations

Given the merits of both face-to-face and distance education, adopting a hybrid learning approach could be highly beneficial. Educational institutions could design courses that combine the strengths of in-person interactions and online flexibility. This would allow students to engage in hands-on learning, build networks, and benefit from social interactions while also accommodating those who require remote access due to various commitments.

Acknowledgements

The authors would like to thank the Universidad de las Fuerzas Armadas ESPE and the Department of Exact

Sciences at the Latacunga Campus for their unyielding support to the research endeavors of the researcher.

References

- Acevedo Calamet, F. (2021). La deficitaria base fáctica de los estudios más influyentes sobre el abandono en la educación superior. *Congresos CLABES*. <https://revistas.utp.ac.pa/index.php/clabes/article/view/3345>
- Altamirano Balseca, M., & Alarcón Parra, G. J. (2020). Importancia del semestre de nivelación en el ingreso a las universidades ecuatorianas. *Revista Conrado*, 16(76), 362-368. http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S1990-86442020000500362&lng=es&tlng=es.
- Barrios Queipo, A., Gallar Pérez, Y., & Azanr Sánchez, T. (2022). Trend study of the process of access to Higher Education in Latin America and the Caribbean post COVID-19. *Journal of Positive School Psychology*, 6331-6344. <https://www.journalppw.com/index.php/jpsp/article/view/4531>
- Burbano Pantoja, V. M., Valdivieso Miranda, M. A., & Burbano Valdivieso, Á. S. (2020). Teletrabajo académico afectado por el coronavirus: una mirada desde un grupo focal de profesores universitarios. *Espacios*, 41(42), 335-48. <https://doi.org/10.48082/espacios-a20v41n42p29>
- Carabantes Alarcón, D., Mendoza, D. J., Bernabé, B., Morocho, M. E., & Mogollón, I. (2021). Impacto de programas formativos orientados al desarrollo competencial de docentes y estudiantes: continuidad de la educación superior en situación de emergencia sanitaria por COVID-19 desde contextos virtuales. *Revista Educación Superior Y Sociedad (ESS)*, 33(2), 196-235. <https://doi.org/10.54674/ess.v33i2.459>
- Cevallos Zambrano, D. P., Moreira-Choez, J. S., Lamus de Rodríguez, T. M., & Sánchez-Urdaneta, A. B. (2023). Psychosocial effects of COVID-19 in Ecuadorian university professors. *Revista De Ciencias Sociales*, 29(2), 15-31. <https://doi.org/10.31876/rsc.v29i2.39960>
- Ezcurra, A. M. (2022). Inclusión y desigualdades en alza. Algunos impactos del COVID-19. *Revista Educación Superior Y Sociedad (ESS)*, 34(2), 224-257. <https://doi.org/10.54674/ess.v34i2.617>
- Hernández-Sampieri, R., & Mendoza, C. (2018). *Metodología de la investigación: las rutas cuantitativa, cualitativa y mixta*. Mcgraw-hill. <http://repositorio.uasb.edu.bo/handle/54000/1292>
- Martínez-Rivera, Óscar. (2022). La universidad de la pospandemia: De la transformación inmediata a la incertidumbre. REVISIÓN HUMANA. *International Humanities Review / Revista Internacional De Humanidades*, 15 (3), 1–8. <https://doi.org/10.37467/revhuman.v11.4237>
- Oloriz, M., & Fernández, J. (2021). El impacto de la pandemia por covid-19 en el abandono temprano de los estudios superiores. *Congresos CLABES*. <https://revistas.utp.ac.pa/index.php/clabes/article/view/3354>
- Prince Torres, Ángel C. (2020). El autoaprendizaje como proceso para la construcción de conocimientos en tiempos de pandemia. *RAC: Revista Angolana De Ciências*, 2(2), e020207. <http://publicacoes.scientia.co.ao/ojs2/index.php/rac/article/view/110>
- Rodríguez-Alarcon, J. F., Vinelli-Arzuviaga, D., Aveiro-Róbaló, T. R., Garlisi-Torales, L. D., Delgado, J. E. H., Marticorena-Flores, R. K., ... & Mejía, C. R. (2022). Repercusiones académicas de la educación virtual en los estudiantes de Latinoamérica: validación de una escala. *Educación Médica*, 23(3), 100741. <https://doi.org/10.1016/j.edumed.2022.100741>

- Roque, V., Raposo, R., Nina de Morais, N. S., & Roque, F. (2021). Enseñanza y aprendizaje en línea durante la pandemia de Covid-19: El caso de la educación superior pública portuguesa. *Revista Prisma Social*, (35), 221–248. <https://revistaprismasocial.es/article/view/4334>
- Shah, S. S., Shah, A. A., Memon, F., Kemal, A. A., & Soomro, A. (2021). Aprendizaje en línea durante la pandemia de COVID-19: aplicación de la teoría de la autodeterminación en la ‘nueva normalidad’. *Revista de Psicodidáctica*, 26(2), 169-178. Autor para correspondencia. <https://doi.org/10.1016/j.psicod.2020.12.004>
- Trujillo Sánchez, S. F. (2015). *Elaboración de un Texto Guía Interactivo de Ejercicios como recurso didáctico y su incidencia en el rendimiento académico de los estudiantes de nivelación de la Universidad de las Fuerzas Armadas ESPE extensión Latacunga*. <http://dspace.esPOCH.edu.ec/handle/123456789/4433>
- Zapata-Ospina, J. P., Patiño-Lugo, D. F., Vélez, C. M., Campos-Ortiz, S., Madrid-Martínez, P., Pemberthy-Quintero, S. & Vélez-Marín, V. M. (2021). Intervenciones para la salud mental de estudiantes universitarios durante la pandemia por COVID-19: una síntesis crítica de la literatura. *Revista colombiana de psiquiatría*, 50(3), 199-213. <https://doi.org/10.1016/j.rcp.2021.04.007>

Focus on their Strengths: Recruiting & Retaining Online Adult Learners in a Hyper-Competitive Environment

Scott Amundsen, PhD

Winthrop University, US

Abstract: Institutions are aggressively recruiting adult learners and developing adult degree completion programs. This is a hyper-competitive market. Many institutions lack experience working with this population. This paper outlines proven strength-based enrollment management strategies to instill confidence and provide student support for adult learners. Institutions can get ahead by focusing on andragogical principles including prior learning assessment. Individual attention and concierge-style support are paramount to enrolling adult learners. A commitment to strength-based / appreciative approaches is the key to retaining them. Faculty members and student services professionals must understand that adult learners are a special population that cannot be served in the same manner as the under 18–24-year-old students.

Keywords: Adult Education, Strengths, Adult-Degree Completion, Andragogy

Citation: Amundsen, S. (2023). Focus on their Strengths: Recruiting & Retaining Online Adult Learners in a Hyper-Competitive Environment. In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023- International Conference on Social and Education Sciences* (pp. 331-337), Las Vegas, NV, USA. ISTES Organization.

Introduction

Colleges and universities are competing to enroll adult students. According to a recent Gray & Associates report (Rowles, 2023), only half of Americans (117 million) over 25 years old have earned a Bachelor's degree. Over 64 million people have earned college credits, but not finished their degree programs. Although there is no shortage of adult student prospects, enrollments are declining. This is in part due to the lack of understanding of the supports this population requires.

Why are adults reluctant to return to school? Traditional higher education institutions are not prepared to support the working adult. Adults tend to have more responsibilities (work, family, etc.), and fewer resources (time, money, support networks) than students who go straight to college from high school. In order to compete institutions need to develop strength-based adult degree completion programs to attract and retain students.

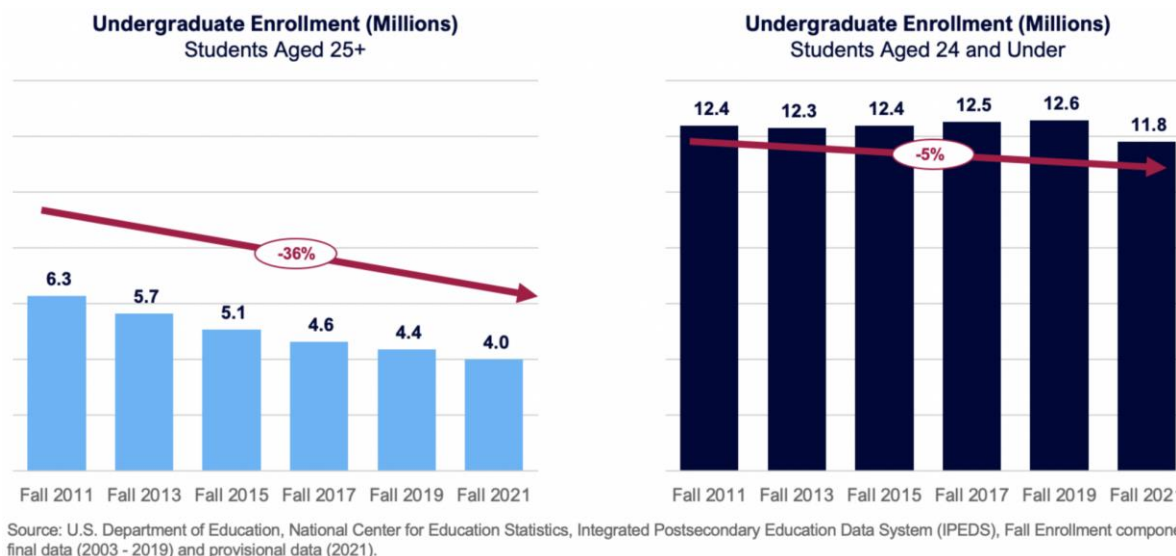


Figure 1. Enrollment Trends

Recruiting/Admission

Prospective adult students are looking for advocates that can demystify the college process. According to Schritter (2019) students matriculating to college right out of high school are more confident about their ability to graduate than those who return as adults or start later in life. If the admissions process is overcomplicated or tedious, adult students are unlikely to matriculate.

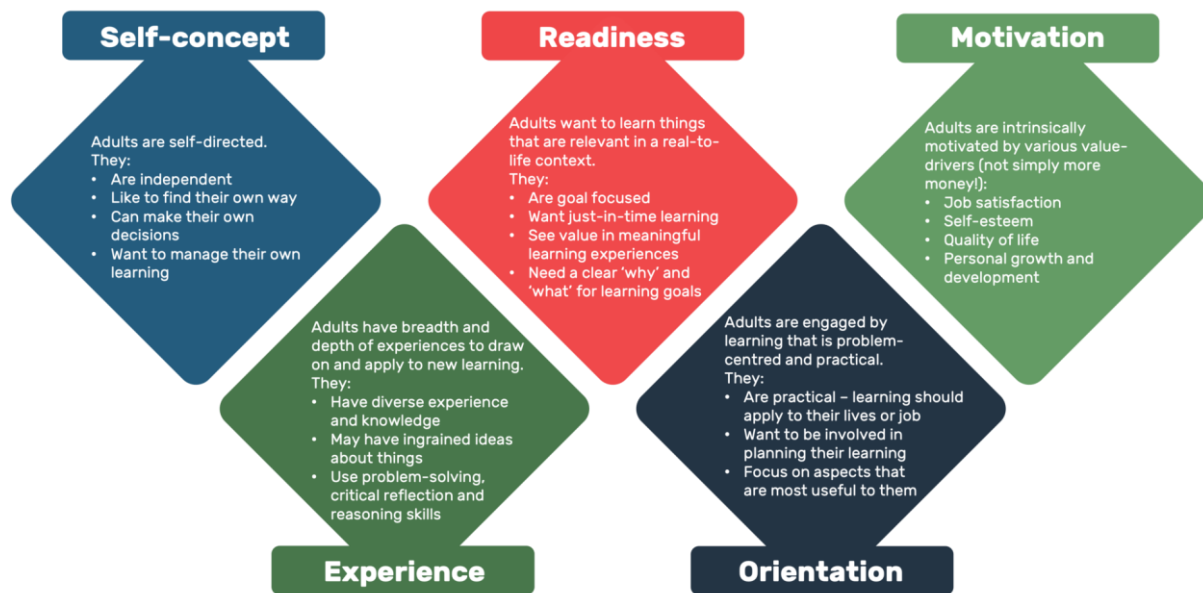
A recent study (Hatcher, 2023) conducted by the American Institute on Research (AIR), found that students rely on one key *information broker* to guide them through the enrollment process. They are viewed as a reliable source that assists the prospective student in gathering information and navigating the admissions process. This could include, but would not be limited to, applying for admission, requesting transcripts, evaluating past college work, understanding graduation requirements, registering for classes, and getting required texts from the bookstore. This person should be available when the student is available. In hybrid and in-person programs students may need additional information regarding immunizations or parking permits. Bertolini (2020) defines this as *concierge* approach to serving adult learners.

This college representative should intentionally focus on the student strengths and positive past performances. A key concept in Appreciative Inquiry (Cooperrider & Whitney, 1999) is that all of our questions are fateful. By asking intentionally positive questions, like “Tell me about a recent peak learning performance, how did it happen, who was involved, why was it so successful?”, “ students will gain confidence and continue to seek out the college representative. Clifton and Rath (2015) simplify this concept by stating that every conversation is either positive or negative, using the analogy of a bucket and a shovel. There is no such thing as a neutral question, neutral equals negative. You are either filling your student’s bucket or dipping out of their bucket. By focusing on what is right in their world, you are much more likely to get them to enroll.

Prior Learning Assessment

Prior Learning Assessment should be addressed during the admission process. Recognizing what a student already knows aligns with the principles of Andragogy (Knowles, 1984).

Andragogy: The Art and Science of Helping Adults Learn



(Instructional Design Australia)

Figure 2. Principles of Andragogy

Focusing on the area of *Experience* and how that aligns with Prior Learning Assessment (PLA) is a good starting point. Adults have breadth and depth of experiences to draw on and apply to new learning (Knowles, 1984). Nothing will frustrate adult learners more than being required to take courses with content that they already have mastered. The best way to acknowledge an adult student’s past learning experiences and personal strengths is through credit award.

Institutions can offer a wide range of opportunities in PLA. Adult learners earning PLA credit are more likely to complete their degree program than those not earning PLA credit (Klein-Collins, et. al, 2020). These may include standardized examinations (CLEP, DSST, Prometric), departmental challenge examinations, portfolio assessment, credit for corporate training, or credit for specific licenses or certification (Klein-Collins, et. al, 2020).

Military Credit

According to a recent CAEL study (Klein-Collins et. al, 2020) the most common PLA credit earned by adult learners is military credit recorded on a Joint Services Transcript (JST). Credit recommendations on the JST are

assessed by the American Council of Education (ACE). Awarding credit for military training and completion of service schools recognizes student knowledge and achievement.

Portfolio Assessment

Portfolios are another common PLA method for earning credit. This approach requires students to present their learning, knowledge, and skills in a portfolio. This is a strength-related activity in that students are submitting their best work, while revisiting past peak performances. This process requires both faculty member buy-in and strong facilitation. It would be ideal if the same information broker mentioned above guided the adult learner through the portfolio process.

Building Positive Psychology & Strengths into the Curriculum

Building intentional strength-based assignments into the curriculum is an excellent strategy when developing courses for adults. The Valued in Action (VIA) Survey of Character Strengths is a 240-item survey designed for adults (Peterson and Seligman, 2004). The VIA Character Strengths Survey is built on the work of Dr. Martin Seligman in Positive Psychology. By identifying and understanding character strengths, students will increase their level of positive emotions therefore improving performance (Seligman, 2002).

Frederickson's Broaden and Build Theory (1998) also supports the positive psychology approach. This theory reinforces that focusing on positive emotions, in turn build their personal resources over time, creating a positive cycle of well being. . This inversion creates a broadening of awareness that is essential for the individual to build both psychological and tangible resources. Table 1 displays the specific effects of positive orientation upon an individual's experience.

Strength-based Instruction

Adult students benefit from working with faculty members who have been trained in Appreciative or Strength-based approaches. A recent study involving military students enrolled in an adult degree completion program found that that positive, supportive, and encouraging language in both in and out-of-classroom communications can help students find motivation in completing their courses and programs using manageable action steps (Amundsen, et al., 2021).

Faculty members teaching adult learners should be familiar with the andragogy model. Assignments that are repeatedly connected to the adult learner's real-world experiences are best practice (Galustyan et al., 2019). This relates closely to the Orientation phase of Andragogy (Knowles, 2004). Adult learners are encouraged to reflect on past peak performances. The focus is on practical learning that will benefit them in the immediate future.

Strength-based Advising & Student Services

There are a variety of strength-based advising models that would benefit adult student populations. Schreiner and Anderson (2005) were pioneers in the strengths-based advising movement. Their work with Gallup CliftonStrengths (formerly Strengthsfinder), significantly impacted the Strengths and the First-Year Experience. This instrument has been used with traditional and adult student populations. It has also been widely used in corporate and civic organizations.

Appreciative Advising is another major strength-based movement. Appreciative Advising draws from Appreciative Inquiry (Cooperrider) and other strengths-based approaches. After proving successful with at-risk and underrepresented populations (Kamphoff, et al., 2007), Appreciative Advising has become a popular approach nationwide (Bloom, et al. 2009). Advisors ask open-ended intentionally positive questions and encourage students to reflect on past peak performances. This approach builds confidence and self-efficacy. The Appreciative Advising Framework can be seen below.



Figure 3. Appreciative Advising Framework

Conclusion

Colleges and universities have an opportunity to increase their enrollments by intentionally recruiting adult learners. It is critical that institutions understand the unique needs of this population and must be intentional with their enrollment management and curricular approaches. This paper makes the case for strengths-based approaches from pre-enrollment through graduation. Institutions must respect the previous learning experiences of this population and aggressively work to develop Prior Learning Assessment strategies. Student services personnel and faculty members teaching adult learners should embrace the andragogical principles and engage in professional development relating to strength-based and appreciative programming.

References

- Amundsen, S., del Hierro, G., & Mullen, T. (2020). Examining the appreciative instruction methods used by instructors within an adult degree completion.associate's program. *Journal of Appreciative Education*, 6 (20), 3-17.
- Andrew, B. (2023, Aug 9). *Increasing adult learners' success: Retention and belonging*, EAB. <https://eab.com/insights/blogs/strategy/increasing-adult-learners-success-retention-belonging/>
- Bertolini, C. (2020, May 12). *Meeting them where they are: the concierge approach to serving adult learners at CUNI CSI*. CAEL.
- Bloom, J. L., Hutson, B. L., & He, Y. (2008). *The appreciative advising revolution*. Stipes Publishing.
- Bloom, J. L., Hutson, B.L., He, Y., Amundsen, S., Buyarski, C., Christman, P.D., Cuevas, A.E.P., Woodward, L.K., Murray, J.E., Robinson, C., & Kucharczyk, L.M. (2009). How Eight Institutions Have Incorporated Appreciative Advising. *The Mentor: An Academic Advising Journal*.
- Cooperrider, D. L., & Whitney, D. (1999). *Appreciative inquiry*. San Francisco: Berrett-Koehler Communications, Inc.
- Fredrickson, B. L. (2001). The role of positive emotions in positive psychology: The broaden-and-build theory of positive emotions. *American Psychologist*, 56(3), 218–226. <https://doi.org/10.1037/0003-066X.56.3.218>
- Galustyan, O. V., Borovikova, Y. V., Polivaeva, N. P., Bakhtiyor, K. R., & Zhirkova, G. P. (2019). E-learning within the field of andragogy. *International Journal of Emerging Journal of Appreciative Education*, 14(9), 148-156. <https://doi.org/10.3991/ijet.v14i09.10020>
- Hatcher, M. (2023, March). *It only takes one...but should it? The Impact of Individuals on an Adult Learners Journey*. Association of Institutional Research (AIR).
- Kamphoff, C. S., Hutson, B. L., Amundsen, S. A., & Atwood, J. A. (2007). A motivational/empowerment model applied to students on academic probation. *Journal of College Student Retention: Research, Theory & Practice*, 8(4), 397–412. <https://doi.org/10.2190/9652-8543-3428-1J06>.
- Klein-Collins, R., Taylor, J. Bishop, C. Bransberger, P., Lane, P. and Leibrandt, S. (2020). *The PLA boost*. CAEL/WICHE.

- Knowles, M. (1984). *Andragogy in action*. San Francisco: Jossey-Bass
- Peterson, C. & Seligman, M.E.P. (2004). *Character Strengths and Virtues: A Handbook and Classification*. Washington, D.C.: APA Press and Oxford University Press.
- Rath, T., & Clifton, D.O. (2015). *Howfull is your bucket?* Expanded Anniversary Edition. New York, Gallup Press.
- Rowles, E. (2023, May 23). *Where have the adult students gone?* *GrayDI*. Retrieved from: <https://www.graydi.us/blog/gray-insights/where-have-the-adult-students-gone>
- Seligman, M. (2002). *Authentic Happiness*. New York: Simon and Schuster.
- Schreiner, L. A., & Anderson, E. (2005). Strengths-based advising: A new lens for Soria et al. *64 NACADA Journal Volume 37(2)* 2017 higher education. *NACADA Journal*, 25(2), 20–29
- Schritter, T. (2019). *Beating the Confidence Gap and Earning Your Degree*. *Abound*. Retrieved from: <https://abound.college/mba/advice/confidence-gap/>
- US Department of Education, National Center for Educational Statistics. IPEDS, Fall Enrollment Component Final Data (2003-2019) and provisional data (2021).

Exploring Feminism in Social Media

Siyuan Xu

School of graduate studies, Lingnan University, Hong Kong, China

Abstract: As the Internet and social media have gained prominence, the third wave of feminism utilized these platforms to champion gender equality and social justice. Online environments facilitated wider engagement, discourse, and campaigns to raise people's awareness. This paper summarizes the current progress of feminism development in social media by reviewing previous literature and cases, and then comparing the advantages of new media when compared with paper media and reviewing the history of feminism development. Finally, it analyses the influence and role of social media as a media on the development of feminism. Hence, the main findings of this paper are: 1) Feminist ideas are disseminated and various groups are connected through digital platforms. While these platforms are active, new debates and conversations may arise; 2) The feminist movement can be divided into three stages based on their academic theory: the stage of pursuing legal equality, the stage of seeking social equality, and the stage of embracing cultural diversity; 3) The positive effects of feminist advancement in social media primarily include the following sections: fostering global connectivity and information sharing, championing justice and parity, advancing important topics, and inspiring individual self-expression. Therefore, this paper contributes to the feminism area that promoting the development of feminism in the new media context.

Keywords: Feminism, Social media, New media

Citation: Xu, S. (2023). Exploring Feminism in Social Media. In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023-- International Conference on Social and Education Sciences* (pp. 338-344), Las Vegas, NV, USA. ISTES Organization.

Introduction

Feminist movement worldwide has been rapidly developed from 19th century till now. The initial wave of the feminist movement emerged during the latter part of the 19th century, which emphasizing women's political enfranchisement and achieving economic parity. The second wave of feminism originates from the 1960s, constituting a comprehensive societal movement which addressing women's societal standing, gender bias, gender roles, etc. The third wave of feminism emerged in the 1990s, with a commitment to tackling issues of gender disparity and systemic gender discrimination. The current feminist movement is suppressed and infringed by many patriarchal and anti-feminists. They often hinder the development of feminist movement through stigmatizing feminists and feminist movements. In order to counter this repression, feminists use social media to post their views and appeals, so that the public will be able to understand the truth and reduce the stigmatization of the concepts of "women," "feminism," and "feminist movements." (Press, 2011). There is also

another study concerning the advantages and disadvantages of the narrative in feminism (Evans & Chamberlain, 2014).

Feminisms in Social Media

Digital platforms refer to mediums for spreading feminist ideas and connecting different groups. During the operation of these platforms, new discourse can be formed (Jackson, 2018). These are so inclusive that many new and creative forms of protest and activism emerge. Thus, digital platforms are seen as offering great potential to advance the feminist agenda. The common platforms for feminist activities are Facebook, Twitter, Sina Weibo, WeChat, etc. Then, it is worth noting that the WeChat Moments, which is often considered to share personal life, has also become a new position for the online feminist movement. According to Jiang Han 's survey in 2019 (Jiang, 2019), WeChat Moments is more in line with the definition of private space for women. They are more inclined to use WeChat Moments as a private domain to record daily life and express opinions on it. Females are more motivated to use it than men. Feminists publish their views through the WeChat public account and use the forwarding function to post these articles to the WeChat Moments. According to a survey conducted by Jackson (2018), for adolescent feminists, respondents ' reluctance to post or repost topics about feminism on digital platforms is mainly due to their emotional perception. Publishing and reprinting feminist topics may instead be supported and encouraged by friends, thereby establishing a positive image in real social interaction. For those who do not support it, they would choose to be silent, or a few will leave arguments in the comment area. Too frequent and radical release of feminist information may leave a negative and radical impression on friends, thus affecting social relationships. Most seriously, WeChat friends are deleted and online and offline social relationships are terminated. Therefore, more females choose to use WeChat Moments as a digital platform for the first attempt to participate in the online feminist movement. Perhaps they will further participate in the promotion of the feminist movement in the future and become influential feminists on the digital platform. This is a very positive change, which is also the motivation given by the digital platform to the development of feminist movements. It is also favored by teenage girls as Keller (2019) discovered.

When the topics about sex and gender are hotly debated on digital platforms, they are often attacked by anti-feminists and misogynists. Regarding the social issues from a gender perspective has arisen with the development of feminist movements, which means that the public rarely thought so before. Due to the short history of this gender perspective, the public has not fully accepted such a discourse system. There are even a large number of anti-feminists and misogynists who hinder the development of feminism in social media. The study of Press (2011) discussed a case of a girl named "Phoebe Prince" suffered public opinion violence and finally committed suicide. The reason is that this girl had a sexual relationship with an adult man. At that time, he was in conflict with his girlfriend. After having a sexual relationship with Phoebe, the man and his girlfriend reconciled. Phoebe was not aware of this, but she had been regarded as a spoiler by public opinion. Because of her sexual life, she was called as 'slut ' and ' Irish prostitute ' by her classmates, humiliating her and bullying her on campus. More seriously, the bullies posted these allegations to social media, triggering more unkind attacks on Phoebe, which directly caused her death. Six days after her death, a page named ' We murdered Phoebe

Prince ' even appeared on Facebook and many attackers commented that it was her due as a slut. The attack is infinitely magnified by the amount of online discussion. The mental health of the victims has been greatly harmed, some of which even paid his/her life. For the society, if this kind of negative review is not controlled, it will promote the development of bullying culture. Especially in the feminist activities of social media, the spread of rape culture has caused victims to suffer secondary damage from public opinions.

According to the above content, it is necessary for feminist workers to document and understand what is happening on various social media platforms with researching, commenting and discussing them. At the same time, it is necessary to examine the evolving social media platforms of activity and content (Locke et al., 2018) . For every comment poster, it is necessary to abide by morality and law. In particular, when it comes to sexuality and gender issues, it is important to be cautious in making comments and looking at the issue as pertinently, objectively and rationally as possible. And it should consciously resist the culture of rape, bravely speak up for the victims, and strongly condemn the perpetrators.

The Historical Development of Feminism in Social Media

Feminist Development

Western feminism originated from the Enlightenment and the French bourgeois revolution (Zhou et al., 2018). Innate human rights, freedom and equality have gradually inspired people to be more independent. Women 's self-consciousness has began to awake under the influence of the Enlightenment, and the Western feminist movement began to sprout. Academically, the feminist movement is divided into three stages: Legal equality stage, Social equality stage, Cultural diversity stage. Parameswaran (2001) even posted a self-reflective account as feminist.

The first feminist movement originated from the end of the 19th century to the beginning of the 20th century. It focuses on women 's political rights and economic equality. With the development of the first industrial revolution in 1860s, the social structure has undergone tremendous changes, and people 's ideas have also been greatly impacted. More and more women have begun to show their skills in the field of social production. When they are engaged in social production, labor prompts them to rethink their status and value. Important events in the movement include: Women 's suffrage movement, education and career opportunities, as well as marriage and family rights.

The second feminist movement originated in the 1960s. It is a broad social movement that focuses on women 's social status, gender discrimination and gender roles. From the end of World War II to the early 1960s, influenced by the Great Depression and the World War, it was not only a great disaster for human society, but also an important opportunity to build a society. During this period, women 's efforts to strive for equality in the political economy and the field of education have achieved remarkable results, and the status of women in Western countries has improved. Western feminists emphasize gender equality, encourage women to fight for

their equal rights in the legal, political, economic, and social fields, call for gender liberations, sexual autonomy and freedom of marriage, along with oppose domestic violence and gender discrimination. Moreover, they strive for women 's reproductive rights, abortion rights and contraceptive rights, and advocate women 's control over their own bodies. Women feminists try to dispel the social system and social concepts under the background of patriarchal culture and strive to further liberate women on the basis of striving for equality between men and women. However, the patriarchal culture and gender discrimination have not improved.

The third feminist movement emerged in the 1990s, committed to solving the problem of gender inequality and institutional gender discrimination. Compared with the large-scale struggle, Western feminists paid more attention to calm thinking in this period. In the 1980s and 1990s, feminist academic and cultural studies were placed in an important position, focusing on cross-gender rights, non-binary gender, multi-gender identity and gender expression rights (Zhou et al., 2018). The focus of research has shifted to cultural equality and cultural identity, not only focusing on the differences between men and women, but also on the differences within women. Feminists call for inclusive feminism and pay attention to the equality and justice of cross-gender identities including race, class, sexual orientation and disability. The construction of a pluralistic female discourse system emphasizing differences is the focus of the development of feminism in this period. Feminists criticize patriarchy and are committed to gradually diluting the strong influence of patriarchy on the first and second waves of feminism.

The Development of Media

The technological progress of each era has had a profound impact on the media form and the transmission mode, shaping the diversity and convenience of modern media. The invention of printing in the 15th century (e.g., movable type printing and the use of printing presses), made large-scale production of books and newspapers possible. This period is representative for the beginning of large-scale communication. At the beginning of the 20th century, the emergence of radio and broadcasting technology has led to the arrival of the broadcasting era. Broadcasting can quickly spread audio content, which can become an important source of public entertainment and news information. In the mid-20th century, television became a mainstream form of media. Television programs transmit information to the audience through images and sounds, changing the way people obtain information and entertainment. At the end of the 20th century, the popularity of the Internet completely changed the media landscape. The Internet provides unlimited information resources and a global communication platform. People can obtain and share information through websites, blogs, social media and other channels. With the popularity of smart phones and mobile devices, media has begun to migrate to mobile platforms. People get news, videos, music and other media content through mobile applications and web pages. The rise of social media platforms such as Facebook, Twitter and Instagram have made it easy for people to share content and connect to social networks. At the same time, the rise of online video platforms such as YouTube and Netflix have changed the way people watch video content.

When it comes to paper media and new media, each of them has some advantages and disadvantages. The first

is the comparison of accessibility and propagation speed. New media can spread information in real time through the Internet, with faster transmission speed. Almost anyone can access news, blogs, social media and online video anytime and anywhere as long as they have access to the Internet. The second difference is update and immediacy. New media can update and publish content in real time. News websites, blogs and social media platforms provide instant access to the latest news and information. These difference of carriers leads to the third difference: interactivity and personalization. New media provides more interactive and personalized choices. Users can interact with content, such as comments, sharing and likes. At the same time, through algorithms and personalized recommendations, new online media can provide customized content based on users' interests and preferences. Finally, it is about credibility and depth difference. Due to the uneven content sources and quality of new media, there are a large number of user-generated contents and fake news. More prudence and discernment are needed on the network to ensure reliable information. It should be noted that paper media and new media are not mutually exclusive, they can complement and coexist with each other. Many traditional media organizations also expand their media business by establishing their online platforms.

Media and the Development of Feminism

With the development of the Internet and new media, feminist topics have appeared on various websites and social media. Some well-known websites have proposed and advocated the development of feminism. For example, in 2016, the Paper News put forward some thoughts on Girls' Day to explain why we need Women's Day (Funv Li Xuedou, 2016). She expounds that the word 'fu nv' (i.e. Chinese pinyin pronunciation of "women") is stigmatized, so that many women do not want to be called as 'fu nv' and do not want to live the social status of 'fu nv festival' (women's day). Feminists call on everyone to understand the origin and significance of Women's Day. For public, the priority is to understand the rich connotation and strength of the word of "women," and then to think about the situation of their rights and interests in China, to support the spread of the positive impact of Women's Day. At the same time, in addition to news websites and organizations, there are also individuals who use social media to publish articles in support of Women's Day. On February 19, 2016, Li Sipan, a feminist, posted an article on Sina Weibo '7th March Girls' Day' or '8th March Women's Day', which is a problem, triggering a discussion of '7th March Girls' Day' and '8th March Women's Day'. Subsequently, a weibo account named "new media women" called on women to go to the scene of gender discrimination, hold up signs with writing/typing their demands to take photos, or take photos of three or eight advertising slogans of gender discrimination, and publish them in the way of topic # anti-7th March Girls' Day, Celebrate 8th March Women's Day #, since '7th March Girls' Day' Day has made the name of obscene and consumer false care a tradition and practice, which has strengthened the gender stereotype of male protection and female tenderness. It not only fails to change the discrimination and isolation against women, but also uses an easy way to cover the most difficult part of it.

It is worth noting that some feminist organizations (e.g., Multiple Family, Hard candy video) or individuals use social media to conduct social surveys, data analysis, and then publish survey results on feminism, in order to make more people pay attention to social issues related to feminism. Through the questionnaire, the "Survey on

the Reproductive Rights of Chinese Female Sexual Minorities " pays attention to the difficulties and needs faced by the current Chinese adult female sexual minorities in their fertility desire, choice and process. While showing the current situation, it will also help relevant institutions to provide more targeted legal assistance and community services related to reproductive rights for female sexual minorities. The results of this survey will serve as an important empirical basis for this policy advocacy (Multiple Family,2021).

The Influence of the Development of Feminism in Social Media

The movement of feminism has promoted great changes in social concepts during the past few decades. It challenges the traditional gender roles and stereotypes, emphasizing that men and women should enjoy equal rights and opportunities. These concepts have gradually penetrated into most areas of society, thereby promoting the awareness and understanding of gender equality in the society.

The positive effects of feminist development in social media mainly include: global connection and dissemination of information, advocacy of fairness and equality, promotion of important topics, and encouragement of personal expression. Social media enables feminists to communicate across borders of space and time in order to share ideas and experiences. This global connection strengthens the power of women 's solidarity, enabling various feminist issues to spread more widely and attract attention, prompting more people to think about gender equality and change in their own communities. At the same time, through social media, feminists are able to propose important topics in public, such as gender discrimination, gender violence, women 's health (as mentioned in the Section 2.1) and so on. These issues may not get enough attention in the traditional media, but through extensive discussion and sharing on social media, they can attract more people 's attention. Social media provides a platform for everyone to express their views and experiences, especially for previously marginalized voices. Feminists can use their personal stories and experiences to infect more people, resonate, and encourage others to come forward and share their stories. However, its negative effects cannot be ignored, such as cyber violence and hate speech, information overload and rumour spreading, and the oversimplification or extremism of complex feminist issues. These may hinder the in-depth discussion and understanding of the problem.

Conclusion

This paper reviews the development of the feminist movement in the new media context, and compare the differences in communication between new media and traditional paper media. By summarizing the various stages of the feminist movement, it illustrated the new development of the current feminist movement, in which new media is one of the ways. Digital platforms spread feminist ideas and connect different ethnic groups. As a medium of connection and communication, new discourse systems of feminism have been formed in operation. Therefore, it is hoped that women will learn to use social media to understand feminism and encourage the development of global feminism.

References

- Evans, E., & Chamberlain, P. (2015). Critical waves: Exploring feminist identity, discourse and praxis in western feminism. *Social movement studies*, 14(4), 396-409.
- Funv Li Xuedou. Girls ' Day replaces Women 's Day ? Let 's first look at why we need Women 's Day. Mar. 6 . 2016. Retrieved on Jul. 9 2023. Retrieved from:https://www.thepaper.cn/newsDetail_forward_1438806
- Jackson, S. (2018). Young feminists, feminism and digital media. *Feminism & Psychology*, 28(1), 32-49.
- Jiang H. (2019). Attitude and Behaviour Analysis of Female WeChat Moments Use from a Gender Perspective (Master 's Degree Thesis, Anhui University).
- Keller, J. (2019). "Oh, she's a Tumblr feminist": Exploring the platform vernacular of girls' social media feminisms. *Social Media+ Society*, 5(3), 2056305119867442.
- Locke, A., Lawthom, R., & Lyons, A. (2018). Social media platforms as complex and contradictory spaces for feminisms: Visibility, opportunity, power, resistance and activism. *Feminism & Psychology*, 28(1), 3-10.
- Multiple Family. 517 Exclusive release | China 's first survey report on the status of reproductive rights of female sexual minorities. May. 17. 2021. Retrieved on Jul. 9, 2023. Retrieved from:https://weibo.com/ttarticle/x/m/show#id=2309404637818038387019&_wb_client_=1
- Parameswaran, R. (2001). Feminist media ethnography in India: Exploring power, gender, and culture in the field. *Qualitative Inquiry*, 7(1), 69-103.
- Press, A. L. (2011). Feminism and media in the post-feminist era: What to make of the "feminist" in feminist media studies. *Feminist media studies*, 11(01), 107-113.
- Zhou Yan, & Cheng Junlin. (2018). The Development of Western Feminist Movement and Its Ideological Evolution. *Journal of Jiamusi Vocational College*, 34 (9), 52-53.

An Educational Perspective on Narrative and Ethnography: A Monolithic Study

Attia Noor

University of Cumberlands, USA

Abstract: Narrative inquiry is a type of qualitative research that explores human experiences through lived or told stories to understand a phenomenon. Narrative researchers collect data through spoken or written stories and life experiences of an individual (subject). The data is examined in chronological order to understand the meaning of the phenomenon being studied (Creswell, 2013). The researcher unfolds the hidden meanings in spoken or lived stories by analyzing the data in relation to social and cultural context. Narrative methodology is used to explain the behaviors or experiences of either an individual or a small group of people. Ethnography is a holistic approach to the study of cultural systems using both qualitative and quantitative methods with ontological and epistemological properties. It is greatly dependent on fieldwork. It is a process of discovery, making inferences, and continuing inquiries to achieve emic validity, while being an iterative process of learning episodes. It is also an open-ended emergent learning process, and not a rigid investigator-controlled experiment.

Keywords: Narrative, Ethnography, Ethics, Communication, Postmodernism

Citation: Noor, A. (2023). An Educational Perspective on Narrative and Ethnography: A Monolithic Study. In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023-- International Conference on Social and Education Sciences* (pp. 345-350), Las Vegas, NV, USA. ISTES Organization.

Introduction

Narrative methodology is collaborated on by both researcher and participant. as the feelings and ethical dispositions of both shape the inquiry (Clandinin, & Huber). Historical origins of the narrative or story telling connects with the evolution of human linguistics and social life. Numerous authors maintain that moreover postmodernist rationale or social constructionism not only accounts for the reproaches of modernist rationale but lays out a basis for the application and understanding of narrative. Social constructionism calls for a foundation of knowledge in the background of its social collaboration. It highlights the communal and traditional nature of narrative dissertation. Postmodernism thrived on the modernist viewpoint that assumes wisdom and universal truth and applied scientific empirical methods to problem solving. Postmodernism, which came into use during the late 20th century, questions the notion of objective truth adopted by preceding pragmatist and realist methods. This philosophy highlights background construction of connotation and the rationality of numerous viewpoints; knowledge is built by individuals and groups of people; reality has several perspectives; truth is

grounded in ordinary life and social relations; life is a text, and a narrative rationalizes that text so one can make sense of it (Mitchell & Egudo, 2003).

Gerhard Friedrich Müller is considered the father of ethnography. He was a traveler and developed the ideas of ethnography as a unique area of knowledge. The education and association with academics gave Müller unique opportunities in his time, where he had a chance to become a participant in the Second Kamchatka Expedition (1733–43) as a professor of history and geography. This involvement in the expedition gave him ample time at hand to work on the concept to differentiate from the work of *Völker-Beschreibung*. This curriculum later became known as "ethnography," following the introduction of the Greek neologism ethnographia by Johann Friedrich Schöpferlin and the German variant by A. F. Thilo in 1767 (Vermeulen, 2008). The Siberian expedition allowed Müller to gather knowledge about various peoples and cultures, and he collected data for the creation of maps. He also described and categorized clothing, religions, and rituals of the many different Siberian ethnic groups.

State of the Art Study

Creswell, (2013) described following four sub-types of narratives. A Biographical Narrative is a story that recounts the important proceedings and facts about a person's life from a first-person perspective. The researcher of a biographical narrative designates the life events in chronological order and highlights the significance of the events. Autoethnography is a form of narrative methodology of qualitative research. The researcher uses self-reflection and presents his/her personal experiences and connect this autobiographical story to broader social, partisan, and communal meanings and understandings for the reader. Life History is another sub-type of narrative, which captures the entire life story of an individual. Finally, the Oral History, is the assortment and learning of historical information about people, relations, significant measures, or ordinary lifecycle using audiotapes, videotapes, or records of prearranged discussions. These discussions are directed with individuals who contributed in or observed historical proceedings and whose recollections and insights of these are to be conserved as an aural record for future generations.

Realist Ethnography and Critical Ethnography are two types we use in this area of research. Realist Ethnography deals with realist thinking in terms of an objective account of the situation. The adaptation of realist ethnography allows the observer to use third person speech to elaborate on the observation and what they have heard from the participants. The ethnographer endeavors to remove all personal biases or political motivations when giving this objective account.

The next type of ethnography is Critical Ethnography. It seeks to understand the ways in which power relations shape people's identities and their experiences, as well as having a focus on underlined biases to challenge social injustices (Dutta, 214). This type of ethnography seeks to govern representative mechanisms, to extract ideology from fulfilling societal norms, and to comprehend the reasoning and conduct of research subjects within historical, cultural, and social frameworks.

Major Thinkers and what they Contributed

As Polkinghorne (1988) mentioned, Bruner (1986, 1991) and Lyotard (1984) distinguished narrative as having two types, namely, “logico-scientific” and ‘believable narrative,’ which is not necessarily true. Authors have presented these relying on dissimilar events for authentication, with narrative expressing positioning around the meticulousness and specificity of what happened, and the active participation of humans making sense of objects in the stories. Hence the term narrative describes making sense of the events and happening in everyday lives with respect to social context. Polkinghorne (1988) views narrative as a major way of making sense of human experiences in their social context. Gubrium & Holstein (2009) emphasized analyzing the narratives to capture the true meanings of the stories. Gubrium & Holstein (2009) also discussed the importance of interpreting the narrative from different perspectives to get at its true essence (Bamberg & Cooper, 2012).

We can find in the research of Boyle (1994), who has suggested that a “central tenet of ethnography is that people’s behavior can only be understood in context.” As per this article’s earlier discussion, we came to know that the procedure of following a rounded view of a certain group frequently comprises ecological and historic reflections which help the ethnographer get an advanced understanding of the context in which an individual or group operates. At the same time though, the importance in ethnography is placed not on distinct social actions, as is repeatedly the case in positivist methods, but on how interactive procedures are related. Earlier to this study Spradley (1979) commented that ethnography is not so much about studying people as it is about learning from them. Ethnography is the process of learning about ethnographic hosts’ worlds or cultural systems, as their socialization into or experience with these systems has rendered them as experts on various aspects of these worlds. Here are a few thinkers of note, who worked with Ethnography in great depth.

Marcel Mauss (1872-1950)

Clifford Geertz (1926-2006)

Paul Farmer (1959-) ...

Bronisław Malinowski (1884-1942)

Lewis Henry Morgan (1818-1881) ...

Eric Wolf (1923-1999) ...

Claude Lévi-Strauss (1908-2009) ...

Ruth Benedict (1887-1948)

Goals of the Two Methodologies

The main goal of the narrative is storytelling, by hearing the words of the unheard. The stories we hear matter, probably almost as much as the stories we heard as children, told to us by our parents and other elders (Gubrium & Holstein ,2009). These stories give us an understanding of what is, what could be, and what should be. The other vital goal of the narrative is formulating an expectancy of such stories with a structure, with protagonists

and villains, a hill to be climbed or a battle to be fought. These scenarios are also known as contexts. Narrative research allows us to form contextual understanding of a situation and persona, of the story's subject. Storytelling also involves creating an understanding of cultures and the norms within those, the behavioral traits of tribes, etc. Observations, recording of stories and creating titles with relative material are also important goals, which a researcher can look into, while conducting a study using several narrative techniques for clarity and conciseness.

Ethnography is a qualitative investigation technique established on the assortment of culture at home and wherever that may be, as well as overseas. Ethnography is a hands-on, experiential learning technique that involves immersing oneself in a culture or group of people to learn about their way of life. It is used to but not limited to, learning about people's social, cultural, or religious practices as well as their beliefs and values (Healy, Beverland, Oppewal, & Sands, 2007). For these explanations, ethnographic lessons narrate numerous fields of study and several kinds of individual experience. These count, for example, education overseas and community-based or intercontinental internships.

The primary goal of Ethnography is trying to understand how people live their lives in a social setting in terms of their cultural norms and actions. Ethnography is not like traditional market research, rather an ethnographer visits people, who can be consumers in their homes or offices, to observe and listen in a nondirected way to conduct behavioral study about some product. The goal is to see people's behavior on their terms, not from the direct perspective of an ethnographer. While this observational process may look inefficient, it educates us about the background in which customers of some cable company would sign-up or subscribe for a new channel or use a new product and the meaning that product might hold in their lives. This means understanding of context is also an important goal. For instance, contextual decisions play a significant role in our lives, such as when someone or some group of people make some decisions to either congregate peacefully or join a protest.

Description of Methods Specific to the Methodology

These are specific methods which we use in Narrative Research.

Story Telling: This deals with gathering life stories of one or more individuals. The stories can be told orally or recorded in a journal or diary through observation.

Interviews: The life stories collected using interviewing methodology. An aspect is asked questions to get the facts to relate with the experiences, such as successes and failures. The researcher can also collect data by collecting documents such as letters or photographs, or other memorable items, to develop a story (Creswell, 2013)

Ethnography is used to describe how a cultural group works and to explore their beliefs, language, behaviors, and issues faced by them. This study can extract information related to the power, resistance, and dominance

within some social settings by applying the observational approach, by not being biased or judgmental. At this step, we incorporate interviewing. The identification of the cultural context of a certain group to study is another milestone to achieve. Such a group of people should have been together for an extended period, so that their shared language, and patterns of behavior and attitudes have merged into discernible patterns. This method can be described as pattern extraction. At this step, we incorporate the Participant Observation method.

The selection of cultural meanings, themes, or theories to study about the group is the next target to hit, where an ethnographer can extract meanings, themes and theories to provide an orienting framework for the study of the culture-sharing group. This allows the ethnographer to start the study by examining people interacting in their everyday settings, which are their embodiment and are pervasive to that set of people. At this step, we incorporate the Surveying method.

Analytic Techniques Specific to Methodology

Interviewing is an extremely important technique to record all as mentioned by the interviewee. The ethnographer is not to use memory, as it is not a sufficient source for citation. Interviews must be transcribed in full or at least partially. Though the full transcription provides the most comprehensive data for the researcher to analyze, it is a laborious task and usually very time consuming. However, there are instances where full transcriptions are not useful or needed and transcription of only the key parts of the interview would be essential. The decision of full or partial transcription depends on the research questions one is trying to answer (Mann, 2011).

The Participant Observation technique for the field study is a very hands-on way to keep track of the observations of a certain group of participants. It is most important to take notes in a journal that will allow the ethnographer to notice patterns that might not been comprehended and were ubiquitous in person (Baxter & Chua, 1998). Since, we know that the memory fails, it is imperative to have comprehensive notes taken by the ethnographer of what has been observed. Otherwise, the observations end up being meaningless.

Conclusion

The article discusses the use of narratives and ethnography in research. The authors discussed topics including collaboration, data collection experiences, narrative authority, ethics, negotiation, and storytelling in relation to narrative methodology. The methodology is used across many disciplines including psychology, sociology, linguistics, philosophy, anthropology, organizational studies, and history. The article also expands upon the role of ethnography in our everyday life. The article also discusses the history of ethnography, its impacts, and the knowledge that can be gained from its documentation. This sets the stage for a more in-depth discussion of methods for data collection and analysis used in ethnographic studies. The articles then describe how these

methods can be used to elaborate on practical issues concerning the selection and use of ethnographic methods by researchers.

References

- Baker, & P. P. Peterson (Eds.), *International encyclopedia of education* (3rd ed.). New York, NY: Elsevier
- Bamberg, M., & Cooper, I. H. (2012). Narrative analysis. *APA handbook of research methods in psychology*, 2, 77-94.
- Baxter, J. A., & Chua, W. F. (1998). Doing Field Research: Practice and Meta-Theory in Counterpoint. *Journal of management accounting research*, 10.
- Clandinin, D. J., & Huber, J. (in press). Narrative inquiry. In B. McGaw, E.
- Creswell, J. (2013). *Qualitative inquiry research design: Choosing among five approaches*. Thousand Oaks, CA: SAGE Publications, Inc.
- Dutta, U. (2014). Critical ethnography. *Qualitative methodology: A practical guide*, 89-105.
- Gubrium, J. F., & Holstein, J. A. (2009). *Analyzing narrative reality*. sage.
- Healy, M. J., Beverland, M. B., Oppewal, H., & Sands, S. (2007). Understanding retail experiences-the case for ethnography. *International Journal of Market Research*, 49(6), 751-778.
- Mann, S. (2011). A critical review of qualitative interviews in applied linguistics. *Applied linguistics*, 32(1), 6-24.
- Mitchell, M. C., & Egudo, M. (2003). *A review of narrative methodology*. Defense Science and Technology Organization Edinburg (Australia) Land Operations Div.
- Polkinghorne, D. E. (1988). *Narrative knowing and the human sciences*. Suny Press.
- Vermeulen, F. H. (2008). Early history of ethnography and ethnology in the German enlightenment. Abstract retrieved from <https://openaccess.leidenuniv.nl/handle/1887/13256>

Predictors of Growth Mindset among Ghanaian Classroom College of Education Teacher Trainees

Seidu Sofu

Southeast Missouri State University, USA,  <https://orcid.org/0000-0003-4941-9681>

Emmanuel Thompson

Southeast Missouri State University, USA,  <https://orcid.org/0009-0002-1094-0656>

Eugene F. Asola

Valdosta State University, USA,  <https://orcid.org/0009-0006-5715-0482>

Abstract: The study aimed to examine the important predictors of Ghanaian classroom Diploma in Basic Education teacher trainees' growth mindset toward student learning. Participants included a purposive sample of 328 (177 male and 151 female) second- and third-year teacher trainees in one college of education in the northern part of Ghana. The predictor variables were the type of program, year in program, age, sex, and marital status. The student learning subscale of the Physical Education and Sports Ability Survey (Sofu et al., 2016) served as the main data source. The items were adapted for the classroom setting. Most of the trainees had a growth mindset but with some fixed ideas for student learning (80.18%). Approximately 19.21% of the trainees had a strong growth mindset in student learning. The mean decreased Gini (MDG) values for the year in the program, program type, and marital status (married vs. single) showed that these predictors were important for student learning. A logistic regression analysis showed that type of program, year in program, and marital status were significant predictors of growth mindset for student learning. Trainees in the early childhood program were approximately seven times more likely to have a growth mindset regarding student learning compared to those in the primary education program. Trainees in their third year were approximately 145 times more likely to have a growth mindset regarding student learning compared to trainees in their second year. Single teacher trainees were approximately 213 times more likely to have a growth mindset regarding student learning compared to married teacher trainees. The study provides insights for teacher educators regarding the profiles and factors that promote the development of a growth mindset in teacher education settings in Ghana.

Keywords: Growth mindset, teacher education, Ghana, Random Forests

Citation: Sofu, S., Thompson, E., & Asola, E. F. (2023). Predictors of Growth Mindset among Ghanaian Classroom College of Education Teacher Trainees. In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023-- International Conference on Social and Education Sciences* (pp. 351-357), Las Vegas, NV, USA. ISTES Organization.

Introduction

Importance of a Growth Mindset in Education

The concept of a growth mindset has received significant attention in the field of education (Dweck, 2006). A person with a growth mindset believes that abilities and intelligence can be developed through effort, learning, and perseverance (Dweck, 2006). This contrasts with a fixed mindset, where individuals believe that their abilities are static and cannot be changed significantly. Adoption of a growth mindset has been shown to have a significant effect on students' motivation, learning, and overall academic success (Blackwell et al., 2007; Dweck, 2008).

The Ghanaian Context of Teacher Education

Ghana places a strong focus on the education of its youth, recognizing that well-trained teachers are essential to achieving educational goals and national development (Ministry of Education, Ghana, 2019). However, these policies, infrastructure, overcrowded classrooms, and the need to continuously improve teaching practices (Anamuah-Mensah, 2019). There is a need to formulate effective and contextually meaningful policies as these play an important role in the determination of educational attitudes and practices. Ghanaian society places a high value on education, and students often face tremendous pressure to excel academically (Adu-Gyamfi & Walker, 2019).

The Need to Understand Predictors of a Growth Mindset

One topic that has not been studied in education in Ghana is the need to understand the predictors of a growth mindset among prospective teachers. A growth mindset, characterized by the belief in the malleability of one's abilities through effort and learning (Dweck, 2006), is not a uniform trait but a dynamic construct influenced by various factors (Yeager & Dweck, 2012). Previous studies have identified possible predictors of growth mindset as the teacher's sociocultural background, prior academic experiences, and instructional practices (Blackwell et al., 2007; Hong, 2013; Sisk et al., 2018). For example, instructional approaches that emphasize effort and learning from mistakes would more likely promote a growth mindset. However, the interaction and relative contribution of these predictors in the context of teacher education are unclear. An understanding of these predictors is essential because it can inform targeted interventions and curriculum enhancements to foster growth mindsets among teacher trainees, ultimately benefiting their students' learning experiences (Haimovitz & Dweck, 2016).

Relevance to Teacher Education in Ghana

As mentioned earlier, Ghana places great emphasis on the quality of its teachers and recognizes that teacher education programs play an important role in shaping the country's educational future (Ministry of Education,

Ghana, 2019). A growth mindset among teacher trainees can help them with the knowledge and efficacy of student learning. In the Ghanaian context, where education is highly valued, the pressure to excel academically can sometimes create a fixed mindset and fear of failure among students (Adu-Gyamfi & Walker, 2019). In addition, a developmental perspective can provide teachers with the flexibility needed to overcome challenges in the education system in Ghana, including overcrowded classrooms and infrastructure (Anamuah-Mensah, 2019).

Purpose of the Study

The study examined the important predictors of Ghanaian classroom Diploma in Basic Education teacher trainees' growth mindset toward student learning. The findings can provide insights regarding the factors that promote the development of a growth mindset among teacher trainees in Ghana. This, in turn, can empower policymakers and educators to design and implement appropriate interventions.

Research Questions

The following research questions guided the study:

1. What are the growth mindset profiles of Ghanaian classroom teacher trainees?
2. What are the important predictors of Ghanaian classroom teacher trainees' growth mindset for student learning?

Method

Participants

Participants included a purposive sample of 328 (177 male and 151 female) second-year (152) and third-year (176) teacher trainees enrolled in a Diploma in Basic Education program at one college of education in the northern part of Ghana. They were aged 19-35 years ($M= 24.45$; $SD= 2.36$). age. The trainees were enrolled in the General Basic (Primary) Education (178) and Early Childhood Education (150) programs at the time of the study.

Instrument and Variables

The student learning subscale of the Physical Education and Sports Ability Survey (PESAS) (Sofa et al., 2016) served as the main data source. The PESAS was, in turn, developed from the Dweck Mindset Inventory (Dweck, 2006). The items were adapted for the classroom setting. The student learning subscale consisted of 12 items on a 4-point scale of strongly agree (4), agree (3), disagree (2), and strongly disagree (1), with "4" being the highest and "1" the lowest for items that were positively stated. The teacher trainees' growth mindset toward student learning and teaching ability served as the response variables. The predictor variables were the type of program, year in program, age, sex, and marital status.

Statistical Analysis

Random Forest Parameters and Evaluation Metric

For all the models estimated using the random forest algorithm for classification, we used the square root of the number of predictors and rounded to the nearest whole number as the number of predictors randomly sampled as candidates at each split (James et al., 2021). We set the variable importance argument to TRUE in the “randomForest()” function and the number of trees was set to the default of 500. The evaluation metric for the random forests for classification was the Out-of-bag (OOB) error metric. This metric measures the prediction error rate for the random forests method. The OOB estimate for the error rate for student learning was 14.33%.

Predictor Importance and Logistic Regression

We used the mean decrease Gini (MDG) value (cut-off point = 10) to determine predictor importance. The higher the value, the greater the importance of the predictor. Predictors with MDG values of at least 10 were important. For student learning, year in program, program, and marital status (married vs single) were important predictors according to their MDG values.

For robustness, and to obtain a more interpretable model to guide practitioners, we estimated the binary logistic regression model and obtained the estimated Odds Ratios and their corresponding 95% confidence intervals. Results of the logistic regression were consistent with the random forests results and hence serve as a check for the robustness of our results.

Results

Teacher Trainees’ Growth Mindset Profiles for Student Learning

The first research question examined the growth mindset profiles of Ghanaian classroom teacher trainees. Table 1 shows data on teacher trainees’ growth mindset profiles for student learning. Most of the trainees had a growth mindset but with some fixed ideas for teaching ability (80.18%). A little over 19 percent of the trainees had a strong growth mindset in student learning. Conversely, only approximately .31% of the trainees had a strong fixed mindset or a fixed mindset with growth ideas.

Table 1. Teacher trainees’ growth mindset profiles for student learning

Category	Frequency	Percent
Strong Fixed Mindset	1	0.305
Fixed Mindset with Growth Ideas	1	0.305
Growth Mindset with Fixed Ideas	263	80.183
Strong Growth Mindset	63	19.210
Total	328	100.00

Important Predictors of Teacher Trainees' Growth Mindset

Table 2 represents the Mean Decreased Gini (MDG) for the predictor variables. Year in program had the highest MDG of 49.20, followed by marital status (Single versus Married). Using a cut-off point of 10 shows that the MDG values for the year in the program, program type, and marital status (married vs. single) showed that these predictors were important for student learning. Alternatively, teacher trainees' sex, age, and marital status (Single versus Other) were not important predictors of teacher trainees' growth mindset for student learning.

Table 2. Mean Decrease Gini values based on Random Forests Methods

Predictors	MDG
Program (Early Childhood vs Primary)	10.49
Year in Program (3 rd vs 2 nd)	49.20
Age (More than 25 years)	3.31
Sex (Female vs Male)	2.04
Marital Status (Married vs Single)	21.64
Marital Status (Other vs Single)	3.61

Logistic regression for predictor variables and growth mindset

We did a logistic regression analysis for the predictors that had MDG values of at least 10. The analysis showed that type of program, year in program, and marital status were significant predictors of growth mindset for student learning. Trainees in the early childhood program were approximately seven times more likely to have a growth mindset regarding student learning compared to those in the primary education program.

Trainees in their third year were approximately 145 times more likely to have a growth mindset regarding student learning compared to trainees in their second year. Single teacher trainees were approximately 213 times more likely to have a growth mindset regarding student learning compared to married teacher trainees.

Table 3. P-values and estimated odds ratios based on predictors with MDG \geq 10

Predictor	P-value (Estimated Log Odds)	Estimated Odds Ratio
Year in Program (Year 3 vs Year 2)	0.000	144.877
Program (Early Childhood vs Primary)	0.000	6.782
Age (>25 vs ≤25)	0.492	1.330
Sex (Female vs Male)	0.996	0.998
Marital Status (Married vs Single)	0.000	0.005
Marital Status (Other vs Single)	0.986	0.000

Discussion

This study examined the important predictors of Ghanaian classroom Diploma in Basic Education teacher trainees' growth mindset toward student learning. Teacher trainees in the early childhood program were approximately seven times more likely to have a growth mindset regarding student learning compared to those in the primary education program. This may be attributed to the more visible growth and development early childhood education trainees observe in young children's abilities, which in turn, may strengthen their belief in the efficacy of a growth mindset approach. Trainees in their third year were more likely to have a growth mindset regarding student learning compared to trainees in their second year. The year three trainees having had more exposure and experience with children in real classrooms might have had a deeper understanding of growth mindset than their counterparts in their second year of training.

Another major finding of our study was that married teacher trainees exhibited lower growth mindset scores than their counterparts who were single. It is possible that single teacher trainees may perceive themselves to have greater control over their lives than married trainees. This perceived control may lead single trainees to have a stronger belief in their ability to change and improve, consistent with the principles of a growth mindset. Also, compared to married couples, single individuals generally have more personal freedom and independence. This autonomy can lead to a strong belief that they have control over their own abilities and can actively work to improve them, consistent with growth mindset principles.

The present study was conducted on teacher trainees in the Diploma in Basic Education program. This program has been phased out and replaced with the Bachelor of Education (B.Ed.) program at the colleges of education. Future research could be done on trainees pursuing the B.Ed. programs at the colleges of education. The growth mindset of prospective teachers in Ghanaian universities could also be investigated. Furthermore, studies comparing the growth mindset of teacher trainees in different teacher education programs are worth investigating.

Conclusion

Our study revealed that three out of six predictors significantly influenced the development of a growth mindset in Ghanaian teacher trainees. Notably, the type of program, year in the program, and marital status significantly predicted their growth mindset regarding student learning. These findings provide important insights for teacher educators regarding the profiles and factors that promote the development of a growth mindset in teacher education settings in Ghana.

References

Adu-Gyamfi, S., & Walker, A. (2019). The culture of achievement and its impact on learning in Ghana. In N. A.

- W. Mwinlaaru & E. K. Mawutor (Eds.), *Education in Ghana: Bridging the gap between research and practice* (pp. 43-58). Springer.
- Anamuah-Mensah, J. (2019). Quality teacher education in Ghana: The journey so far. In M. Asamoah-Hassan, L. Wilmot, & E. K. Mawutor (Eds.), *Teacher education in Ghana: A practitioner's perspective* (pp. 7-24). Springer.
- Blackwell, L. S., Trzesniewski, K. H., & Dweck, C. S. (2007). Implicit theories of intelligence predict achievement across an adolescent transition: A longitudinal study and an intervention. *Child Development, 78*(1), 246-263.
- Dweck, C. S. (2006). *Mindset: The new psychology of success*. Random House.
- Dweck, C. S. (2008). *Mindset: The psychology of success*. Ballantine Books.
- Haimovitz, K., & Dweck, C. S. (2016). What predicts children's fixed and growth intelligence mind-sets? Not their parents' views of intelligence but their parents' views of failure. *Psychological Science, 27*(6), 859-869.
- Hong, Y. Y. (2013). The influence of perceived effort-ability on task enjoyment. *Motivation and Emotion, 37*(2), 280-290.
- James, G., Witten, D., Hastie, T., & Tibshirani, R. (2021) *An Introduction to statistical learning: With applications in R*. (2nd Edition). Springer, New York.
- Ministry of Education, Ghana. (2019). Education sector performance report 2019. Planning, Budgeting, Monitoring, and Evaluation Unit. Accra.
- Sisk, V. F., Burgoyne, A. P., Sun, J., Butler, J. L., & Macnamara, B. N. (2018). To what extent and under which circumstances are growth mindsets important to academic achievement? Two meta-analyses. *Psychological Science, 29*(4), 549-571.
- Sofa, S., Curtner-Smith, M., Thompson, E., & Asola, E. F. (2016). Influence of gender, university class, and orientations to teaching and coaching on preservice teachers' mindsets. Paper presented at the AIESEP International Conference held at Laramie, WY from June 8-11, 2016.
- Yeager, D. S., & Dweck, C. S. (2012). Mindsets that promote resilience: When students believe that personal characteristics can be developed. *Educational Psychologist, 47*(4), 302-314

Two Preadolescents' Perceptions of Developmental Issues in a Deconstructing Society

Sandra Terneus

Tennessee Tech University, USA,  <https://orcid.org/0000-0001-7192-1286>

Abstract: Most literature on youth focuses on prominent issues of bullying/cyber abuse, dating and relationship issues, and mental health concerns for children and adolescents; however, specific to preadolescence, little is written in comparison due to the implication that the transition between the two life stages are well blended. However, the question becomes whether the recommendations from researchers to target presadolescents for youth aggression interventions are delivered effectively to this population. Thus, the focus of this research is to ascertain the perspectives of developmental issues of self-concept, relationships, bullying, and safety from preadolescents. Some of the responses from two preadolescent females concurred with literature; however, responses were nonexistent or scant regarding interactive or existential learning through family, school, church, and community. Although this research is limited to only two presadolescent females, the developmental perspectives reflect societal degeneration as experienced in a rural Midwest town attending school lockdowns with casualties and residing within close proximity to registered sex offenders.

Keywords: youth development, violence, relationships, bullying

Citation: Terneus, S. (2023). Two Preadolescents' Perceptions of Developmental Issues in a Deconstructing Society. In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023-- International Conference on Social and Education Sciences* (pp. 358-370), Las Vegas, NV, USA. ISTES Organization.

Introduction

Current literature on adolescents primarily focused on increasing youth aggression amid a violent environment inclusive of students' weekly physical altercations and bullying, criminal activity in school neighborhoods, student-teacher altercations (Juvonen, 2001), and increasing school shootings with casualties (Wang et al., 2020). Bullying and cyberbullying continued to be a prominent safety issue in regards to non-heterosexual relationships as well as results from the 2021 National School Climate Survey found that 83.1% of LGBTQ+ students reported harassment or assault based on personal characteristics, including sexual orientation, gender expression, gender, religion, actual or perceived race and ethnicity, and actual or perceived disability (Kosciw et al., 2022).

According to the Centers for Disease Control and Prevention (2020, April 7), teens reported dating abuse more often than any other age group with homicide identified as the 3rd leading cause of death for youth. Within the context of heterosexual relationships, persistent trends revealed both genders engaged in the roles of perpetrator

as well as victim equally (Close, 2005; Herman, 2009). Ackard et al. (2007) found that youth perpetrated and experienced violence differently. For example, young males responded to their partners with more severe physical violence and suffered fewer psychological consequences than young females who perpetrated with less intense forms of physical violence but suffered more profound psychological consequences. However, differences in cyberbullying's perpetrator/victim roles based on sexual orientation revealed 21% of LGBTQ+ students admitted to cyberbullying others as compared to 8% of heterosexual students (Hinduja & Patchin, 2011). On the other hand, a study by Burgess-Proctor et al. (2008) on adolescent girls' response to cyber abuse, revealed that 27% had responded by cyberbullying back, 36% reported that they did not inform anyone, and 25% reported that they did nothing at all. These findings implied that the girls' reactions may be indicative of cognitive restructuring of the abuse in defining the perpetrators' character as "pathetic," (this type of response may be the suggested action from school anti-bullying intervention programs). Additionally, the girls may not have been affected by the cyber abuse, were perpetrators themselves, or were desensitized to abuse and/or believed bullying and cyber abuse were the norm.

The hostile environment on school grounds created situations of victims relying on the school personnel and peers as rescuers. In regards to reporting bullying on school grounds, 61.5% of LGBTQ+ students did not report the incident to school staff because they did not believe school staff would do anything about the harassment. This may be based on the fact that 60.3% of the students who did report an incident said that school staff did nothing in response or told the student to ignore it (Kosciw et al., 2022). As a potential result, 32.2% of LGBTQ+ students reported absence at least one entire school day and 11.3% missed four or more days in a month due to safety issues.

Young adolescent females who have experienced dating violence also have developed other at-risk behaviors as well as the comorbidity of mental health issues (Silverman et al., 2001). By contrast, adolescent male victims of dating abuse seldom seemed to fear violence by their female partners, often describing the attacks as amusing (Molidor & Tolman, 1998) and flirtatious. Researchers have documented a trend that teenagers, who have lower self-esteem, were more likely to show addictive behaviors involving cell phone and social media usage (Bianchi & Phillips, 2005), score significantly higher on depression and anxiety assessments (Gellene, 2006, May 24), as well as have stalking patterns as exhibited by both genders (Shariff, 2008; Smith-Darden et al., 2016). Rothman et al. (2021) found that 48% of teenagers who have reported being stalked or harassed from a relationship proposed that adolescents may not recognize inappropriate relationship boundaries nor may not have known effective and safe methods to confront someone's overwhelming or covertly threatening attention. Stalking would become a more pertinent safety issue as students believed they were in a potentially hostile environment and would not be protected by school officials and/or parents. In addition to the school environment, neighborhoods may harbor adult sex offenders as 1 in 9 girls and 1 in 53 boys as sexually assaulted traveling to and from school by an adult perpetrator according to the Register Sex Offenders Registry (n.d.). Thus, factors of safety issues impacting youth steadily inclined in peer victimization, school shootings, and suicides ranging from elementary schools to college campuses as indicative of the pervasiveness or desensitization of violence and a lack of safety intervention as a social norm.

Although some school communities have provided anti-bullying programs and interventions (Close, 2005; Hinduja & Patchin, 2008a) as well as offered curriculum on dating violence prevention (Cissner & Ayoub, 2014), professionals have advocated that interventions for adolescence and teenagers would be more effectively served by reaching the youth at the earlier age of preadolescence (Close, 2005; Shariff, 2008). For example, it was reported that more than 20% of high school students have had their first sexual intercourse prior to age 14, i.e., during preadolescence (Escobar-Chaves & Anderson, 2008), and earlier sexual encounters have demonstrated the requirement for interventions in middle schools (Foshee et al., 2001). Collins and Van Dulmen (2006) and Cutter-Wilson & Richmond (2011) warned that relationship violence which began in adolescence has been shown to continue into adulthood, and therefore, Arsenault (2001) recommended that educators and counselors evaluate their students as early as age six to remediate any developmental factors which might hinder later personal growth and academic achievement. Also, Linder and Collins (2005) warned that research findings indicated that preadolescence or middle childhood behavior predicted more strongly towards early adulthood dating violence than adolescent behavior.

Purpose and Rationale

In examining preadolescent literature, the majority of topics emphasized developmental issues of self-esteem, physiological changes which accompanied puberty, and parenting preteens (Huston & Ripke, 2006), and seemed more appropriate for optimal interactions between the child and the environment for learning and development per Bronfenbrenner's Ecological Systems Theory (Bronfenbrenner Center for Translational Research, n.d.). However, with the current state of youth aggression, the interactions may be stifled resulting in isolation, withdrawal, and inhibited communication and connections to others. Therefore, to ascertain whether the at-risk interventions and programs originally designated for older youth were reaching the mindset of preadolescents as allegedly administered by parents, school, and community personnel, it was this author's intention to inquire how preadolescents would perceive these issues in context of their environment. Specifically, this author surveyed two preadolescent females in regards to the issues of self-concept, relationships, bullying, and personal safety.

Methodology

Participants

The two preadolescents in this study were Caucasian females who were students in different grades at the same public middle school, who participated in extracurricular activities, church, and community functions, and who were from lower-middle socioeconomic nontraditional families. Both were clean in appearance, very thin in stature, reported no substance use, and used media two hours daily, i.e., cell phones, computer, video games, and cable/dish television monitored by parental control. Both resided within close proximity to a registered sex offender in a small Midwest town inhabited by 85 registered sex offenders (National Sex Offender Registry, n.d.).

Procedure

Prior to the study, the author developed a series of questions pertaining to four categories of self-concept, relationships, bullying, and personal safety. Among a group of youth, two females volunteered to participate and parental consent was received. The author met with both subjects simultaneously, and had instructed them that they would be given a tablet which contained a series of generic questions related to self-concept, relationships, bullying, and personal safety. The author instructed the subjects to think about their answers as long as they needed, to write their answers to the questions in a covered tablet used to maintain privacy, and to leave questions unanswered if they felt uncomfortable with the question. The subjects were not cued to answer the questions in any way as a measure to discourage biased comments. In addition, the author did not read the preadolescents' comments until after the conclusion of the study. The duration of the research was approximately one hour over two consecutive days.

The following text includes the author's questions and the subjects' answers as well as a summary of responses and supplements from the literature as reflective of the four categories of self-concept, relationships, bullying, and personal safety: 1. Self-Concept: Preadolescents form identities and measured their worth based on interpretations of others' evaluations, and thus, the successful adult life was defined as having a college education, a good job, and healthy relationships (Huston & Ripke, 2006). Therefore, based on the literature of preadolescence and self-concept, the author composed generic questions for this survey. In regards to developmental tasks of preadolescence, the author was interested in the participants' perceptions of: 1) sense of identity as defined by their accomplishments, 2) the ability to set goals, 3) sense of their world, and 4) the influence of friends, family, school, church, and community upon their self-identity.

Self-Concept Questions and Participants' Responses:

Both subjects portrayed having a sense of self as revealed in their values, interests, and in what they do well; this concurred with the literature. In regards to identifying the "best" about their selves and world, both subjects identified friends as a valuable asset in their lives, and identified themselves overall in optimistic terms as well. In regards to identifying what they didn't like about their self and their world, one subject answered in regards body image and world issues while the other subject's responses referred to being frequently teased and familial issues. In regards to self-responsibility for their lives, a sense of awareness and self-empowerment was evident in their responses as well as coping skills of cognitive reconstructing such as "making my times fun so I can remember them easier." In regards to future aspirations, both preadolescents identified the necessity of college and jobs which concurred with the literature; however, one preadolescent identified long-term goals to reach her proposed outcome while the other preadolescent identified more short-term goals.

It is interesting to note that questions asking, "What have you learned about how to live a better life from friends, church, community, and worldly events," were omitted by both participants. In addition, questions asking, "What have you learned about how to live a better life from family, school, and the best of worldly

events,” were omitted by one participant. In regards to the unanswered questions, perhaps, the questions reflected that the two preadolescents were not aware of reciprocated learning opportunities from their friends, school, church, and the community, or there may have been a negative connotation with these specific areas which did not comply with the values of building “fun times” or self “power”, and therefore, were selectively dismissed. However, in regards to self-concept, both preadolescents identified having friends as one of the “best” features of their self/world which is consistent with development transitions in the literature.

2. Relationships: Research supported friendships as an important part of self-identity and influences psychological growth (Wierkle & Avgoustis, 2003). For example, preadolescents who have committed friendships show better academic performances, enjoy school, and participate more in school (Huston & Ripke, 2006). Richard and Schneider’s (2005) study revealed preadolescents females were more determined in their friendship development to produce prosocial and less conflictual relationships, and thus, were preferred by their peers as play-work companions. Contrarily, Troop-Gordon and Ladd’s (2005) research on peer relationships found that although children’s self-appraisals became increasingly positive during preadolescence, their appraisals of peers became more negative. Because peer-to-peer relationship norms peaked around age 12, preadolescents were especially susceptible to both prosocial and antisocial contagion group norms.

Preadolescents spend significant amounts of time in mixed gender groups that may initiate romantic interests (Connolly et al., 2004). Sorensen (2007, July) warned that youth lacked the maturity and awareness to know healthy dating behavior. As a result, youth are likely to misinterpret and tolerate dysfunctional relationships. For example, an act of jealousy or constant text messaging could be misinterpreted as a sign of love. Preadolescents and adolescents often misinterpreted “love” as submission or domination relative to what they have seen in their own families or what they have learned from more experienced peers (Close, 2005). Although Sorensen (2007, July) reported that middle childhood peer relationships usually lasted only a few weeks or months, Huston and Ripke (2006) stressed that these relationships significantly predicted behavioral patterns in adult romantic relationships.

In regards to dating advice, preadolescents and adolescents preferred consulting a friend or the media. Due to watching soap opera-type programs, adolescents learned that it was appropriate and expected to date at a younger age than their maturity age, and that dating many partners reflected higher social status with their peers. According to the 2003 Middle School Youth Risk Behavior Surveillance Survey, 6% of sixth graders and 9% of eighth graders have had sexual intercourse (Escobar-Chaves & Anderson, 2008; Whalen et al., 2006;). In addition to learning about dating roles from the media, Albert et al. (2003) found naive acceptance of sexual coercion among youth ages 12-14 with 34% of males’ beliefs that it was acceptable to pressure a female to have sex when it had been rumored that the female had already engaged in prior sexual behaviors. It was clear from the literature that youth engaged in sexual risk-taking behaviors before they were developmentally mature to cope with potential outcomes. Learning about sexual risk-taking behaviors seemed to be indicative of media’s influence as well as the youths’ own interactions and experiences with peers and their home environment. In addition, there seemed to be a high probability that youth cannot distinguish between love and friendship. In

regards to questions on relationships, the author was interested in the preadolescents' perceptions of: 1) the definitions of "friend" and "love," 2) the influence of the media, and 3) the influence of friends, family, school, church, and community upon the subjects' perceptions of relationships.

Relationship Questions and Participants' Responses:

Both subjects' definitions of friendship included elements of shared commonalities, loyalty, and trust. Both subjects differentiated "love" from "friendship" by suggesting a bond connection. These responses did not necessarily concur with the literature since the preadolescents were not dating; therefore, the context for defining "love" and "friendship" may be different. Television seemed to be a neutral influence on their learning about relationships, but dating behaviors modeled by adult couples seemed to have been vicariously learned. Answers were more detailed in responding to generic questions while other sources of learning through family, church, and community were minimal or nonexistent. In regards to learning about relationships from friends, family, school, and the church, one subject recited conservative norms such as "choose carefully," while the other subject critiqued her peers' fickle dating behaviors. This critique could be reflective of disapproval from the apparent lack of loyalty expected of friendships and peers who like each other. Thus, the preadolescents viewed friendships in optimistic terms which concur with the literature.

It is interesting to note that the question asking, "What have you learned about relationships from your community, and worldly events," were omitted by both participants. In regards to the unanswered questions, perhaps similar to the section on self-concept, the question reflected that the two preadolescents were not aware of reciprocated learning opportunities from their community, or there may have been a negative connotation with this specific area which did not comply with their values.

3. Bullying. Research indicated that numerous youth have either been bullied or have witnessed bullying among peers. Hinduja and Patchin (2008b) reported that as many as 8% of victims reported that the consequences of bullying left them feeling angry, vengeful, afraid, with an aftermath of suicidal ideations, depression, anxiety, urges toward school refusal and to run away. As noted earlier, the National Crime Prevention Council reported that children who were themselves victimized could also perpetrate violence (Li, 2005; Strom & Strom, 2005). Hinduja and Patchin's (2008a) study reported that 12% of the adolescents felt threatened and 5% feared for their safety. However, most youth were reluctant to report cyber abuse due to fears that parents would remove their internet access, and thus, immobilize youth to social isolation by prohibiting immediate access to their friends (Cottle, 2001). Adolescents could become confused about their difficult situation, and not have the trust to seek help. As with dating violence, many adolescents withheld information for fear of being judged as immature, wrong, or not normal (Vernberg et al., 1999), especially when doing so manifested further revictimization by the perpetrator. Li's (2005) study revealed that the majority of the students who were cyber-bullied or bystanders chose to be quiet rather than to inform adults, and reported that students believed school personnel have not tried to stop cyber abuse even when officials were aware of it. Another variable was the exposure to violence in real life and in various media which could desensitize youth to the point of their acceptance of victimization as a

reality of life. Thus, survey questions on bullying were based on these issues as well as how preadolescents perceived the influence of friends, family, school, church, and community upon the subjects' perception of bullying.

Bullying Questions and Participants' Responses:

Consistent with the literature, both participants have been physically and psychologically bullied and cyber abused on an intermittent and frequent schedule. They have witnessed numerous incidences of abuse at their school. Both participants did not know why they were bullied but assumed it was because of their small stature and for the abuser's amusement. They believed peers bullied because they lacked friends, had problems, and projected their troubles upon others so they would feel powerful. This abuse existed in the participants' world because bullies weren't reported; the threat of retaliation was real, and the lack of the school's willingness to stop or have effectively enforced anti-bullying policies reinforce violence. One subject still believed in the importance of telling someone while the other subject's experience reinforced mistrust of school personnel. However, she advocated for more direct involvement by school authorities to stop bullying by showing videos of the harmful and hurtful consequences suffered by the victims; this statement concurred with the literature that abusers lack compassion due to possible avoidance of the duress they cause others. As suggested by Pellegrini and Bartini (2000), a pervasiveness of bullying in schools may reveal a lack of effective and enforced anti-bullying policy.

Although the subjects felt hurt and powerless as victims, they have also replicated the bullying behavior upon others; this reciprocal nature was consistent with the literature. There was a sense of desensitization due to the frequent cyber abuse and bullying in schools as evident in their report that they don't worry about the abuse because it was "who we were," indicative of abuse as an accepted part of their life. Unfortunately, a school lockdown due to violence and peer casualties may have reinforced the reality of living with violence for these preadolescents.

4. Personal Safety. In this country, when youth feel threatened, children have learned the response of "Don't talk to strangers," and "Stranger Danger," preadolescents have learned, "Walk/run away," while teens have learned, "Be safe, not sorry." Although this may be the current intervention to feeling threatened, Kremar and Curtis (2003) reported on the influence of violent cartoon media upon children's moral development, and found that children who watched a video of cartoon characters who argued and engaged in violent behavior or watched a similar clip except the characters argued and walked away tended to judge violence as morally acceptable behavior regardless of which video they had watched. This outcome suggested that children may not have understood the discrepancies between solving arguments by walking away and solving arguments with violence. The results may have also suggested that children were desensitized to violence due the prevalence on television content and computer games, and therefore, chose to engage in more primitive criminal behavior as acceptable responses. One ponders how well these lessons have been learned when our society has included the protective safeguards of Amber Alert, websites, and newscasts devoted to alerting society to criminal activity.

Smith and Wilson (2002) examined the influenced of violence from media exposure to children and found that compared to other youth, children under the age of eight were more likely to be anxious when they were exposed to news with graphic and intense visual images such as natural disasters and accidents. Female preadolescents were more likely to be upset and anxious by stories involving crime and violence inclusive of personal injury and kidnapping (Wilson, 2008). Wilson (2008) reported that 40% of juvenile kidnappings were perpetrated by a family member, 27% by an acquaintance, and 24% by a stranger, and sadly, resulted in children who were kept or murdered. Such horrific reports would not only manifest anxiety in preadolescents, but in older adolescents and adults as well.

In addition to the victimization of cyber abuse, and media violence, Shariff (2008) reported that psychological bullying was just as prevalent and intended to isolate, stalk, and ostracize the victim. This was similar to the psychology of stalking which is a form of psychological trauma resulting in potential physical harm. Among the behaviors of a stalker, the psychology of a stalker has been defined as someone who denigrated the victim to an object in order to eliminate empathy or guilt. Stalkers would slander or defame the character of their victim which isolated the victim and give the stalker more control or a feeling of power (Law Encyclopedia, n.d.). Although significant attention has been devoted to adult perpetrators and victims of stalking, there was persuasive evidence that stalking began at a much younger age (McCann, 2001). Stalking was found in obsessional harassment such as bullying, sexual harassment, and dating violence. Burgess-Proctor et al. (2008) reported adolescent females sensed they were being stalked by an ex-boyfriend or a stranger, and one in five females did not know the identity of their cyber abuser. Research on child abusers revealed adult child predators would select their victims from schoolyards, church, community gatherings, single-parent households, as well as the internet and would stalk and lure their victims by acting friendly, smiling, and asking for help. Generally, the target of the sex offender's fantasy would typically be a child or preadolescent less than 12 years old (Gado, 2008, September 7). Thus, issues of dating violence, bullying, cyber abuse, and personal safety all are systemic to the home, school, and community norms of expected and permitted behaviors.

The survey questions regarding personal safety was based on the literature. Inclusive to the generic questions, the author selected four photographs to ascertain which adult was perceived as more trustworthy. Since both preadolescents were Caucasian, all photographs were of Caucasians males and females. The photos are described as follows:

- Photograph 1 was an older middle-aged male, Caucasian, short white hair, broad smile, wearing a casual shirt [a medical doctor].
- Photograph 2 was a young adult female, Caucasian, short brown hair, gentle smile, wearing a shirt [a high school student].
- Photograph 3 was a young adult female, Caucasian, short red hair, broad smile, head bent sideways, wearing summer attire, petting a dog beside her [a college student].
- Photograph 4 was a middle-aged male, Caucasian, short brown hair, blue dress shirt and tie, demonstrating attending behaviors [a professional counselor].

Personal Safety Questions and Participants' Responses:

The only input this section of the survey can offer was the participants' perceptions regarding the appearance of trustworthiness among four photographs of Caucasians. The subjects selected Photographs #1 and #3; other than race, the only other common characteristic among these two photographs that differentiates them from Photographs #2 and #4 were the broad smiles, (i.e., "looked nice," and "looked sweet" interpreted by the participants). Therefore, one may infer that broad smiles may be indicative of someone trustworthy to preadolescents. In comparison, the subjects selected Photographs #2 and #4 as least trustworthy; a young female with a gentle smile who was perceived as "tired," and "on drugs," and a middle-aged male demonstrating counseling attending behavior of open arms/palms up gesture who was perceived as "scary." It was also interesting to note that the professional counselor (Photograph #4) was not perceived as trustworthy by either subject. During the following question, "Have you even been in a situation in which you felt worried or scared being by yourself or around a person?" were omitted by both participants, and both elected to terminate the survey.

It was hoped that this section on personal safety would shed light on how youth live as neighbors with criminals, specifically, registered sex offenders. However, the subjects' sensitivity and personal rights to terminate the study were respected. Nonetheless, other researchers may find the avenues to obtain such data from children and youth. For this survey, the participants' responses ranged from optimism to references to evil may have confirmed a dire need for future research.

Summary and Implications

Due to prominent issues of at-risk behaviors and violence, many professionals have adamantly stated that prevention programs must be delivered to a younger population prior or at preadolescence to establish and stabilize healthy behaviors through adulthood. Thus, this author was initially interested in accessing the perceptions of preadolescents in regards to self-identity, relationships, bullying, and personal safety as well as the influence of learning from friends, family, school, and community. In regards to self-concept, the subjects' responses reflected awareness and self-empowerment as well as means of coping such as choosing to remember good things and learning from parents' mistakes. In regards to dating, the subjects' responses concurred with the literature but lack substantial learning (why, what, and how). In regards to bullying, although both subjects and preadolescent literature emphasized the importance of committed friendships, one subject reported her girlfriend had sent her a threatening internet message that made her feel sad. How then does bullying, cyber abuse, and being a bystander come into the definition of "friendship?" How is "commitment" to friendship adjusted to the reality of abused youth. Perhaps, one subject's comment of, "It is who we are," provides an allowance of bullying among friends (although the term "bullying" was not in the subjects' definition of friendship). If this is so, then at what point is the boundary crossed when a friend is now a stalker and is someone to be wary of? Even with earlier statements of empowerment, one subject wrote that she did not talk

openly anymore due to victimization. Although Perlstein (2004) wrote that preadolescents usually have more school-connectedness with their teacher and principals than with their family, this belief in school personnel to protect students from violent behavior failed. In regards to personal safety, although the subjects' refused to answer questions pertaining to safety in a world of consistent abuse as well as residing near registered sex offenders, it was hoped that other researchers may find sensitive avenues to obtain such data from youth.

The number of blank answers perhaps would be indicative of: 1) that the educational and intervention programs were not being implemented, 2) the educational and intervention program were implemented but not impactful as strongly recommended in the literature, 3) the material was not as the preadolescents' cognitive awareness, or 4) the violence experienced by the participants posed "shut down" responses. Since dating relationships are occurring at this age, knowledge of healthy relationships dynamics and boundaries were lacking, especially in confronting unwanted and threatening behavior. Follow-ups by adults and authority figures were also perceived as lacking, thus, allowing and promoting the acceptance of violent tendencies among youth. Although this study was limited to only two female subjects, their responses may provide insight to the awareness and lack of consistent and effective interventions from parents, schools, church, and community to reach the mindset of preadolescents, especially in regards to bullying and personal safety, and thus, possibly fuel the emotional disturbance residing as an undercurrent in youth.

References

- Ackard, D., Eisenberg, M., & Neumark-Sztainer, D. (2007). Long-term impact of adolescent dating violence on the behavioral and psychological health of male and female youth. *Journal of Pediatrics*, 151(5), 476–481.
- Albert, B., Brown, S., & Flanigan, C. (Eds.). (2003). *14 and younger: The sexual behavior of young adolescents (Summary)*. Washington DC: National Campaign to Prevent Teen Pregnancy.
- Arsenault, D. J. (2001, April). *Behavioral, social, and cognitive predictors of adolescent academic self-concept: A longitudinal investigation*. Paper presented at the Annual Meeting of the Society for Research in Child Development, Minneapolis, MN.
- Bianchi, A., & Phillips, J. G. (2005). Psychological predictors of problem mobile phone use, *CyberPsychology & Behavior*, 8(8), 39-51.
- Bronfenbrenner Center for Translational Research. (n.d.). Urie Bronfenbrenner. Cornell University. <https://bctr.cornell.edu/about-us/urie-bronfenbrenner>
- Burgess-Proctor, A., Patchin, J. W., & Hinduja, S. (2008). *Cyberbullying research summary: The victimization of adolescent girls*. https://cyberbullying.org/cyberbullying_girls_victimization.pdf
- Centers for Disease Control and Prevention. (2020, April 7). *Preventing Youth Violence*. <https://www.cdc.gov/violenceprevention/youthviolence/fastfact.html>
- Close, S. M. (2005). Dating violence prevention in middle school and high school youth. *Journal of Child and Adolescent Psychiatric Nursing*, 18(1), 2-9.

- Collins, W. A., & Van Dulmen, M. (2006). The significance of middle childhood peer competence for work and relationships in early adulthood [Electronic version]: In A. C. Huston & M. N. Ripke (Eds.), *Developmental contexts in middle childhood: Bridges to adolescence and adulthood* (pp. 41-61). NY: Cambridge University Press.
- Connolly, J., Craig, W., Goldberg, A., & Pepler, D. (2004). Mixed-gender groups, dating, and romantic relationships in early adolescence. *Journal of Research on Adolescence*, 14(2), 185-207.
- Cottle, T. J. (2001). *Mind fields: Adolescent consciousness in a culture of distraction*. New York: Peter Lang.
- Cissner, A. B., & Ayoub, L. H. (2014). *Building healthy teen relationships: An evaluation of the Fourth R Curriculum with middle school students in the Bronx*. Center for Court Innovation, US Department of Justice. <https://www.ojp.gov/pdffiles1/nij/grants/248486.pdf>
- Cutter-Wilson, E., & Richmond, T. (2011). Understanding teen dating violence: Practical screening and intervention strategies for pediatric and adolescent healthcare providers, *Current Opinion Pediatric*, 23(4), 379–383. doi:10.1097/MOP.0b013e32834875d5.
- Escobar-Chaves, S. L., & Anderson, C. A. (2008). Media and risky behaviors, *The Future of Children*, 28(1).
- Foshee, V. A., Linder, G. F., MacDougall, J. E., & Bangdiwala, S. (2001). Gender differences in the longitudinal predictors of adolescent dating violence. *Preventive Medicine*, 32, 128-141.
- Gado, M. (2013, January 1). *The slaughter of innocence*. 2008 Turner Broadcasting System. http://www.crimelibrary.com/criminal_mind/psychology/pedophiles/1.html
- Gellene, D. (2006, May 24). Teens who use cell phones most found to be sadder and less assured: Study defined heavy use as over 90 calls or text messages a day. *San Francisco Chronicle*, p. A4.
- Herman, J. (2009). There's a Fine Line...Adolescent Dating Violence and Prevention. *Journal of Pediatric Nursing*, 35(3), 164–170.
- Hinduja, S., Patchin, J. W. (2011). *Cyberbullying Fact Sheet: Bullying, Cyberbullying, and Sexual Orientation*, https://cyberbullying.org/cyberbullying_sexual_orientation_fact_sheet.pdf
- Hinduja, S., & Patchin, J. W. (2008a). *Cyberbullying Fact Sheet: What you need to know about online aggression*. http://cyberbullying.us/cyberbullying_fact_sheet.pdf
- Hinduja, S., & Patchin, J. W. (2008b). *Cyberbullying Research Summary: Emotional and Psychological Consequences*. http://www.cyberbullying.us/cyberbullying_emotional_consequences.pdf
- Huston, A. C., & Ripke, M. N. (2006). Middle Childhood: Contexts of development. In A. C. Huston, & M. N. Ripke (Eds.), *Developmental contexts in middle childhood: Bridges to adolescences and adulthood* (pp. 1-22). [Electronic version]. New York: Cambridge University. 2006.
- Juvonen, J. (2001). *School Violence: Prevalence, Fears, and Prevention*. Santa Monica, CA: RAND Corporation, 2001. https://www.rand.org/pubs/issue_papers/IP219.html.
- Kosciw, J. G., Clark, C. M., & Menard, L. (2022). The 2021 National School Climate Survey: The experiences of LGBTQ+ youth in our nation's schools. New York: GLSEN.
- Kremar, M., & Curtis, S. (2003). Mental models: Understanding the impact of fantasy violence on children's moral reasoning, *Journal of Communication*, 53(3), 460-78.
- Law Encyclopedia: *Stalking*. Answers. <https://www.answers.com/t/stalking>
-

- Li, Q. (2005). New bottle but old wine: A research of cyberbullying in schools. *Computers and Human Behavior*, 23, 1777-1791.
- Linder, J. R., & Collins, W. A. (2005). Parent and peer predictors of physical aggression and conflict management in romantic relationships in early adulthood. *Journal of Family Psychology*, 19, 252-262.
- McCann, J. T. (2001). *Stalking in children and adolescents: The primitive bond*. Washington, DC: American Psychological Association.
- Molidor C., & Tolman, R. M. (1998). Gender and contextual factors in adolescent dating violence. *Violence Against Women*, 4, 180-194.
- National Sex Offender Registry. (n.d.) United States Department of Justice. <https://www.nsopw.gov/>
- Pellegrini, A., & Bartini, M. (2000). A longitudinal study of bullying, victimization, and peer affiliation during the transition from primary school to middle school. *American Educational Research Journal*, 37(3), 699-725.
- Registered Offenders List. (n.d.). *National Registered Sex Offender Laws*. Santa Barbara, CA. <http://www.registeredoffenderslist.org>
- Richard, J. F., & Schneider, B. H. (2005). Assessing friendship motivation during preadolescence and early adolescence, *Journal of Early Adolescence*, 25(3), 367-385.
- Rothman, E. F., Bahrami, E., Okeke, N., & Mumford, E. (2021). Prevalence of and risk markers for dating abuse-related stalking and harassment victimization and perpetration in a nationally representative sample of U.S. adolescents. *Youth & Society*, 53(6), 955-978. <https://doi.org/10.1177/0044118X20921631>
- Shariff, S. (2008). *Cyber-bullying: Issues and solutions for the school, the classroom and the home* [Electronic version]. New York: Routledge.
- Silverman, J. G., Raj, A., Mucci, L. A., & Hathaway, J. E. (2001). Dating violence against adolescent girls and associated substance use, unhealthy weight control, sexual risk behavior, pregnancy, and suicidality. *Journal of the American Medical Association*, 286(5), 572-579.
- Smith, S., & Wilson, B. (2002). Children's comprehension of and fear reactions to television news, *Media Psychology*, 4(1), 1-26.
- Smith-Darden, J. P., Reidy, D. E., & Kernsmith, P. D. (2016). Adolescent stalking and risk of violence, *Journal of Adolescence*, 52, 191-200.
- Sorensen, S. (July 2007). *Adolescent Romantic Relationships*. ACT for Youth Center of Excellence: Research Facts and Findings, New York: Cornell University, University of Rochester, NY State Center for School Safety, and Cornell Cooperative Extension of NYC. http://www.actforyouth.net/resources/rf/rf_romantic_0707.pdf
- Strom, P., & Strom, R. (2005, Fall). Cyberbullying by adolescents: A preliminary assessment. *The Educational Forum*, Fall 2005, 70, 21-32.
- Troop-Gordon, W., & Ladd, G. W. (2005). Trajectories of peer victimization and perceptions of the self and schoolmates: Precursors to internalizing and externalizing problems, *Child Development*, 76(5), 1072-1091.

- Vernberg, E. M., Jacobs, A. K., & Hershberger, S. L. (1999). Peer victimization and attitudes about violence during early adolescence. *Journal of Clinical Child Psychology*, 28, 386-395.
- Wang, K., Chen, Y., Zhang, J., & Oudekerk, B. A. (2020). *Indicators of School Crime and Safety: 2019* (NCES 2020-063/NCJ 254485). National Center for Education Statistics, U.S. Department of Education, and Bureau of Justice Statistics, Office of Justice Programs, U.S. Department of Justice. Washington, DC.
- Wilson, B. (2008). Media and children's aggression, fear, and altruism, *The Future of Children*, 18(1), 87-118.

Reviewing the Anxiety and Motivation in Foreign Language Learning From the Perspectives of Definition and Classification

Tongyu Wu

Department of English, Binhai School of Foreign Affairs of Tianjin Foreign Studies University, Tianjin, China

Abstract: Many previous studies have identified “foreign language anxiety” and “motivation” as two important areas of applied linguistics. This study aims to evaluate the pertinent literature with also providing new information and justifications in past studies on learning anxiety and motivation. In this paper, the first section explains the concept of L2 anxiety and elaborates on the three most widely used classifications of learning anxiety: “trait anxiety,” “state anxiety,” and “situation-specific anxiety.” Furthermore, according to the anxiety’s impact on learners, it can be broadly divided into two types: “debilitating anxiety” and “facilitative anxiety.” Then, the second section of this paper explains the concept of L2 motivation from the abstract to the concrete, divides learning motivation into two categories (i.e., “integrative motivation” and “instrumental motivation”) by its importance to second language learning, and classifies them into two other different categories (i.e., “intrinsic motivation” and “extrinsic motivation”) by introducing new theories. The last section summarizes the relationship between the independent variables of L2 anxiety and motivation, along with the dependent variable of L2 learning, and also the relationship between learning anxiety and language motivation, which provides some constructive suggestions to the students and teachers of related majors. Therefore, the contribution of this paper is to empower faculty to adapt their instruction to the motivation and anxiety of different students in various classes, which enables learners to strike a balance between motivation and anxiety in order to achieve effective and fruitful learning outcomes.

Keywords: Anxiety, Motivation, Classification, Relationship.

Citation: Wu, T. (2023). Reviewing the Anxiety and Motivation in Foreign Language Learning From the Perspectives of Definition and Classification. In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023-- International Conference on Social and Education Sciences* (pp. 371-379), Las Vegas, NV, USA. ISTES Organization.

Introduction

Language instruction and learning have identified anxiety and motivation as key elements influencing students' capacity to learn a foreign language. The overwhelming majority of linguists concur that nearly all EFL (English as a foreign language) students experience anxiety related to learning a second language to variable degrees. Additionally, people overcome their fear of learning by engaging in positive cognitive processes, commonly known as learning strategies (Litterwood, 1999). With the development of the history of the field of educational

research, motivation and anxiety have seemed to be intertwined and interconnected in a complex way, and previous scholars have thoroughly examined the connection between the success of language learners and these two affective factors, concluding that learning anxiety and motivation are, respectively, negatively and positively correlated with foreign language learning. The majority of the earlier study, however, concentrated on the relationship between anxiety or motivation on foreign language learning separately. For example, the impacts of motivation and learning anxiety on learning a foreign language were mostly explored independently in the earlier studies. However, the relationship between anxiety and motivation was rarely considered as their mutual influence on foreign language learning.

The research area for this field spans from the core of the prehuman to the periphery of particularity, and it simultaneously conducts a thorough literature review on foreign language anxiety and motivation, searches through the theoretical models explaining the definitions of language anxiety and motivation, investigates the effects of both on the usefulness of foreign language learning, and examines the relationship between the two independent variables. Additionally, it provides the overall suggestion that staff and students should take in light of the current circumstances in order to adjust to the needs of the drastically shifting educational growth.

Definitions and Classification of Anxiety and Motivation

Anxiety

In the literature, there are numerous definitions of language anxiety (Horwitz et al., 1986; MacIntyre, 1999). According to Horwitz et al. (1986), foreign language anxiety is "a distinct complex of self-perceptions, beliefs, feelings, and behaviors related to classroom language learning arising from the uniqueness of the language learning process." Similar to this, MacIntyre (1999) defines language anxiety as a sensation of stress, tension, emotional reactivity, and fear related to learning a second or foreign language. Since MacIntyre's concept is clearer and simpler to comprehend, we used it in this study (MacIntyre, 1999).

A variety of anxiety-related topics should be covered in order to comprehend foreign language anxiety in a wider context. Spielberger divides anxiety in psychology generally into three categories: 1) trait anxiety, 2) state anxiety, 3) situation-specific anxiety (Spielberger, 1983). Compared with the two-type classifications below, it is more comprehensive; also, when compared with the four-type classifications, it tends to be more brief.

Trait perspective. It happens when someone intends to feel nervous all the time (Scovel, 1978). It is a universal personality attribute that is unaffected from different situation. Trait anxiety, according to Sieber, O'Neil, and Tobias (Sieber et al., 1977), reveals consistent personality differences in anxiety tendencies. Because anxiety is a personality feature, this aspect of anxiety doesn't change over time. Trait anxiety, in Eysenck's opinion, interferes with memory and inhibits cognitive performance (Eysenck, 1979). In some ways, anxiety is a natural psychological condition of the human body, but when it builds up to a level beyond what people can tolerate, it will take a toll on psychological health, such as weakening memory and cognition,

State perspective. It is described as a condition of emotion. Spielberg defined state anxiety as the emotional response or pattern of response that occurs in a person who perceives a particular situation as personally dangerous or threatening, regardless of the presence or absence of objective danger (Spielberger, 1972). Another way to describe state anxiety is a feeling of tension that changes over time and fluctuates in rigour (Young, 1998). For instance, test anxiety is a prime example of state anxiety since it occurs when students are nervous before a certain examination, but it may also fluctuate over time. Compared with trait anxiety, state anxiety is more precise and subjective, and an individual's condition, cognition, and behavior will alter with time.

Situation-specific perspectives. It happens at a specific time and is the outcome of a specific circumstance (Spielberger, 1983). According to MacIntyre and Gardner (1991), situation-specific anxiety is a special type of anxiety that always develops over time in a certain situation. An example of this anxiety is language anxiety. Learning a foreign language, according to language researchers, is linked to situation-specific anxiety rather than trait anxiety because the latter is a stable trait and anxiety is triggered by all situations, whereas the former is linked to particular circumstances (Oxford and Ehrman, 1992). The situation-specific perspective, according to MacIntyre and Gardner, is the ideal technique to investigate foreign language anxiety since language learners encounter worry in many contexts during language instruction. In short, situation-specific anxiety cannot be isolated from particular circumstances, focusing on specific types of anxiety that occur repeatedly over time.

Furthermore, there are additional categories of two-factor and four-factor in addition to the aforementioned three-factor classification. Alpert and Haber divided it into two different types: debilitating (harmful) anxiety and facilitative (beneficial) anxiety (Alpert & Haber, 1960), while the four variables proposed by Paredes and Muller-Alouf were communication apprehension, anxiety about foreign language learning processes and situations, comfort in using English inside and outside the classroom, and negative attitudes towards learning English (Paredes & Muller-Alouf, 2000).

Motivation

In language acquisition, anxiety and motivation are negatively correlated (Liu & Huang, 2011), and the latter often plays a motivating and stimulating role in learning the second foreign language. In terms of motivation, Johnstone regards motivation as a stimulus for achieving a particular goal on an abstract level (Johnstone, 1999). Similarly, Ryan and Deci's view is that being motivated implies progress or active engagement in a task (Ryan & Deci, 2000); From the perspectives of second language acquisition, Cook found that learners' language acquisition is different in learners. Furthermore, he has suggested and advised that age, personality, and motivation are the three key characteristics that affect and have an impact on second language acquisition. He added that among the three factors mentioned above, motivation is the most crucial to learning a second language (Cook, 2000). According to Lightbrown and Spada, learners' communication apprehensions and attitudes toward the second language community could be used to describe motivation in second language acquisition as a multifaceted phenomenon (Lightbrown & Spada, 2001). In short, when L2 learners believe that

they have to speak a foreign language to interact with others or to fulfil and achieve their particular aspirations and aims, they are motivated to acquire expertise and skills in this area.

Apart from this, Gardner and Lambert carefully proposed two factors as integrative and instrumental motivation (Gardner and Lambert,1972). 1) **Integrative motivation:** It occurs when a student enjoys being a part of a particular group and culture, and it denotes learning the language in order to interact with the locals' way of life (Gardner and Lambert, 1972);2) **Instrumental motivation:** It indicates and proposes that a student picks up a language in support of a goal related to job or another advantageous purpose, and it shows up when the learner predicts a number of benefits he plans to take advantage of when picking up a particular language. (Gardner and Lambert,1972). Compared to integrative motivation, aims at understanding and integrating into the cultural environment of the second language acquisition, instrumental motivation focuses more on learners' acquisition on more practical and concrete knowledge or skills, thus making their goals become clearer and more concrete.

To comment on integrative motivation, Ellis contends that it is the best and most perfect form of motivation (Ellis, 1994). Based on his arguments, this kind of motivation is more competent and organized,while in the study and research of second foreign language, the two are complementary and indispensable.Tengku Sepora confirms that success in learning a L2 language depends largely on these two types of motivation, and Cook agrees that the two motivations suggested by Gardner and Lambert are valuable and successful components of learning a second language.It is clear that these two motives significantly enhance language learning. Students who are driven by these two goals may achieve twice as much with half the work.

Ryan & Deci's Self-Determination Theory (Ryan & Deci, 2000) provided yet another idea in the subject of motivation. According to Ryan and Deci, self-determination theory classifies and distinguishes several forms of motivation based on the various justifications, causes, or goals that support an action or an accomplishment. The most important distinction according to this theory is between (1) intrinsic motivation and (2) extrinsic motivation. Intrinsic motivation is the desire and interest to undertake and participate in a particular activity because the individual finds it to be appealing and enjoyable.On the other side, extrinsic motivation is the tendency to engage in activities for reasons unrelated to the action. These justifications may include expectations of reward or punishment.

Relationships of Anxiety and Motivation with Learning

Correlations between anxiety and motivation

Anxiety and motivation, which are considered to be two crucial emotional factors, have been discovered to be closely associated to the learning of second or foreign languages.

The major finding of this area is foreign language anxiety is negatively correlated with foreign language motivation. For instance, it was shown in Liu and Huang's study that respondents with a higher anxiety level

tended to hold a lower level of intrinsic motivation when 980 Chinese undergraduate students were invited to complete a questionnaire consisting of the Foreign Language Anxiety Scale and the English Learning Motivation Scale (Liu & Huang, 2011). However, the findings were slightly different from Khodadady, Ebrahim, and Gholam Hassan Khajavy's study that intrinsic motivation and identified regulation were negatively connected with linguistic anxiety. It is important to note, however, that the study also came to the conclusion that both motivation and anxiety strongly influence the English achievement of language learners in an Iranian context (Khodadady & Khajavy, 2013).

One of the forms of extrinsic motivation that is most self-determined in this study is "Identified regulation", which was specifically connected negatively with two subscales of FL anxiety: a negative attitude about English class and comfort in English class. According to the three extrinsic motivation subscales, students who study English for personally relevant reasons to achieve a desired target do so with less anxiety than those who do so under internal or external pressure. The external and introjected regulations of the three extrinsic motivation subscales, with the exception of comfort in English class, had positive correlations with all FL anxiety subscales. As a result, pupils who learned English to get a benefit or escape punishment all had a dread of communicating in English, a worry of receiving a bad grade, and a bad attitude toward L2 English classes (Khodadady & Khajavy, 2013).

Intriguingly, studies have shown that L2 learners' motivation has little bearing on their anxiety related to foreign languages. In their investigation of foreign language anxiety among Indonesian undergraduates majoring in English, French, Japanese, Korean, and Arabic, one study came to the conclusion that students' motivation and their perception of teachers' behaviors do not simultaneously affect students' foreign language anxiety. Additionally, among Indonesian undergraduate students, motivation for language acquisition is not a predictor of language anxiety. One explanation for this is that for the majority of Indonesian students; external elements like the classroom atmosphere have a greater impact than internal ones like motivation (Djafri & Wimbari, 2018).

Meanwhile, in Jiang and his colleagues' paper, L2 anxiety was not directly associated with motivated behavior for either promotion-focused or prevention-focused learners. The lack of a connection between L2 anxiety and motivated actions for respondents who had either a facilitative orientation or a preventive orientation was also confirmed (Jiang & Mostafa, 2022).

Correlations between L2 Anxiety and Learning

One of the challenges affecting language acquisition is language anxiety (Ling & Wang, 2014). The majority of L2 studies has demonstrated a negative relationship between anxiety and Learning proficiency. For instance, in the study by Salehi and Marefat, 200 pre intermediate participants who learn English as a second language were invited in this study, with indicating that foreign language anxiety is negatively correlated with test performance (Salehi & Marefat, 2014).

There are numerous negative influences caused by anxiety on learning. For instance, anxiety has a detrimental effect on students' self-worth, confidence, communication abilities, and test performance. They worry about making errors in their oral, writing, and reading practices. They frequently avoid responding to queries because they are too shy, their responses are terse and vague, or they are even frightened to speak. They find it difficult to focus during the listening practice since they are anxious. In terms of listening, although they listened, their thoughts were blank. They struggle to learn since they are unable to enhance their overall learning capacities. Poor performance is caused by anxiety because it makes people tense and scared. This, in turn, makes the external factors cause even lower performance (Ling & Wang, 2014).

Foreign language anxiety is caused by a variety of factors. The six basic factors for learning a foreign language are influenced by three key sources: the learner, the teacher, and instructional practice based on Abdullah Nijr Al-Otaibi's classification (Djafri & Wimbari, 2018). These six factors are: 1) interpersonal and personal relationships anxiety; 2) learners' attitudes about learning a foreign language; 3) classroom procedures; 4) teacher-centered technique; 5) Instructors' ideas about language teaching; 6) language testing (Djafri & Wimbari, 2018). Another classification was proposed by Luo, which includes the classroom environment, learner characteristics, the target language, and the actual process of learning a foreign language that are crucial causes of experiencing foreign language anxiety (Luo, 2012).

However, not all of the anxiety would decrease learners' interests for the subject. In a 2007 study, Professor An showed that one classification named "promoting anxiety" helped people learn L2. It can inspire students to take on new learning challenges, focus on gathering strength and coping mechanisms to finish the work in a short amount of time. Even some of them might have more ideas when they meet the deadlines (An, 2007). Similarly, Liu and Huang's study suggests that the fear of negative evaluation may actually improve English learning performance (Liu & Wang, 2011).

Although L2 anxiety has become a significant barrier to language learning, it can be lessened through various ways as this study proposes. Firstly, in order to assist students to develop a proper value for learning a foreign language and acquire scientific learning methodologies, teachers should possess the proper understanding of both language learning and language teaching. Secondly, the goal of educators is to provide a welcoming, democratic, laid-back, and peaceful learning environment. In order to study in a relaxed environment free from coercion, students are encouraged to take certain calculated risks. Finally, students' abilities and improvements should be clearly understood by teachers, who should also be aware of their potential and assist in boosting their self-efficacy. A thorough, unbiased evaluation of the student should be offered.

Correlations between L2 Motivation and Learning

Motivation is one of the basic and essential components of learning (Brewer & Burgess, 2005). The majority of studies reveal a significant positive correlation between L2 motivation and learning. For instance, in a survey of English majors at seven institutions in Shaanxi province of China, Zhang, Dai, and Wang discovered that the

participants' integrative and instrumental motivations had a positive impact on their competency in a L2 learning (Zhang et al., 2020).

However, internal motivation factors will diminish or even disappear due to the influence of external factors, such as teaching methods, learning materials, and the learning environment. This may eventually result in demotivation (Dörnyei, Zoltán, and Ema Ushioda, 2011), which will ultimately have a negative impact on mastery of a foreign language.

There are a good deal of variables that play a significant role in motivating language learners. Firstly, it is important for teachers to encourage students more oftenly, thereby facilitating students' motivations. This is essential for both promoting the outcomes of multilingual education and learning sustainability after graduation. Second, given that EFL mediates the association between motivation and second language competency, teachers should work to enhance their students' curriculum experiences by enhancing the classroom environment and incorporating interesting learning activities. As Jiang and Dewaele note, teachers are more likely to cause FLE, so it is necessary to encourage teachers to provide a more relaxing atmosphere, as they hone their instructional abilities (Alshenqeeti, 2018). Finally, L2 learners should frequently provide themselves with more self-encouragement, and cultivate a strong enthusiasm in studying L2. Additionally, they might set up a system of incentives to reward each minor accomplishment with a present they hope to receive soon, which is their self-efficacy.

Conclusion

To sum up, the above content shows that both foreign language anxiety and motivation are two of the most essential factors in the field of foreign language learning. For the potential readers of this paper, researchers should deal with this issue systematically and provide adequate understanding. Language instructors and teachers should identify, recognise and explore students' personalities, master the knowledge of the types and the importance of anxiety and motivation. These L2 learners should adapt to the language classroom and find a balance between positive anxiety and motivation. Furthermore, there is still a need for more research in the field to confirm and elaborate on the previous results on foreign language anxiety.

References

- Alpert, R., & Haber, R. N. (1960). Anxiety in academic achievement situations. *The Journal of abnormal and social psychology*, 61(2), 207.
- An, D. Q. "The Role of "Facilitative Anxiety" in Foreign Language Learning." *Shandong Literature* (2nd half) (2007).
- Alshenqeeti, H. (2018). Motivation and foreign language learning: Exploring the rise of motivation strategies in the EFL classroom. *International Journal of Applied Linguistics & English Literature*.

- Brewer, E. W., & Burgess, D. N. (2005). "Professor's role in motivating students to attend class". *Journal of Industrial Teacher Education*, 42(3), 24.
- Cook, V. (2000). *Linguistics and second language acquisition*. Beijing: Foreign Language Teaching and Research Press and Macmillan Publishers Ltd.
- Djafri, F., & Wimbari, S. (2018). Measuring foreign language anxiety among learners of different foreign languages: In relation to motivation and perception of teacher's behaviors. *Asian-Pacific Journal of Second and Foreign Language Education*, 3(1), 1-15.
- Djafri, F., & Wimbari, S. (2018). Measuring foreign language anxiety among learners of different foreign languages: In relation to motivation and perception of teacher's behaviors. *Asian-Pacific Journal of Second and Foreign Language Education*, 3(1), 1-15.
- Dörnyei, Zoltán, and Ema Ushioda. "Teaching and researching motivation." (2021).
- Eysenck, M. W. (1979). Anxiety, learning, and memory: A reconceptualization. *Journal of research in personality*, 13(4), 363-385.
- Ellis, R. (1994). *The Study of Second Language Acquisition*. Oxford: Oxford University Press. *The study of second language acquisition*. Shanghai: Shanghai Foreign Language Education Press by Arrangement with Oxford University Press.
- Gardner and Lambert. (1972). *Attitudes and motivation in second language learning*. Rowley, MA: Newbury House
- Horwitz, E. K., Horwitz, M. B., & Cope, J. (1986). *Foreign language classroom anxiety*. *The Modern language journal*, 70(2), 125-132.
- Hu, Ling, and Na Wang. "Anxiety in foreign language learning." 2014 International Conference on Global Economy, Commerce and Service Science (GECSS-14). Atlantis Press, 2014.
- Johnstone, K. (1999). *Research on language learning and teaching: 1997-1998*. *Language Learning*. London:Routledge.
- Jiang, Chen, and Mostafa Papi. "The motivation-anxiety interface in language learning: A regulatory focus perspective." *International Journal of Applied Linguistics* 32.1 (2022): 25-40.
- Khodadady, E., & Khajavy, G. H. (2013). Exploring the role of anxiety and motivation in foreign language achievement: A structural equation modeling approach. *Porta Linguarum: revista internacional de didáctica de las lenguas extranjeras*, (20), 269-286.
- Lightbrown, P. M. & Spada N. (2001). Factors affecting second language learning. In: Candlin, C.N. & Mercer, N.(Eds.), *English language teaching in its social context*. London: Rutledge.
- Liu, M., & Huang, W. (2011). An exploration of foreign language anxiety and English learning motivation. *Education Research International*, 2011.
- Luo, H. (2012). Sources of foreign language anxiety: Towards a four-dimension model. *Contemporary Foreign Language Studies*, 12, 49-61.
- MacIntyre, P. D. (1999). Language anxiety: A review of the research for language teachers. *Affect in foreign language and second language learning: A practical guide to creating a low-anxiety classroom atmosphere*, 24, 41.
- MacIntyre, P. D., & Gardner, R. C. (1991). *Methods and results in the study of anxiety and language learning: A*

- review of the literature. *Language learning*, 41(1), 85-117.
- Oxford, R. L., & Ehrman, M. (1992). Second language research on individual differences. *Annual review of applied linguistics*, 13, 188-205.
- Paredes, P., and Muller-Alouf, H. (2000). A Spanish version of the foreign language classroom anxiety. Scale: revisiting Aida's factor analysis. *Rev. Española de Ling. Aplic.* 14, 337-352.
- Ryan, R. M., & Deci, E. L. (2000). "Intrinsic and extrinsic motivations: Classic definitions and new directions". *Contemporary Educational Psychology*, 25, pp. 54-67.
- Speilberger, C. D. (1983). State-trait anxiety inventory for adults (Form Y): sampler set. Mind Garden, Redwood City.
- Scovel, T. (1978). The effect of affect on foreign language learning: A review of the anxiety research. *Language learning*, 28(1), 129-142.
- Sieber, J. E. O'Neil Jr., HF, & Tobias, S.(1977). *Anxiety, learning, and instruction*,Routledge.
- Spielberger, C. D. (1972). *Anxiety as an emotional state*. Anxiety-Current trends and theory, 3-20.
- Salehi, M., & Marefat, F. (2014). The Effects of Foreign Language Anxiety and Test Anxiety on Foreign Language Test Performance. *Theory & Practice in Language Studies*, 4(5).
- Zhang, H., Dai, Y., & Wang, Y. (2020). Motivation and second foreign language proficiency: The mediating role of foreign language enjoyment. *Sustainability*, 12(4), 1302.

Exploring Barriers to Time Spent on Social Studies and Science in K-6 Classrooms

Josh Montgomery

Northland College, USA,  <https://orcid.org/0000-0001-6311-5647>

Abstract: That social studies and, to a lesser degree science, have become something of orphans in k-6 instruction is an open secret. The system of schooling in the US has increasingly become objectives and standards based. As this edifice has grown, it has demanded more measurability and thus more accountability. That accountability, through testing, is focused almost solely on math and language arts. This leads to a feedback loop, a cycle that encourages teachers- pressured by administrators- to spend increasing amounts of time on instruction in subjects that will demonstrate progress on scales of school success. As teachers feel and apply more pressure on students to succeed on assessments of math and language arts, more time is relegated to their instruction. Since the early part of this century, time spent on social studies and to a somewhat lesser extent, science, have consequently suffered nationwide, with some exceptions, from varied factors. I explore these factors, and the inevitable consequences, with the help of early career teachers in two states.

Keywords: Social studies, k-12 instruction, standards, accountability, early career teachers.

Citation: Montgomery, J. (2023). Exploring Barriers to Time Spent on Social Studies and Science in K-6 Classrooms. In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023-- International Conference on Social and Education Sciences* (pp. 380-398), Las Vegas, NV, USA. ISTES Organization.

Introduction

“If it is not a standard, then it is wasting our time”
(A teacher quoted by Boyle-Baise et al., 2008, p.239)

“Social studies and science education usually involved a video and discussion and if other things needed to be done, social studies/science were the first subjects to be tossed in order to make times for the other things.”

(Early Career Teacher [ECT] in the Mountain West)

That social studies and, to a lesser degree, science, have become something of orphans in k-6 instruction is an open secret. The system of schooling in the US has increasingly become objectives and standards based. As this edifice has grown, it has demanded ever more sophisticated measurability and accountability (Coburn, et al., 2016). Those metrics, through testing, are focused almost solely on math and language arts (Fitchett, et al,

2014). This leads to a feedback loop, a cycle that encourages teachers- pressured by administrators- to spend increasing amounts of time on instruction in subjects that will demonstrate progress on scales of school success. As teachers feel and apply more pressure on students to succeed on assessments of math and language arts, more time is relegated to their instruction. Since the early part of this century, social studies and to a somewhat lesser extent, science, have consequently suffered nationwide, with some exceptions, from varied factors, explored with the help of some early career teachers (ECTs) in two states.

Over time, high stakes testing limited to math and language arts has been the most common explanation for the lack of time dedicated to science and social studies in k-6 classrooms (and beyond) (Fitchett & Heafner, 2010; Vogler 2003). We codify a narrative of the subjects we choose to first standardize, then assess, and then attach high levels of school accountability to those assessments. As we necessarily devote more instruction time to subjects assessed, we create a null curriculum for American K-6 classrooms- science and social studies. We telegraph to teachers, who then communicate to students, that the process skills—*informed action, critical thinking, and awareness* (Hutton & Hembacher, 2018)-- taught through these subjects have no place in American schooling. In the contemporary United States, we have consistently signaled to administrators, to teachers and parents and students, that only math and language arts are important to learn.

This raises interesting questions about who is making these decisions, and what this reveals about those with the power to determine what American students will learn in their classrooms. Foucault lurks in the competing social narratives of who will determine what students will learn as demonstrable truth and might suggest that those who favor the ‘clerks and machinists’ economic training mode of education have determined the outcome for students in K-6 classrooms (Dimitriadis & Kamberelis, 2006). Further, through the absence of process skills, students in later grades suffer from an inability to think and analyze critically (Journell, 2013). Thus, this null curriculum may have impacts far beyond the time children spend in k-6 classrooms.

Once easily explained away by the bugaboo of accountability through testing, it appears likely that the cause of a lack of instruction in social studies and science in American k-6 classrooms is far more varied and may offer up some uncomfortable conclusions. In addition to the emphasis on tested subjects and written standards, likely culprits explored in this work include:

- 1) feelings of teacher control and confidence to teach multifaceted process skills,
- 2) the controversial nature of both science and social studies, and finally,
- 3) a potential resultant resistance of teachers to effectively instruct in science and social studies constituting a form of salutary neglect.

Math and language arts have been objectified and standardized on a national scale through the Common Core State Standards. Setting educational goals defined solely by clarity and specificity leads to a simplified method for both assessment and data collection in diverse classrooms (Eisner, 1967; 2009). Because process driven skills can lead to novel interpretations, social studies and science can defy simple objectives. In many communities this can be a controversial path, causing many teachers to avoid topics that may offend community

members. If a comma is a comma, addition always consistent, the sciences, social and otherwise, carry the potential to produce student thinking outside that intended by the teacher, echoing Dewey's (1897) admonition to make a classroom a reflection of real life: messy and unpredictable. Many teachers, faced with competing time constraints in contemporary classrooms, prefer the order and clarity of instruction in language arts and math (Anderson, 2009). Both subjects lend themselves easily to seatwork, quiet reading, and worksheets; the favored tactics of many classroom teachers (Boyle-Baise, et al., 2008). When asked to compare, a clear majority of teachers, 96%, favored language arts first, followed by math (McEachron, 2009). This is perhaps the reason for claims that schools are increasingly seen as reading academies (Boyle-Baise, et al., 2008). If teachers continue to track towards the lecture and worksheet model of delivering content knowledge in a way that may lead to success on high stakes tests, teaching kids what to know— as opposed to Dewey's (1894) suggestion-- learning to think, then perhaps it is better that process learning is left to upper grades (Curtis, et al., 2006).

Cobbled Method

This work represents a snapshot: of teachers, of classrooms, of practice. This is not exhaustive. Instead, consider it a peak into fairly typical classrooms in two different states near the bottom of the drop down menu. What follows is akin to planomenon, an expression of exploration through connection (Deleuze & Guattari, 1987). As such, we peer in and wonder whether these experiences match what we see through the literature, itself peeks into classrooms and what they reveal about teacher readiness and willingness to teach.

I reached out to a dozen early career teachers and sought their opinions regarding questions related to their experience of social studies and science instruction in their schools. Through this dialogue I located the links to themes in related literature. Because the experience emanating from teacher practice and the larger context of literature both corroborates established theories and confirms none of them we are left with an important question that guides this exploration: How do we account for the causes of a lack of time dedicated to the instruction of social studies and science in k-6 classrooms, and, more saliently, what might be the consequences of a long-term nullification of learning in these specific subjects? To begin to answer these questions, I engaged in conversations with early career teachers (from student teaching through the first several years) and, through their quotes, illuminated the links to the emergent themes in the literature.

Discussion of Literature and Results

Themes emerge: Time

“Yes, they valued science and social studies. They wanted to put more time into the day in which instruction included the subjects. However, many times they had to plan multidisciplinary lessons in order to include them.”

(ECT in the Mountain West)

“I believe my mentor teacher values science and social studies because it is integrated into math and science.”

(ECT in the Mountain West)

Time spent instructing in social studies and science has been consistently verified as declining for some time (Fitchett, et al., 2014; Boyle-Baise, et al., 2008). These studies demonstrate the reduction of instructional time on science and social studies is relatively consistent, both across geographic areas and over the past few decades. That time increasingly has been reallocated to language arts and math, both growing 62 percent by cutting 44 percent from other subjects. During this time, social studies lost an average of 76 minutes per week (Boyle Baise, et al., 2008). Standardization and testing accountability, particularly in math and language arts, have driven the direction of school objective setting (Houser, et al., 2017).

Teachers at one representative district claim to instruct in social studies two to three times per week equaling less than 30 minutes (Anderson, 2009). In that district, this instruction primarily addressed good character, introductory lessons in tolerance and diversity, and map skills. Further, social studies has a place so long as it performs a support role for tested subjects or achieves some fuzzy goal of character education. Similarly, in a survey of California schools, half of the teachers reported spending less than half an hour weekly on social studies, scarcely a quarter spent any more than 3-4 days a week engaged in social studies, and less than 2 percent taught it daily. Half of the surveyed teachers reported they alternated between social studies and science when allocating instructional time (Hutton, et al., 2006). These findings are echoed in school districts across the nation, with social studies receiving the least amount of instructional time of the core subjects, typically less than two hours a week. It is, in short, a national phenomenon. Studies demonstrating the increasing marginalization of social studies find a theme of twenty minutes or less a day in lower grades (Good, et al., 2010; McEachron, 2009).

We may trace the origins of this testing regimen guiding educational practice to the scientific curriculum makers. The advocates of social efficiency and the objectification of subject matter include theorists Popham, Tyler, and Bobbitt. The effort at taming the peculiarities of educational outcomes (and controlling social complexity) has other antecedents, but the makers of scientific curriculum, attempting to apply scientific calculus to determine and enforce effectiveness puts them in a grandfatherly role for high stakes testing growing out of the era’s emphasis on quantifying and harnessing intelligence. Bobbitt captures the moment: “The controlling purposes of education have not been sufficiently particularized... an age of science is demanding exactness and particularity” (Bobbitt, 2009, p 16). This idea, that we can create objectives and the measurement tools to accurately determine whether they are met, creates the system of accountability that favors objectifiable subjects over more subjective ones, and results in the potential relegation of science and social studies to ever smaller slices of instructional time. We ensure the dominance of the clock as primary author of the rush to efficiency, and codify external control as the mode of determining the work of schools. A creation of a system of standards then required a system of measurement, shifting control decisively from teachers to policy makers. (Darling-Hammond & Wise, 1985)

Themes emerge: Control

“I don't think it (social studies) is being ignored on purpose. We don't have any curriculum to use for either subject. I think it also isn't a priority since we just got our new math curriculum.”

(ECT in Great Lakes region)

“Yes, they valued science and social studies. They wanted to put more time into the day in which instruction included the subjects. However, many times they had to plan multidisciplinary lessons in order to include them.”

(ECT in Mountain West region)

“Science and social studies were not a high priority for my mentor teacher or the principal of my school.”

(ECT in Mountain West region)

If we start with a supposition that time spent on social studies and science is largely determined by policymakers outside of classrooms, we must address issues of control. By delineating a system of education based on clear learning targets, or objectives, we increasingly create the necessity for a system of assessments to determine whether we are reaching those objectives. For Popham, the goal—achievable-- was to uncover the nebulous realm of learner outcomes (Popham, 1972) The resulting system was tasked with determining the assessments to measure learner outcomes, and who will be responsible for ensuring students reach the objectives. Current approaches echo, no mirror, this effort at objectification, removing teacher control from their classrooms.

The emphasis on high stakes testing directly determines the subjects teachers spend time planning and instructing, associated with the time spent on social studies and science in k-4 classrooms (Anderson 2009; Boyle-Baise, et al., 2008.) As control of the work of teachers has intensified via interest groups and government action, measures of accountability- so that outside groups may measure success- have become more entrenched (Ingersoll, et al., 2011). This raises a host of issues. Most salient to this work include the short sightedness of testing driving instruction to the exclusion of certain subject areas while also contributing to teacher shortages due to attrition among teachers of color in underserved districts (Ingersoll, et al., 2019). Increased accountability achieves the technocratic supremacy over the art and craft of teaching leading to, one surmises, a loss of joyful practice.

As testing has become the means to hold schools accountable, teachers have had to adapt to an increasingly standardized reality. While classroom practice continues to outwardly appear under the control of the teacher (providing a convenient scapegoat when things go wrong), they are constrained by systems of by codified expectations. Demands made on teachers may in subtle ways determine outcomes that seem on the surface to be within their control (Pace, 2011; Wills & Sandholtz, 2009). As the pressure on administrators to meet benchmarks increases, so does the tendency to take curricular decision making out of the hands of classroom teachers and replace autonomy with prescribed curriculum designed specifically-- often by the testing

companies themselves-- to standardized educational approaches in preparation for mandated assessments (Severance et al., 2016). This loss of autonomy is more pronounced in high minority districts, where teachers feel the greatest loss of classroom control (Hong & Hamot, 2019). Even when ready-made curricula is not enforced, hierarchical control persists, limiting instructional decisions, and impacting time spent on social studies (Huck, 2020). To do otherwise is considered a risk (Wills & Sandholtz, 2009; Moran, 2015).

Risk in American education becomes something of a paradox. When exploited by policy makers (when risk is used to illustrate perceived threats to the American enterprise, say, the Soviets in the wake of Sputnik, or Japan in the reaction to industrial in-efficiency in the 1980s) it motivates changes to schooling resulting in things like accountability through testing. In contrast, risk can encompass aversion to taking chances, a natural consequence of external testing regimens—risk avoidance. If we take a contemporary approach to the purposes of education, that of preparing students to participate in the economy of tomorrow, risk taking, experimental strategies, and creativity ought to be the norm—embracing risk. However, as a response to testing, risk taking becomes, well, too risky, and schools avoid innovation in favor of preparing students for short term success on high stakes assessments (Moran, 2015). Or, more plainly suggested by one teacher, “if it is not a standard, then it is wasting our time” (Boyle-Baise et al., 2008 p. 239).

Reactions, like the National Defense Education Act, when seen through the lenses of socio-economic and gender, take on added impact when discussing issues of control. If thought of as a top down statist approach, initiatives like NDEA and No Child Left Behind (or its 2016 revision as Every Student Succeeds Act) appear to share as goals the teacher-proofing of curriculum and removal of autonomy from a majority female workforce. The removal of autonomy and control from teachers is part of a larger social process, the ‘proletarianization’ of teachers, through a sort of panopticon approach to determining and monitoring the actions of hitherto potentially autonomous actors. This mirrors a larger labor trend, the scientific management of workers reflecting a reverence for Taylorism, a managerial movement that, while never fully de-skilling workers, did alter permanently the social perceptions of their appropriate subservient role and behavior and enabled the carving up of labor into discrete units of time, a tool of bodily exploitation (Apple, 2009; Graeber, 2018). We map a terrain for the slow erosion of teacher professionalism. With each passing generation of teachers, we lose more and more control over the inputs and outcomes in our classrooms. The inevitable result is teachers, working in their professional terrain, removed of autonomy, operating as pedagogical technicians, enacting discrete scripted learning events (Moran 2015). Not so long, then, until teachers can be re-classified as service employees, an emerging proletariat (Hill, 2022).

The removal of autonomy represented by a testing regimen suggests other social consequences as well. A system that grades schools based on testing outcomes tends to punish schools in areas that traditionally struggle in this realm, an outcome that further ossifies disparities among school districts. Testing itself is fraught with a host of historically significant implications, from IQ tests that marginalized students of color to the Social Efficiency movement that sought to prepare students for an industrialized economy. And here the testing movement may be open to charges of not only marginalization, but a conspicuous effort to maintain socio-

economic stratification (Cole-Malott & Malott, 2016). The movement represented by testing, mirrored in the social efficiency school, was (is) intended to produce factory workers, clerks and secretaries. The skills most valued: basic reading, penmanship, math and obedience. There is little room for the systems of scientific inquiry, creativity, or the process skills inherent in social studies- bias detection, critical literacy, and meta-analysis- and these are disappearing (Boyle-Baise et al., 2008). Thus, the absence of social studies and science in a system where social efficiency has won Kliebard's (1995) struggle for the American curriculum is no longer surprising. If the goal of American education is to produce a manufacturing workforce, then a prescribed, standardized, Taylorized, and constantly measured educational approach is not just warranted but essential. Ironically, instead of liberalizing, or creating economic freedom through a good job, this becomes an approach favored by those adhering to a Marxian materialist dialectic, one class of decision makers determining reality for another class and creating the system of measurement to determine success and failure. Or, a plague-town education system preparing students for a plague-town civic space- one characterized by always on systems of surveillance (Hikida, & Taylor, 2023). When used at all, social studies is utilized as a vehicle for honing language arts skills, teaching character, or practicing non-fiction comprehension (Boyle-Baise et al., 2008). If a teacher is to challenge this system and create a classroom where social studies and science become not just another approach to math and language arts, where they stand as disciplines in their own right, they must have the competence and confidence necessary to take that risk and be able to justify the time spent to building administrators and parents.

Competence/Confidence

“As for Social Studies, that is one subject I haven't taught yet by itself. We kind of have a social studies built in with our ela curriculum, but it's more focused on the social aspect of things, if that makes sense.”

(ECT in Great Lakes region)

“No. Social studies and science education usually involved a video and discussion and if other things needed to be done, social studies/science were the first subjects to be tossed in order to make time for other things.”

(ECT in Mountain West)

Many teachers, in the absence of time to teach and control over what to teach, may lack the confidence in the instruction of science and social studies to carve out instructional time. This may further be complicated by teachers struggling with the controversial nature of some social studies and science instruction. Teachers may also struggle when designing curriculum that addresses process-based skills. Social studies and science share the characteristics of a systemized approach to investigating the world, using and verifying sources, understanding biases, cause and effect, collecting and interpreting data (WDE, 2014), and meta-analysis of an individual's place and impact on their world. Many teachers potentially, when confronting this level of complexity while developing curriculum, will revert to, as Dewey calls it, “ready-made info transmitted to the learner and instruction delivered in lock-step fashion” (Dimitriadis & Kamberelis, 2006 p.11).

Lambert and Morgan (2009) would argue that due to increasing centralization teachers have seen that the actual design of curriculum has been so farmed out to outside forces for so long that many lack the agency to write and design curriculum for themselves. Indeed, it has been the experience that most instruction exists in the classroom on day one, whether in the form of immersive textbooks that provide step by step instructions for lesson development for varying learning styles and level, or in modules provided with all instructive texts. The goal has been to reduce the time and burden a cumbersome curriculum imposes on students; instead the result has been to reduce the power and efficacy, and, likely, this researcher supposes, the confidence teachers have when developing curriculum that is both new and tailored to a specific set of circumstances (Lambert & Morgan, 2009; Ro, 2019).

Teachers struggle with a paradox when confronting curriculum design. They crave the range and agency to make determinations leading to the most effective and responsive lesson possible, but at the same time need a well-defined space with established boundaries of expectations placed on them from outside experts or administration. The suggestion is, that while text book manufacturers have begun providing prescriptive curriculum, they have taken the self confidence from teachers to produce their own work. So instead of an adaptable, reflective, and flexible classroom, we get standardized curriculum (Houser, et al., 2017). Add to this the pressures applied by high stakes testing (provided by the very same publishers producing those all-encompassing texts) and teachers feel ill-equipped to make their own decisions regarding what should be taught and when in their classrooms. If the school focuses on success in a single high stakes test, largely because a state has installed a one size fits all curriculum and then use that to measure the effectiveness of teachers, then it is understandable when teachers lose interest and confidence in the generation of their own idiosyncratic curriculum and embrace these ready-made units. After all, their jobs are now on the line (NCTQ, 2015; Weaven & Clark, 2015). In the end, teachers struggle with original curriculum because they lack the time resources and confidence to initiate the difficult processes of designing a complete curriculum, what to include, what to discard, and how to determine those decisions (Shay, 2016).

Teachers, when developing original curriculum, ask themselves typical questions. What skills and values do students need to face complex societal issues? What model or framework works best and for which curriculum? What knowledge ought curriculum to require? How can students connect "thinking with doing" (Sugawara & Luca, 2009. p. 9)? The literature demonstrates that curriculum changes are important, but, largely, does not address the process or the "how" of curriculum development. This is difficult for teachers (and students), they struggle with a narrowing of both creativity and space to pursue novel curriculum, while seeking more guidelines to define the process (Berliner, 2011; Weaven & Clark, 2015).

No doubt many teachers are turned off by what Lambert and Morgan (2009) refer to as curriculum as a convoluted and fluid battleground. Or, put another way, teachers, already overextended with the demands on their limited time and resources, opt not to develop an entirely new curriculum because it is difficult and time consuming, it is potentially controversial, and it goes against the textbook protocol established by many schools. Should curriculum as Lambert and Morgan (2009) suggest, encompass learning and decision making in

environmental and social contexts, reliant on an evocation of values in the classroom? This question gets at some of the complexity involved when going off script and generating new curriculum. There are no disinterested parties, the only unknown is when those groups will rear their heads. Because the process of curriculum development is so politicized, teachers tend to stay away. Teachers are now more regulated, ruled, and guided than ever and thus, far from being classroom dictators, cobble small tidbits of autonomy together to produce their desired outcomes. According to Bandura's self-efficacy theory, teachers can only instill values in their kids if they feel confident and autonomous enough to have these values themselves (Dierking & Fox, 2013).

Themes Emerge: Controversy

"I made it a point to include as much science and social studies at the end of the day as possible. The kids loved it. For example, together with the kids, we did a unit on penguins while we also focused on the geography of the southern hemisphere. During this time, we also made didgeridoos and had a didgeridoo concert. We also studied heredity with puppies and made our own designer dogs. We also focused heavily on space and spent a significant amount of time learning about moon phases. The kids had a blast."

(ECT in the Mountain west)

Historically, education has been conceived of as a way to balance competing values in the American experiment, such as freedom and order. It is, in many ways, the original goal of American education, the passing on of cultural values to the youth of a nascent United States, an early form of character education. Teach citizens to be moral and they will create a stable republic (Kaestle, 1983). This is the virtue and values education—how we enculturate, how we teach young people to be human (Duplass, 2011). How much, however, character education is reaction to the controversial nature of social studies and science is contingent how much control we are willing to cede. If we give students the tools to ask questions, we may not like the answers that they come up with. Perhaps then, character education (and, the rather uncontroversial science approaches revealed in answers... the growth of trees or genetic diversity of puppies) is a reaction to the danger of challenging cultural mores, or, of challenging parental or community values. Who, in the end, can really quibble with character education-- we deify the persistence of Thomas Edison, or the honesty of George Washington. According to one study, when asked about the role of social studies education, teachers most often suggested the goal was to create responsible citizens; a citizenship transmission (VanFossen 2005). This is a convincingly simple and common response. The straightforward nature of the answer belies the inherent complexities underlying it. Until we can agree as a society what constitutes a good citizen (one who questions the dominant narrative, propels the society forward, creates space for tolerance and diversity, or is it respect for authority and loyalty to one's nation?) we struggle to appropriately instruct it. And yet, if social studies and science are taught as a series of memorized content, of incontrovertible facts, without instruction in the underlying systems of questioning, then they become yet another system of banking, a series of factoids that we then expect to be delivered back to us. Content without process is shallow and stultifying. Or, as Paulo Freire (1970) writes, 'To glorify democracy and to silence the people is a farce' (p.91).

It is likely not a coincidence that Science and Social studies do not have Common Core State Standards (CCSS) attached to them in grades K-6. After 6th grade they consist of subheadings to the literacy standards (corestandards.org, 2018). It is also not a coincidence that these are the subjects with the least time devoted to them (David, 2011). Science and social studies are inherently controversial (Camicia, 2008; Miller & Toth, 2014). While math and language arts are concrete and rarely challenge societal and cultural attitudes, social studies and science have the potential to be at odds with family and local mores (think global warming or causes of the Civil War). “The social studies curriculum in the United States has been a perennial source of controversy. Disputes over history curriculum have been an especially contentious component of the American educational landscape” (Camicia 2008 p.302).

An (2014) suggests that most social studies work revolves around rights and responsibilities. Or through question posing- how does one become the participating citizen of a nation? This requires patriotism, thus exposing the underlying paradox at the heart of social studies. Patriotism, indeed the concept of nationalism, Einstein’s “that infantile disease... the measles of mankind” (Vierek, 1929) precludes critical analysis of nations and their governments if that criticism is seen as unpatriotic (An, 2014). This situation is especially pronounced in grade school, which utilizes the Expanding Communities curriculum intended to reflect the development patterns of the students studying it- we start with the self, expanding to family, the neighborhood, town- stopping the expansion at nations (Duplass, 2011; Russell & Waters, 2021). This predominant strategy then uses the student’s nation as a tool to compare and contrast with other nations, mirroring Peggy McIntosh’s (2009) submission of nationalism as “a series of concentric loyalties” radiating out from place (p. 388). There is no acknowledgement of a global citizenry, only the initial steps towards othering different cultures.

As in social studies, science is subject to the same controversial pressures, where, “those who have wielded power in this country over defining narratives tend to push back, they fear a loss of ‘social solidarity’ where others represent a threat to stability and so tend to be gotten rid of physically or psychologically” (Miller & Toth, 2014 p.239). Early career teachers’ fear of becoming an outsider, concerns about community or school norms, or personal viewpoints leads to a rejection of controversial subjects. To take just one example, a third of teachers spend less than six hours in high school on the subject of evolution, 20% don’t cover it at all (Hermann, 2011). This raises the question, are subjects like the causes of the Civil War, or evolution or global warming controversial because as a society we cannot reach consensus on who will control competing narratives, or do we avoid them based on their potential to be controversial? Put another way, do only a third of Americans believe in the concept of evolution because of societal constraint: religion, tribalism, political disposition, or because teachers, fearing those same constraints, refuse to educate students in scientific and social studies process skills (Masci, 2017).

In grade school it is important that students get the foundational science skills to be able to evaluate claims in later years, including things like creationism. It may be because Americans don’t have these skills that they cannot determine the scientific veracity of things like evolution. But what if they learn the wrong things from elementary teachers not equipped to handle complex topics like science and social studies? What if by learning

the storybook tales about Columbus sailing to prove the world was round, or a flawed version of the first Thanksgiving or the simplistic construction of Abraham Lincoln singlehandedly ending slavery, they then resist the more complex and accurate learning in later years? In 17 years of classroom instruction in social studies, I often commented that much of my efforts were spent dispelling the myths students had learned in previous grades.

Perhaps if we can't do social studies or science right, we should avoid it all together. Do we cause harm by having K-6 teachers instruct in subject areas that they are not qualified to broach? Journell (2013) promotes the process of critical dialogue, of debating and holding different viewpoints, as a central process developing skill in social studies. In short, controversy is key. It exposes students to that challenging counter-narrative. These can be historical controversies but may be most dynamic when discussing public solutions to public problems (Journell, 2013; Hess, 2009; Rubin, 2012). And what happens when teachers refuse to teach these things because they don't accept the science, or the history? Both slavery and evolution are central concepts in any study of the social studies and science, and yet many teachers ignore them, either out of an avoidance of the controversy, or because they themselves do not hold the views of the established scholarship.

Themes Emerge: Salutory Neglect

Should teachers wait until they are experts in the subject areas before teaching social studies and science? Maybe we should just stick to the basics in K-6- the tools- and wait for the more complex subject matter to be broached with content experts "Not surprisingly, recent findings indicate that elementary school teachers devalue social studies, misunderstand its purpose, and fail to utilize powerful instructional methods" (Boyle-Baise et al., 2008). In a survey of over 500 elementary teachers in Indiana, one researcher found that a majority ranked social studies last among core subjects (reading/language arts, math, science, and social studies) and that only one third identified its purpose as citizenship education (VanFossen, 2005). If teachers feel incapable, untrained, or lack any sense of value for the disciplines of social studies and science perhaps it is better if they do not spend time on their instruction. Or, conversely, social studies is relegated to transitory times in the day—snack time, as Whitlock and Bruger (2019) write, or recess; a form of character development, enabling schools to suggest they are dedicating resources to the discipline. Students might, in the long term, be better off if not exposed to half conceived lessons over vital process skills in these subjects. It might be possible that no approach is better than an unskilled one. High stakes testing might not be the reason social studies and science are neglected in K-6 classrooms.

All states currently test grades 3-8 in math and language arts and teachers consistently suggest that this informs the decisions they make about time spent on instruction in their classrooms, "impacting curriculum, quality of instruction, and instructional time" (Anderson, 2009 p. 413). And yet, studies have shown that time spent engaged in social studies and science instruction has not changed substantially in the years between the 1970s and now, an era that has seen the rise of the high stakes testing regimen. What if, then, decisions made at the governmental level have not impacted teacher decisions about subject emphasis? Between 1970 and 2010 time

allocated for language arts remained relatively steady at 35% of classroom time, math at 17%, and social studies at 5% across the time period (Anderson, 2009). This suggests that there are other factors at play, and testing is just a convenient excuse.

Social studies and science are hard to teach. Language arts and math are relatively concrete, easy to assess, and typically uncontroversial. While teachers suggest that they value critical analysis and thinking, as much as eighty percent of their instruction consists of lecture and reading worksheets (Curtis, et al., 2006). As Pianta (2007) roughly 90% of classroom time is spent on teacher directed whole class/seatwork instruction, a similar number to 1970. Further, a study from 1912 suggests that teachers then relied on basic recall questions too, “smothering student expression” (Anderson, 2009 p.414), suggesting that teachers have not altered practice in a century; they still teach and test over the bottom levels of Bloom’s taxonomy- knowledge and comprehension (Rubin & Giarelli, 2013). So, is accountability at fault? If social studies and science require a level of process instruction and critical learning strategies, then students would not be well served by a model that persists in educating at the lowest level of Bloom. And does this account for the alienation students and teachers feel in social studies and science classrooms as well as our inability to tolerate controversial subject matter (Moran, 2015)? If, as Dewey (1897) said, history is lifeless and inert if removed from the lived experience of the child, then we may be doing more damage pursuing half measures and estranging students from vital engagement strategies. We create the narrative of social studies as simply the recall of dates, or states and capitals, and hamper students in the subject when they, and their teachers, reach a point of effectively engaging with the subject matter. As Maxine Greene writes, a generic learner is paired with a system, or curriculum (the enforcer of reality)- “pre-existent and objectively real”- that alienates both because it appeals neither to “existential predicament or primordial consciousness, the process of knowing” (Greene, 2009, p. 164).

The lack of instructional time devoted to science and social studies has been corroborated across the country. It is reflected in quoted experience of ECTs in multiple states. The answer to the question of whether schools are devoting time and resources to these subjects is, with few exceptions, no. Thus, the thrust of this research becomes why? In tracing the causes of the lack of time allocation we discover a perception of a dearth of control leading to decreasing levels of confidence in the subject matter, teacher avoidance of controversy, or even perhaps, because teachers simply do not enjoy the complexity and inconclusiveness of process skill training.

Conclusion

“I’m sure both people would love students to have more time to study science and social studies, however, my first grade students were not tested in these subjects. I taught at a Title 1 school, and it was very important for both my principal and my mentor teacher to make sure students were showing growth in the content areas of reading and math. We would even have extended day interventions in these areas to make sure all students were at grade level for these subjects. Because most of the time in the day was dedicated to either reading or math, social studies and science was shoved into a 35-minute block at the end of the day, however, there was no

required curriculum, and teachers were only encouraged to use this block for science and social studies. It was more suggested science and social studies time, but not mandatory.”

(ECT in the Mountain West)

What happens when social studies and science become the null curriculum? Freire calls this “the theme of silence” (152). When we fail to acknowledge the reality of generative themes (our ability to impact and change our world, our thematic universe) we engage in static approaches, silencing creative power by not allowing it to exist. Thus, we preserve the reality as we found it and, by definition, participate in banking, or a refusal of dialogue. What if we are teaching our kids that civics or scientific inquiry just don’t matter? What happens when the null curriculum is the process skills necessary to functioning society? When we make decisions that disfavor student exploration in science and social studies from their earliest exposure to education, we set the tone for a mindset favoring content knowledge acquisition and regurgitation and create students who resist later attempts at process skill introduction. If we start with Dewey’s (1897) supposition that education and a democratic society are co-constructive with a focus not on knowing stuff, but knowing how to sustain community and connection with one another, then our current emphases in K-6 classrooms are out of balance. Functioning in a democracy (or a republic, as it were) requires that sort of deep reflective work that binds new and old, the person to the material, and the person to the community. It is a process of discourse that by design is constantly in flux, establishing and reestablishing knowledge as actors react and reflect on the changing world around them.

These themes in social studies and science are difficult to assess in any conventional way. Perhaps we can see the effects of their absence when we look around. Bernstein (2000) proposes a pedagogical model: An elucidation of rights, enhancement- the expanded role of the individual, inclusion- and the individual participating in social surroundings- politics (Bernstein, 2000). We can see the potential power (and rediscover some hope) when watching teachers as they regain some measure of power and control over schools by mass action, by a self-realized class of Gramscian organic intellectuals to pressure state legislatures across the United States. Thus, through the re-empowerment of teachers, who can then empower students, we can reassert some measure of real democracy, one where American youth have the capacity to deliberate thoughtfully.

But students have not been granted that capacity, because we don’t allocate time and resources to the teaching of the skills necessary in functioning democracy- detecting bias, critical reading, cause and effect, meta-analysis. If social studies and science have been back-burner subjects since at least the 1970s (Boyle-Baise et al., 2008), can we start to see the consequences of decisions about time in the classroom? There appears to be something of a negative feedback loop in American education concerning these neglected subjects. A lack of effective social studies and science instruction leads to a rise in students with a decided lack of critical analysis skills, leading to these subjects becoming more controversial and thus teachers allocating even less instruction time-- again, their jobs are on the line (Weaven & Clark, 2015)-- which leads to even worse attitudes regarding civil discourse and the merits of the scientific method. This loop continues when students who lack critical process skills then make poor decisions about representation leading to further crack-downs on themes deemed controversial. Can we

make a case that the lack of the key skills elucidated through social studies and science leads to a national population that becomes even more resistant to these critical skills? The consequences are plainly obvious. A society that has effective civics instruction does not elect a Father Coughlin-like nihilist to national office, it does not elevate a character like Cliven Bundy to a folk hero. A society that has a strong background in scientific thinking does not allow industry to write its environmental regulations, does not deny anthropogenic climate change. A society with strong social studies and science education does not see, as the SPLC reports, “heightened anxiety and concern on the part of students worried about the impact of the election(s) on themselves and their families” and “verbal harassment, the use of slurs and derogatory language, and disturbing incidents involving swastikas, Nazi salutes, and Confederate flags” (Nygreen, et al., 2017. p. 341).

Further, can we trace this anti-intellectualism, or at least a reduced exposure to opposing viewpoints and controversial ideas, for the rise in reactionary campus student groups? When students arrive on college campuses, and are exposed to many narratives running counter to everything they learned, (or didn’t learn in K-6 and beyond classrooms), they may go into a bunker mentality, defined by the question, ‘if this were true, wouldn’t I have learned it already?’ When students first confront counter-narratives to those they faced in public schools, they react tribally, claiming marginalization by liberal professor limiting their freedoms of expression (Nygreen et al., 2017). The lacuna of effective instruction in science and social studies, even in high school, leaves students vulnerable to constructing narratives that fuel the idea that universities are hotbeds of socialist anti-American doctrine. This idea has come to dominate the story of colleges in the United States and reflects the over-all growing hostility to experts in this country. Even narrow debates about the role of testing in diminishing social studies echo larger cultural themes surrounding the core curricular question, the complex conversation: what knowledge is of most worth (Evans, 2015; Pinar, 2005). All of this occurs at a time when as a society we face greater challenges that require novel and creative solutions and cooperation. Here, at what may be the nadir of civil discourse, solutions elude us due potentially to the lack of a strong foundation in social studies and science process skills.

Recommendations

A final, thorny question: Which system is preferred; a current one that presents indigenous peoples as props in a national narrative of destiny represented in sanguinary detail by cringe inducing Thanksgiving pageants, or one that embraces a deeper more critical appraisal of systems incorporating indigenous knowledges? That we debate this, even if implicitly, is damaging-- damning-- to a future in which we’ll need young people equipped to solve the challenges we are passing on. I wrestle with this concept of salutary neglect. But unless we commit to a radical change not just in how we structure public schools and time spent, but in how we approach teacher preparation, then we embrace stasis I think we can prepare ECTs to venture into classrooms with the confidence and competence to teach the ingrained process skills so needed and also to take on leadership roles to reassert professional control. Equipping early career teachers with the tools to facilitate broad learning experiences that value the importance of the skills and knowings represented by science and social studies can only occur

through the removal of high stakes summative assessments and a return of control to (re)professionalized teachers confident in their classrooms and making curricular decisions to improve outcomes.

Acknowledgements

None of this work, especially going forward, is possible without generous and dedicated teachers striving to ensure the best outcomes for our students.

References

- An, S. (2014). Preparing elementary teachers as global citizenship educators. *The Journal of Education*, 194(3), 25-38. Retrieved from <http://www.jstor.org.libproxy.uwyo.edu/stable/43823661>
- Anderson, L. (2009). Upper elementary grades bear the brunt of accountability. *The Phi Delta Kappan*, 90(6), 413-418. Retrieved from <http://www.jstor.org.libproxy.uwyo.edu/stable/20446133>
- Apple, M. (2009). Controlling the work of teachers. In D. Flinders and S. Thornton (Eds), *The curriculum studies reader*. (199-213). New York: Routledge.
- Dimitriadis, G & Kamberelis, G. (2006). *Theory for education*. (47-58) New York: Routledge.
- Berliner, D. (2011). Rational responses to high stakes testing: The case of curriculum narrowing and the harm that follows. *Cambridge Journal of Education*, 41(3), 287-302. <https://doi.org/10.1080/0305764X.2011.607151>
- Bernstein, B. (2000). *Pedagogy, symbolic control, and identity: Theory, research, critique* (Vol. 5). Rowman & Littlefield.
- Bobbitt, F. (2009). Scientific method in curriculum-making. In D. Flinders and S. Thornton (Eds), *The curriculum studies reader*. (336-347). New York: Routledge.
- Boyle-Baise, M. Hsu, M. Johnson, S. Serriere, S. & Stewart, D. (2008) Putting reading first: teaching social studies in elementary classrooms, theory & research in social education, *Theory & Research in Social Education* Vol 36, Iss 3 233-255
- Camicia, S. (2008). Deciding what is a controversial issue: A case study of social studies curriculum controversy. *Theory and Research in Social Education*. Vol. 36, Iss. 4
- Coburn, C. Hill, H. Spillane, J.(2016) Alignment and accountability in policy design and implementation: The common core state standards and implementation research *Educational Researcher*, Vol. 45 No. 4, pp. 243–251 Retrieved from <http://er.aera.net>
- Cole-Malott, D. & Malott, C. (2016, 03). Testing and social studies in capitalist schooling. *Monthly Review*, 67, 51-56. Retrieved from <http://libproxy.uwyo.edu/login/?url=https://search-proquest-com.libproxy.uwyo.edu/docview/1768931133?accountid=14793>
- Common Core State Standards Initiative. (2018). Common Core State Standards.org. Retrieved from <http://www.corestandards.org/ELA-Literacy/RST/>

- Darling-Hammond, L., & Wise, A. E. (1985). Beyond standardization: State standards and school improvement. *The Elementary School Journal*, 85(3), 315-336.
- David, J. (2011). Research Says... / High-stakes testing narrows the curriculum. *Educational Leadership*. Vol. 68 Num 6 Retrieved from http://www.ascd.org/publications/educational_leadership/mar11/vol68/num06/
- Delueze, G., & Guattari, F. (1987). *A thousand Plateaus. Capitalism and schizophrenia*. University of Minnesota Press.
- Dewey, J. (1897). *My pedagogic creed* (No. 25). EL Kellogg & Company.
- Dierking, C. & Fox, R. (2013). "Changing the way I teach": building teacher knowledge, confidence, and autonomy. *Journal of Teacher Education*, 64(2), 129+. Retrieved from http://link.galegroup.com.libproxy.uwyo.edu/apps/doc/A343364206/SUIC?u=wylrc_uwyoming&sid=S UIC&xid=851628de
- Duplass, J. (2011). *Teaching elementary social studies. Strategies, standards, and internet resources*. Wadsworth Cengage Learning. Belmont, CA.
- Eisner, E. W. (1967). A response to my critics. *The School Review*, 75(3), 277-282.
- Eisner, E. (2009). What does it mean to say a school is doing well? D. Flinders and S. Thornton (Eds), *The curriculum studies reader*. (327-335). New York: Routledge.
- Evans, R. W. (2015). The social studies wars, now and then. In (Parker, W. C., Ed.) *Social Studies Today* (pp. 25-34). Routledge.
- Fitchett, P. G., & Heafner, T. L. (2010). A national perspective on the effects of high-stakes testing and standardization on elementary social studies marginalization. *Theory & Research in Social Education*, 38(1), 114-130. <https://doi.org/10.1080/00933104.2010.10473418>
- Fitchett, P. Heafner, T. & Lambert, R. (2014). Assessment autonomy, and elementary social studies time. *Teachers College Record* Volume 116 Oct. 2014 Teachers College, Columbia.
- Freire, P. (1970) *Pedagogy of the oppressed*. Continuum: New York
- Good, A. J., Heafner, T., Rock, T., O'Connor, K. A., Passe, J., Waring, S., & Byrd, S. (2010). The de-emphasis on social studies in elementary schools: Teacher candidate perspective. *Current Issues in Education*, 13(4).
- Graeber, D. (2018). *Punching the clock*. (p. 11-15) Harpers Magazine, June 2018. Vol. 336, NO. 2017.
- Greene, M. (2009). Curriculum and consciousness. D. Flinders and S. Thornton (Eds), *The curriculum studies reader*. (155-167). New York: Routledge.
- Hess, D. E. (2009). *Controversy in the classroom: The democratic power of discussion*. Routledge.
- Hermann, R. (2011). Breaking the cycle of continued evolution education controversy: on the need to strengthen elementary level teaching of evolution. *Evolution: Education and Outreach*, Vol 4, Num 2, 267
- Hikida, M., & Taylor, L. A. (2023). "As the test collapses in": Teaching and learning amid high-stakes testing in two urban elementary classrooms. *Urban Education*, 58(6), 1032-1060. (include this? How teachers operate as in Foucault's plague stricken town, where all behavior is controlled, but you carve out little spaces)

- Hill, D. (2022). Critical Education, Social Democratic Education, Revolutionary Marxist Education. In *The Palgrave Handbook on Critical Theories of Education* (pp. 243-259). Cham: Springer International Publishing.
- Hong, H., & Hamot, G. E. (2020). Differential effects of state testing policies and school characteristics on social studies educators' gate-keeping autonomy: A multilevel model. *Theory & Research in Social Education*, 48(1), 74-100.
- Houser, N., Krutka, D., Roberts, R., Pennington, K. & Coerver, N. (2017). Navigating the reform accountability culture in Oklahoma social studies. *Theory and research int social education* 45(1) pp 7-42.
- Huck, A. (2020). Hierarchical discourse in elementary social studies: a teacher's view of decision-making. *Social Studies Research and Practice*, 15(2), 195-210.
- Hutton, L., & Hembacher, D. (2018). Create space for history-social science in elementary classrooms to foster content knowledge, inquiry, literacy, and citizenship. *Social Studies Review*, 56, 44-50. Retrieved from <http://libproxy.uwyo.edu/login/?url=https://search.proquest.com/docview/>
- Hutton, L., Reagan, C., & Burstein, J. (2006). The state of elementary social studies teaching in one urban district. *Journal of Social Studies Research*, 30(1), 15-20. Retrieved from <http://libproxy.uwyo.edu/login/?url=https://search-proquest-com.libproxy.uwyo.edu/docview/211065095?accountid=14793>
- Ingersoll, R. M., May, H., & Collins, G. (2019). Recruitment, employment, retention and the minority teacher shortage. *Education Policy Analysis Archives*, 27(37).
- Ingersoll, R., Merrill, L., & May, H. (2011). Do accountability policies push teachers out? *Educational leadership*. 68(6). Retrieved from www.ascd.org/publications/educational-leadership/may16/vol73/num08/
- Journell, W. (2013) Learning from each other: what social studies can learn from the controversy surrounding the teaching of evolution in science, *The Curriculum Journal*, 24:4, 494-510,
- Kaestle, C. (1983). *Pillars of the republic common schools and American society, 1780-1860*. Hill and Wang, New York.
- Kliebard, H. (1995). *The struggle for the American curriculum 1893-1958*. Routledge New York.
- Lambert, D. & Morgan, J. (2009). Corrupting the curriculum? The case of geography. *London Review of Education* v7 no2 147-157.
- Masci, D. (2017). For Darwin Day, 6 facts about the evolution debate. *Pew Research*, <http://www.pewresearch.org/fact-tank/2017/02/10/darwin-day>. Retrieved June 2018.
- McEachron, G. (2009). Study of allocated social studies time in elementary classrooms in virginia: 1987-2009. *Journal of Social Studies Research*, 34(2), 208-228. Retrieved from <http://libproxy.uwyo.edu/login/?url=https://search-proquest-com.libproxy.uwyo.edu/docview/753951911?accountid=14793>
- McIntosh, P. (2009). Gender perspectives on educating for global citizenship. D. Flinders and S. Thornton (Eds), *The curriculum studies reader*. (385-398). New York: Routledge.

- Miller, J. & Toth, R. (2014). The process of scientific inquiry as it relates to the creation/evolution controversy: I. A serious social problem. *The American Biology Teacher*, 76(4), 238-241.
- Moran, P. (2015). Reacting to crises: The risk-averse nature of contemporary American public education. *USA Policy Futures in Education* 2015, Vol. 13(5) 621–638. Author(s) 2015 retrieved June from: pfe.sagepub.com
- NCTQ. (2015). Teacher evaluation policy in wyoming. *Wyoming State Teacher Policy Yearbook*. Retrieved from www.nctq.org
- Nygreen, K. Lazdowski, K. & Bialostok, S. (2017), Educational anthropologists respond to the 2016 U.S. presidential election: rupture, continuity, and resistance. *Anthropology & Education Quarterly*, 48: 339-348. doi:10.1111/aeq.12225
- Pace, J. L. (2011). The complex and unequal impact of high stakes accountability on untested social studies. *Theory & Research in Social Education*, 39(1), 32-60. <https://doi.org/10.1080/00933104.2011.10473446>
- Pinar, W. F. (2005). Complicated conversation: Occasions for" Intellectual breakthrough" in the internationalization of curriculum studies. *Journal of Curriculum Studies*, 1(1), 2.
- Popham, J. W. (1972) Objectives-based management strategies for large ducational systems. *The Journal of Educational Research*, 66:1, 4-9, DOI: 10.1080/00220671.1972.10884390
- Ro, J. (2019). Learning to teach in the era of test-based accountability: a review of research. *Professional Development in Education*, 45(1), 87-101. <https://doi.org/10.1080/19415257.2018.1514525>
- Rubin, B. C. (2012). *Making citizens: Transforming civic learning for diverse social studies classrooms*. Routledge.
- Rubin, B. C., & Giarelli, J. M. (Eds.). (2013). Introduction. *Civic education for diverse citizens in global times: Rethinking theory and practice*. Routledge.
- Russell III, W. B., & Waters, S. (2021). *Essentials of elementary social studies*. Routledge.
- Severance, S. Penuel, W. Sumner, t. & Leary, T. (2016) Organizing for teacher agency in curricular co-design. *Journal of the Learning Sciences*. Vol 25, Iss 4. Retrieved <https://www.tandfonline.com/doi/abs>
- Shay, S. (2016). Curricula at the boundaries. *Higher Education*. Volume 71, Issue 6, pp 767
- Sugawara, C. & Luca, G. (2009). Building social capital among social work educators: A strategy for curriculum development. *Journal of Social Work Education*; Washington45.3 445-466
- VanFossen, P. (2005) "Reading and math take so much of the time...": An overview of social studies instruction in elementary classrooms in indiana, *Theory & Research in Social Education*, 33:3, 376-403, DOI: 10.1080/00933104.2005.10473287
- Viereck, G. (1929), "What life means to einstein: An interview by george sylvester viereck", *The Saturday Evening Post*: 117, retrieved on 19 June, 2018.
- Vogler, K. (2003). Where does social studies fit in a high-stakes testing environment? *The Social Studies*, 94(5), 207-211.<https://doi.org/10.1080/00377990309600208>
- Weaven, M. & Clark, T. (2015). Discretionary space: English teachers discuss curriculum agency [online]. *The Australian Journal of Language and Literacy*, Vol. 38, No. 3, Oct 2015: 162-170. Retrieved: <<https://search.informit.com.au/documentSummary>;

- Wills, J & Sandholtz, J. (2009). Constrained professionalism: dilemmas of teaching in the face of test-based accountability. *Teachers College Record*. 111. 1065-1114.
- Whitlock, A. M., & Brugar, K. A. (2019). Teaching Elementary Social Studies during Snack Time and other Unstructured Spaces. *The Journal of Social Studies Research*, 43(3), 229-239.
<https://doi.org/10.1016/j.jssr.2018.09.007>

DEI in the Culture Wars: How to Advocate for Diversity, Equity, and Inclusion without Alienating Others

Hershey H. Friedman

Business Management Department, Koppelman School of Business, Brooklyn College of the City University of New York

Svetlana Vlady

Accounting Department, Koppelman School of Business, Brooklyn College of the City University of New York

Abstract: There are numerous terms that should be seen as positive values but have been co-opted by today's cultural wars. These terms include "woke," "social justice," "cancel culture," "identity politics," "politically correct," "Black Lives Matter," and DEI. Surprisingly, the term DEI, which stands for diversity, equity, and inclusion, has negative connotations today. These are noble values that anyone with a soul should admire. This paper examines what went wrong and how to fix the problem. A biblical approach to DEI is discussed. For organizations to thrive, their leaders must realize that the foundations of DEI initiatives must be compassion, empathy, and humility rather than anger and victimization. Leaders need to understand the correct way to advocate for the ideals of diversity, equity, and inclusion in a way that brings people together and does not offend.

Keywords: DEI, wokeness, dualistic thinking, black-and-white thinking, cancel culture, ableism, lookism, critical thinking, second chance.

Citation: Friedman, H. H. & Vlady, S. (2023). DEI in the Culture Wars: How to Advocate for Diversity, Equity, and Inclusion without Alienating Others. In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023-- International Conference on Social and Education Sciences* (pp. 399-413), Las Vegas, NV, USA. ISTES Organization

Introduction

Workplace diversity, equity and inclusion efforts, or DEI, are increasingly important in today's globalized world. Diversity refers to various identities, including race, gender, age, religion, sexual orientation, ethnicity, nationality, socioeconomic status, weight, height, attractiveness, language, (dis)abilities, parental status, education, values, beliefs, and other social identities. Diversity ensures that a variety of voices, experiences, and knowledge contribute to building an organization or community. Moreover, diversity means diversity of minds, ideas, and approaches and it allows teams to find a solution that considers multiple angles of the problem, thus

making the solution better, stronger, and more optimal. Teamwork and collaboration are essential in today's globalized and information-driven workforce comprising diverse individuals.

Equity refers to fair treatment for all people so that the practices and policies in place ensure fairness in pay and opportunities for advancement. In many firms, historically disadvantaged groups were underpaid and had to struggle to be promoted. Inclusion ensures that diverse individuals feel like essential parts of the team and have fair opportunities to grow and contribute. Some firms include accessibility and stress that their organization cares about DEIA (Diversity, equity, inclusion, and accessibility).

Moreover, DEI is an integral part of a successful revenue generating business and has both moral and financial benefits. DEI is also essential for recruiting and retaining top talent (Friedman and Amoo, 2002; Rohwerder, 2017). DEI in the workplace is vital for long-term progress, and companies committed to it can attract top talent. DEI has been found to improve financial performance, creativity, and customer and employee satisfaction (Dixon-Fyle et al., 2020; Hunt, Layton, & Prince, 2015; Urwin et al., 2013, p. 22; Wright et al., 2014; Zalis, 2017). Duarte *et al.* (2015, p. 1) maintain: "Psychologists have demonstrated the value of diversity – particularly diversity of viewpoints – for enhancing creativity, discovery, and problem solving." There is evidence that diversity makes us brighter (Phillips, 2014). Immigrants were responsible for 23% of the patents granted between 1990 and 2016 (Savchuk, 2023).

There is a strong correlation between diversity and high-technology growth. Regions that scored high on composite diversity (gays, foreigners, and bohemians) scored high on the Milken Institute's measure of high-technology growth. Creative people in the technology areas were attracted to regions where people who are tolerant, open-minded, and accepting of others reside. Countries that discriminate against women seriously hurt their economic growth rate. This should not be surprising given that these countries did not have access to the brainpower of approximately 50% of the population. Even in the United States, research indicated that racial discrimination resulted in a 4% reduction in GDP (Friedman and Amoo, 2002).

Edmans, Flammer, and Glossner (2023) found that the best way to measure the true DEI of a firm is to do more than simply examine traditional measures of demographic diversity. The ideal DEI measure must also consider whether a workplace is inclusive and equitable; this requires learning about the attitudes of employees and managers in a firm. To measure the true DEI, the authors examined the proprietary data from the Trust Index used in the GPTW (Great Places to Work) scale; this is needed to create the "100 Best Companies to Work for in America" list. The type of questions employed in the Trust Index (e.g., "I can be myself around here," "Managers avoid playing favorites," and "This is a psychologically and emotionally healthy place to work") tap into the equity and inclusion dimensions of DEI. The authors found that their measure of DEI was positively correlated with seven out of eight measures of profitability (as well as Tobin's Q, a measure of valuation); diversity alone is not associated with profitability.

It is astonishing that the term DEI has become so contentious. Several red states, such as Florida and Texas,

have passed legislation abolishing DEI initiatives in higher education, and many more are in the process of doing so. This paper will focus on the good, the bad, and the ugly of how DEI is being applied today and why it has become controversial.

The Good, the Bad, and the Ugly of DEI

The problem with DEI is that it focuses too much on demographic diversity and ignores many other kinds of diversity. There definitely should be more ethnic minorities and women on the board of directors of an organization, but that is not sufficient. Recruiting minorities to diversify the recruitment pool or hiring people of color to check off a box does not improve DEI. As noted above, demographic diversity is only weakly correlated with DEI. An organization's culture has to be changed to create a climate of equity and inclusion.

Rowinski (2022) asserts the following:

Advancing the opportunities of women and minorities is important, but these are not the only two faces of diversity. People from different countries with varied political and economic backgrounds develop unique expectations and approaches to solving problems. Even neurodivergence and disability bring new perspectives to business discussions. And the result is often impactful business decisions that take more people into consideration so we can solve more (and bigger) problems (Rowinski, 2022, para. 13).

There are many kinds of bigotry, and it is a mistake to focus only on discrimination based on skin color or gender. Many feel that racial categorization itself is problematic and may result in intense battles among various ethnic groups. It should be underscored that race is a biological myth, and it is socially constructed. This paradigm shift is the first step in moving away from racism and bigotry. There are six arguments supporting the view that race is not biology:

1. People cannot be reliably divided into racial groups.
2. There are no relationships between traits that are used to categorize people into races (like skin color) and associated stereotypes.
3. Over time, geography and environment influence the genetic structures of human populations through natural selection.
4. There is more diversity within racial groups than between racial groups.
5. All people living today are descended from populations that originated in Africa.
6. All people living today are one biological species (McChesney, 2015, p. 2).

Moreover, classification by race is often misleading, given that ethnic groups do intermarry. Indeed, 35% of Americans have close relatives that married someone from another race, and approximately 30% of Asians marry someone from a different ethnic group (Brooks, 2022).

Other Kinds of Discrimination

Prejudice based on skin color and gender may be common, but other biases exist. All are morally reprehensible. Let us focus on just a few different types of discrimination.

Neurodiversity in the workplace is essential, and firms should do their utmost to hire people with autism spectrum disorder, dyslexia, or with ADHD (Austin and Pisano, 2017). Neurodiverse people have different neurological wiring than neurotypical people, which can benefit a firm. They may see the world and solve problems in different ways, and this can lead to new perspectives and solutions.

Grandin (2023) calls attention to the fact that diversity also includes being aware of the different kinds of minds that exist. Temple Grandin is autistic and a visual thinker, so she processes information differently than most people. Previously, it would have been hard for visual thinkers to do well in school and get hired. They cannot sit still or do abstract math, yet they can be highly creative. Thomas Edison did very poorly in school—he was at the bottom of the class—and had to be home-schooled. One way of increasing creativity is to put different kinds of thinkers together and allow them to use different approaches to come up with solutions.

According to the Centers for Disease Control and Prevention (CDC), in 2020, 41.9% of American adults were obese (<https://www.cdc.gov/obesity/data/adult.html>). It is morally wrong to deride overweight people; it is well known that diets do not work, and the obese are not responsible for their conditions. Obesity is stigmatized in society, and people with excess weight are often discriminated against. This can happen in many places, such as the workplace, school, healthcare settings, and even in personal relationships. Women are more likely to experience weight discrimination than bias based on ethnicity, sexual orientation, or physical disability (Puhl, 2008). It bears mentioning that neurological issues such as autism and obesity are disabilities. About 27% of Americans have some kind of disability (CDC, 2023) and have faced discrimination in employment, housing, and education. The Americans with Disabilities Act (ADA) of 1990 is a federal law that protects the civil rights of individuals with disabilities by prohibiting discrimination against them in everyday activities. More than 50% of the complaints concerning discrimination in Canada deal with ableism. Only 4% of Canadian firms consider disability in their DEI efforts. There is something seriously wrong with DEI initiatives if the 22% of Canadian workers with disabilities can be ignored (Friedman, 2023).

There is a large body of research that demonstrates that there is an attractiveness bias, also known as lookism (Chamorro-Premuzic, 2019). People seen as more attractive will earn higher salaries and receive better treatment in schools and the workplace than plain-looking individuals. Moreover, those who are not seen as attractive (e.g., those who are short or obese) will be discriminated against. There is a problem in our society with body shaming and appearance mocking. Donald Trump was known for doing this, especially when dealing with women (Bodenheimer, 2020).

DEI is a concept that aims to create a more inclusive environment where everyone feels respected and valued.

However, in recent years, DEI has been criticized for promoting hate and racism. This may result from overstressing prejudice based on race and ignoring other kinds of bias. Some believe DEI training courses reinforce stereotypes and "backfire" by increasing, renewing, or even fostering new sensitivities. There is evidence to support these criticisms; several researchers have found that DEI training has little or no positive effects (Miller, 2023; Paluck, 2006; Plaut et al., 2011; Rufo, 2023; Singal, 2023). People of all races resent hearing about a "white supremacy culture" or that there is something insidious in stating that "America is a melting pot." Rufo (2023) argues that DEI programs on college campuses have become highly ideological political programs designed to promote a specific radical political agenda; they do not make universities more tolerant and receptive to open debate.

Some bias researchers advocate that the focus should be on changing behavior rather than people's attitudes. Introducing white fragility workshops into an organization probably accomplishes considerably less than finding ways to widen the net when hiring managers. Some companies are talking about "diversity and belonging" rather than "diversity and inclusion" because the latter reduces individuals to "victim or villain" and often alienates coworkers (Miller, 2023). We need to be careful not to let DEI become a tool for promoting hate and division. Instead, we should use it as an opportunity to build a more inclusive and equitable society for everyone.

Lily Zheng, DEI strategist, consultant, and author of several books on DEI, emphasizes that DEI training often does not work because of employee fatigue with these initiatives which often accomplish nothing. To engage workers, they must feel that DEI initiatives are needed and will result in concrete, visible results. Moreover, Zheng states:

To address backlash companies need to frame DEI efforts as resolving inequities and achieving justice. We need to frame DEI less like we are attacking people and more in a way that people can see a role for themselves in these efforts (cited in King, 2023, para. 2).

Most organizations virtually ignore one kind of diversity: diversity of opinion. Demographic diversity alone may not be sufficient to ensure this. Today's Supreme Court is the most demographically diverse in history: four women, two Blacks, and a Latina. Despite this, it is not that diverse when it comes to opinions. Indeed, the Supreme Court is expected to question the value of diversity and reverse affirmative action.

Another kind of discrimination is workplace bullying. It has been well-documented how harmful workplace bullying can be to an organization. About 11% of workers are victims of bullying, and many are blue-collar and unskilled workers (Sansone and Sansone, 2015). A leader must create zero tolerance for deriding or insulting any person.

In summary, many kinds of bias should be addressed. Focusing exclusively on one type of discrimination and ignoring others could devastate an organization. The emphasis should be on all kinds of bigotry. What is the root cause of all types of discrimination, whether against gay people, Asians, Jews, stutterers, dwarfs, unattractive people, people with disabilities, or intellectuals? What should be done to eliminate all of them? There is no reason for managers in charge of diversity to believe that the problem will be solved only by hiring more Blacks and Latinos. First, as stated above, it is the CEO's responsibility to change the organization's culture. Second, the refrain of fictional detective Harry Bosch in Michael Connelly's novel, "Everybody counts or nobody counts," should be the philosophy of every leader. It is about changing an organization into one where all are respected.

Problems with DEI in Education and Science

Scholars with different opinions who raise evidence-based questions about the views of the extreme left are often banned from campuses. Hooven (2023) is concerned with journal guidelines such as "Science must respect the dignity and rights of all humans." This seems like a laudable standard but can be used to suppress research demonstrating group differences. Would we want to silence research that shows that some drugs work better on women than men (or white rather than Black) because of biological differences? There is evidence that there are sex differences when it comes to the body's response to various medications (Jacobson, 2014). Carole Hooven was attacked as transphobic and dangerous for stating that there are two sexes – male and female—and "those sexes are designated by the kinds of gametes we produce." She emphasized that "understanding the facts about biology doesn't prevent us from treating people with respect" (p. 6). Hooven challenges those who argue that one must be ready to subvert science and deny reality to protect the rights of oppressed minorities. University administrators are part of the problem.

Another force inhibits administrators: the now-ubiquitous acceptance of vague and subjective principles of diversity, equity, and inclusion, and the consequent investment of vast quantities of time and money in ensuring that these principles guide all the actions of the university community. While these initiatives have improved the campus environment in some respects, they have harmed it in others. Students have become conditioned to believe that it is their right to be free from offense, whether in the classroom or even the dining hall, and they have framed ringing endorsements of academic freedom as covert defenses of bigotry and injustice (Hooven, 2023, para. 31).

Lukianoff and Haidt (2018) have written about the danger of teaching students such untruths and cognitive distortions as "What doesn't kill you makes you weaker," "Always trust your feelings," and "Life is a battle between good people and evil people." These beliefs are related to three cognitive biases: overgeneralization, emotional reasoning, and black-and-white thinking. Schools should teach students to listen and be receptive to new ideas. They should be critical thinkers and appreciate different perspectives. Instead, we are seeing students attacking lecturers who present ideas students consider offensive. This is increasing the polarization of society and making students less adaptable and resilient, essential attributes to thrive in the real world.

DEI has not only spread across college campuses but is now a part of k-12 education in many schools (Odabas and Aragao, 2023). There is a great deal of conflict over how educators indoctrinate students and teach them controversial topics sometimes linked to DEI, such as critical race theory and critical social justice. There are elementary schools where K-3 children are taught to "break the binary of gender" or to "deconstruct their racial and sexual identities" and identify themselves according to power and privilege. Terms such as "white colonizers" and "infinite gender spectrum" are used indiscriminately as facts (Kauffman, 2023).

Injecting DEI into science can create all kinds of problems. There is now a movement for citation justice, defined as "the act of citing authors based on identify [sic] to uplift marginalized voices with the knowledge that citation is used as a form of power in a patriarchal society based on white supremacy" (cited in Staddon, 2023, para. 18). Some DEI activists have been encouraging researchers to consider the gender and race of authors when deciding on which researchers to cite in their references. Many feel that citation justice corrupts science, not enhances it (Staddon, 2023). Even the view that because there is a disparity in science – not enough females in STEM areas – may not be a problem if there is no discrimination. Regardless of what some believe, not everything is about power. Women should be encouraged to enter STEM fields, and any bias blocking it should be eliminated; but is it a problem if women prefer nursing to engineering? It might be impossible to ensure that the distribution of ethnic groups in every discipline should match society's demographics (Staddon, 2023). Should we be concerned if there are too many Asians in the sciences?

Staddon believes that the focus should be on the real problems in science, not those that are popular fads.

Most dramatic is the replication crisis, which is still going on almost twenty years after it was first identified. At least fifty percent of results in social and biomedical science turn out not to be replicable. The main reason is a misapplication of statistical methods so as to get positive, publishable results, which are necessary for career advancement because of the citation/publication/grants-awarded evaluative criteria that are used. Another error is the widespread application to, say, individual psychology of data obtained from groups (we are all subject to 'confirmation bias'; well, no we're not, but you wouldn't know it from most reports). Fraud is also skyrocketing; papers with fake data, imaginary clinical trials, and the like grow in number every year. Correlations (easily obtained by appropriate statistical tests) are almost always presented as causes; just look for the phrase "linked to" (Staddon, 2023, para. 21).

Critical Thinking as an Antidote to Dualistic Thinking

Dualistic thinking, also known as black-and-white or polarized thinking, is a general tendency to see things as good or bad, right or wrong, and us or them, without room for compromise and seeing shades of gray. This all-or-nothing cognitive approach leads to poor decision making. It also creates polarized groups (think of today's Democrats and Republicans) and encourages discrimination and prejudice by creating the "us vs. them" approach to life. It interferes with one's ability to be an innovator, which requires one to be open-minded.

This type of dualistic thinking is known in the mental health field as "splitting," which is a "defense mechanism in which people unconsciously frame ideas, individuals, or groups in all-or-nothing or either-or terms (e.g., all-powerful vs. 100% powerless)" (Redstone, 2021, para. 2). It is often seen in people who have a borderline personality disorder (Villines, 2022). Splitting is a severe problem when dealing with people with different opinions or interacting with those from other races or religions.

Splitting is also emotionally dysregulating, fostering behavioral problems like aggression and leading to psychic pain and mental illness. It also makes it hard for people to have productive dialogue, and it works against our shared ideals as a society, like love, peace, justice, and unity (Redstone, 2021, para 6).

Ironically, some strong advocates of DEI would employ a kind of binary thinking that harms values such as "love, peace, justice, and unity."

Brooks (2018) demonstrates the dangers and challenges of extreme wokeness. Wokeness combines perceiving and proposing, so one must see any injustice in maximalist terms. One can be canceled for not considering a problem in the most pessimistic way and as having absolutely no solution. It is almost as if the goal is to get everyone to give up hope, become cynical and aggressive, and be filled with rage and negativity. Brooks concludes: "But in its extreme form, whether on left or right, wokeness leads to a one-sided depiction of the present and an unsophisticated strategy for a future offensive" (para. 17).

Former President Obama warned of the dangers of a "purist" approach by some progressives that he compared to a circular firing squad. For example, he asserted that it is wrong to characterize every individual concerned about immigration as a racist. The all-or-nothing approach does not work and can cause more harm than good.

One of the things I do worry about sometimes among progressives in the United States — maybe it's true here as well — is a certain kind of rigidity where we say, 'Oh, I'm sorry, this is how it's going to be,'" Obama said. "And then we start sometimes creating what's called a 'circular firing squad' where you start shooting at your allies because one of them is straying from purity on the issues" (Collins, 2019, para. 3).

Facione (2011) provides a good reason for the encouragement of learning critical thinking rather than dualistic thinking:

Education which includes a good measure of critical thinking skills and dispositions like truth-seeking and open-mindedness, is a problem for terrorists and extremists of every stripe because terrorists and extremists want to control what people think. They are ideologists of the worst kind. Their methods include indoctrination, intimidation, and the strictest authoritarian orthodoxy. In the "black-and-white"

world of "us vs. them" a good education would mean that the people might begin to think for themselves. And that is something these extremists do not want (Facione, 2011, p. 25).

No Second Chance?

President George W. Bush declared, "America is the land of the second chance, and when the gates of the prison open, the path ahead should lead to a better life." This is consistent with the value of "Inclusion" in DEI. Rinderle (2021, para. 8) underscores that "Cancelling has no place in creating a more equitable and inclusive environment." She asserts, "To cancel is to expose your own fragility and intolerance, and to reveal your commitment to victimhood." (para. 12). We all make mistakes, and if one shows remorse, why should that person be ostracized or destroyed? Creating an environment where everyone walks on thin ice and is terrified of saying the wrong thing is the enemy of equity and inclusiveness.

Moreover, people should be allowed to express different opinions without fear of being scorned. Diversity is almost meaningless if everyone is expected to have the same viewpoint. Diversity of thought is the essence of what diversity is all about. The following summarizes what is needed:

Cancelling, consensus, and perfection have no place in true DEI work. The Seven C's of commitment, consciousness, curiosity, courage, compassion, choice, and changeability are what's needed to create a world that works better for more of us. They're what's needed to ensure we don't replicate the dynamics of oppression and inhumanity that got us here (Rinderle, 2021, para. 31).

Friedman and Lipman (2023) contend that we should cancel the 'cancel culture' because it results in people losing sight of the outstanding accomplishments of many historical figures, including Thomas Jefferson (a slave owner, famously of Sally Hemmings, who putatively bore some of his children), Abraham Lincoln (early in his career he favored a gradual freeing of the slaves), Rev. Martin Luther King, Jr. (several extramarital affairs), as well as great biblical personalities such as Abraham, Judah, Moses, and David. No human being is perfect, and much can be learned from flawed individuals. There are several websites dedicated to demonstrating that great people we idolize have ugly, dark sides to their personalities (e.g., Brandy, 2023).

Should we cancel the United States, one of the greatest countries in the history of the world, because of its horrific misdeeds? These wrongs include committing genocide against Native Americans; the Dred Scott decision by the Supreme Court; being among the last countries to abolish slavery; placing Japanese Americans and Italian Americans in internment camps during the Second World War; sending back the St. Louis, a ship filled with Jewish refugees from Nazi Germany; and much more.

Friedman and Lipman spotlight the danger of being too quick to cancel people.

In 1822, Heinrich Heine, a Jewish-born poet who converted to Christianity to advance in German society, wrote the prophetic words, "Where they burn books, they will, in the end, burn human beings,

too." Today, one might say, "Where they cancel people, they will, in the end burn them" (Friedman and Lipman, 2023, p. 42).

A Biblical Approach to DEI

There are numerous terms that should be seen as positive values but have been co-opted by today's cultural wars. These terms include "woke," "social justice," "cancel culture," "identity politics," "politically correct," "Black Lives Matter," and DEI. These words and phrases may be used in various contexts, and their implications can vary depending on the speaker's perspective. Thus, right-wing politicians use many of the above phrases as symptoms of a dangerous philosophy that can destroy the country. Ron DeSantis, Governor of Florida, asserted: "We fight the woke in the legislature. We fight the woke in the schools. We fight the woke in the corporations. We will never, ever surrender to the woke mob. Florida is where woke goes to die." Interestingly, because the term has been weaponized, very few people even use the expression today (Harriot, 2022).

The majestic ideas behind these phrases have their roots in the Bible. Thus, the idea of not oppressing the stranger is mentioned dozens of times in Scripture (Friedman and Gerstein, 2015). The "stranger" is anyone who is different and includes everything from racism to xenophobia. A crucial message of Scripture and all the prophets is the importance of repentance (*teshuvah*). The purpose of punishment was to get the people to repent of their evil ways. This was the primary purpose of sending prophets to the people. They were preachers whose job was to get the people to repent and were told of the consequences of not heeding the word of God. Leaders understood that their job was to lead with justice and compassion, especially for the indigent members of society (Friedman and Gerstein, 2017; Friedman and Fischer, 2021).

All humankind was created in the image of God (*Tzelem Elohim*) (Genesis 9:6) and deserving of dignity and respect. This is why human dignity is a crucial belief in all theistic religions and is emphasized in Islamic theology (Aramesh, 2007). Human dignity is based on the idea that we were all created in God's image, a core value of the Abrahamic religions. Malachi said (2:10): "Have we not all one father? Has not one God created us? Why do we deal treacherously every man against his brother?" This philosophy "invests all human life with intrinsic sanctity and immeasurable value" (Korn, 2021, p. 22).

The great prophets Isaiah, Amos, and Micah envisioned a world of full employment, tolerance, and love. In this utopian Messianic world, the lamb and lion could lie down together, and exploitation, bias, and racism would vanish. It would be a world of true diversity, equity, and inclusivity. A spiritual world where those who want jobs will find them, and those unable to work will receive assistance. Problems such as racism, poverty, pollution, warfare, and oppression would be drastically reduced or even eliminated. Their vision was of a beautiful, peaceful, idyllic, spiritual world where humanity lives in harmony with tolerance for others.

The wolf will live with the lamb, the leopard will lie down with the goat; the calf, the lion cub, and the fatling [will feed] together, and a small child will lead them. A cow and bear will graze together, and their young will lie down together. The lion will eat straw like the cattle. An infant will play over a viper's hole, and a newly weaned child will stretch forth his hand over an adder's den. They will do no harm or damage anywhere in all of My sacred mountain; for the earth will be filled with knowledge of God, as water covers the sea (Isaiah 11:6-9).

He will judge between many peoples and will settle the disputes of mighty nations far and wide. They will beat their swords into plowshares and their spears into pruning hooks. Nation will not lift up sword against nation, nor will they learn war anymore (Micah 4:3).

Behold, the days are coming, says the Lord, When the plowman shall overtake the reaper, and the treader of the grapes the one who sows the seed; The mountains shall drip with sweet wine, And all the hills shall flow with it (Amos 9: 13).

A foundational value of the Bible is helping the needy and powerless (the proverbial "widows, orphans, strangers, and the poor" – see, for example, Zechariah 7:10. The above prophets use the metaphor of people working the soil, meaning that everyone capable will be employed (Rae, 2004). Humankind's role is to improve the world and make it better for all. Rae points out that God put Adam in the Garden of Eden (Genesis 2:15) "to work it and protect it" even before sin entered the world. Work was always part of God's plan for humankind. The Messianic world is one where "the Lord will be king" (Obadiah 1:21). Obadiah sees the saviors on Mount Zion judging the Mountain of Esau (Obadiah 1:21). In the end, "the kingdom will belong to the Lord" (Obadiah 1:21). Empires, such as Esau, that are built on plunder, exploitation, discrimination, and robbery will not last. Zechariah (2:14-15) proclaims: "Rejoice and sing, O daughter of Zion! For I am coming to live among you, says the Lord. And many nations will join themselves to the Lord on that day, and they will be my people, and I will live among you."

The most important word in the Hebrew Bible is *chesed* which appears 248 times (Griffin, 2022). It is not easy to translate (it has been translated as mercy, kindness, steadfast love, unfailing love, and more). The best definition of *chesed* is probably lovingkindness, a principal value in most religions. It includes ideals such as love, compassion, tolerance, and forgiveness. A person filled with *chesed* is one with compassion for the weakest members of society and who does everything possible to elevate them and restore their dignity. Political and corporate leaders must ensure that their countries and organizations are based on *chesed*. Organizational compassion is a litmus test of whether one's organization has a soul (Delbecq, 2010). To be spiritually woke is to be filled with *chesed* and love for all people. The foundation of all DEI initiatives has to be *chesed*.

The social justice advocated by the ancient prophets did not blame everyone for the oppression of society's vulnerable and powerless members. They indicated who was responsible (often the rulers) and rebuked them.

Today's so-called social justice warriors have no problem admonishing innocent people who did not participate in or contribute to the problem. An alleged characteristic of today's social justice movement is the right to defame and demonize everyone, whether innocent or guilty. Tarring everyone with the same brush is wrong from a justice or social justice point of view. Assuming that everyone from a particular group (e.g., white, Jewish, male, heterosexual, etc.) is automatically "privileged," unteachable, irredeemable, and guilty of all kinds of misbehaviors goes against everything the prophets preached. The prophets showed that people could be penitent and turn over a new leaf. This may be a key reason many leaders have repudiated critical race theory. Provocative terms such as "white privilege," "gaslighting," "cancel culture," "systemic racism," "decolonizing the curriculum," "critical race theory," "abolitionist pedagogy," and many others do not help bring people together.

Conclusion

Sacks (2002, pp. 50-51) underscores that the solution to the problem of intolerance is not universalism. The idea that there is one truth and you must accept it (or we will kill you!) has caused as much harm to society as tribalism. If the overarching values underlying DEI are to be accepted by the public, those advocating it must reject dualistic thinking, an approach that can only have dire consequences and further polarize society. They should stress that "Everybody counts or nobody counts." The idea of no "second chance" and rejection of the "one-strike-and-you're-out" philosophy must be discarded; demanding the perfection of people is not realistic. People should be critical thinkers who recognize that the world consists of many grey areas. For organizations to thrive, their leaders must realize that the foundations of DEI initiatives must be compassion, empathy, and humility rather than anger and victimization.

References

- Aramesh, K. (2007). Human dignity in Islamic bioethics. *Iran Journal Allergy Asthma Immunology*, February, 6 (Suppl. 5), 25-28.
- Austin, R. D. & Pisano, G. P. (2017). Neurodiversity as a competitive advantage. *Harvard Business Review*, May. Retrieved from <https://hbr.org/2017/05/neurodiversity-as-a-competitive-advantage>.
- Bodenheimer, R. (2020, November 22). It's time for liberals to stop fat shaming Donald Trump. *Business Insider*. Retrieved from <https://www.businessinsider.com/liberals-progressives-stop-fat-shaming-donald-trump-obesity-2020-11>.
- Brandy. (2023). "MLK Jr. is not who you think he is": We didn't know these historical figures were incredibly problematic until now. *Nature World Today*. Retrieved from <https://natureworldtoday.com/historical-figures-is/>
- Brooks, D. (2018, June 7). The problem with wokeness. *New York Times*. Retrieved from <https://www.nytimes.com/2018/06/07/opinion/wokeness-racism-progressivism-social-justice.html>
- Brooks, D. (2022, October 14). When race is everything, this happens. *New York Times*, A23.

- CDC (2023). Disability impacts all of us. *CDC*. Retrieved from <https://www.cdc.gov/ncbddd/disabilityandhealth/infographic-disability-impacts-all.html>
- Chamorro-Premuzic, T. (2019). It's time to expose the attractiveness bias at work. *Forbes*. Retrieved from <https://www.forbes.com/sites/tomaspremuzic/2019/07/17/its-time-to->
- Collins, S. (2019, April 6). Barack Obama warns against a circular firing squad over ideological purity in politics. *Vox*. Retrieved from <https://www.vox.com/policy-and-politics/2019/4/6/18298287/barack-obama-berlin-town-hall-speech>
- Delbecq, A. L. (2010). Organizational compassion: A litmus test for a spiritually centered university culture, *Journal of Management Spirituality & Religion*, 3, 241-249. DOI:10.1080/14766086.2010.499998
- Dixon-Fyle, S., Dolan, K., Hunt, V., & Prince, S. (2020, May). Diversity wins: How inclusion matters. *McKinsey & Company*. Retrieved from <https://www.mckinsey.com/featured-insights/diversity-and-inclusion/diversity-wins-how-inclusion-matters>.
- Duarte, J. L., Crawford, J. T., Stern, C., Haidt, J., Jussim, L., & Tetlock, P. E. (2015). Political diversity will improve social psychological science. *Behavioral and Brain Sciences*, 38, 1-13. DOI: <http://dx.doi.org/10.1017/S0140525X14000430>
- Edmans, A., Flammer, C., & Glossner, S. (2023, April 29). Diversity, equity, and inclusion. *European Corporate Governance Institute – Finance Working Paper 913/2023*, Available at SSRN: <https://ssrn.com/abstract=4426488> or <http://dx.doi.org/10.2139/ssrn.4426488>
- Facione, P. A. (2011). Critical thinking: What it is and why it counts. *Insight Assessment*. Retrieved from http://www.student.uwa.edu.au/__data/assets/pdf_file/0003/1922502/Critical-Thinking-What-it-is-and-why-it-counts.pdf
- Friedman, S. (2023, June 25). *Organizations are leaving disabled workers behind in their DEI efforts — here's how they can do better*. Retrieved from <https://theconversation.com/organizations-are-leaving-disabled-workers-behind-in-their-dei-efforts-heres-how-they-can-do-better-207800>
- Friedman, H. H. & Amoo, T. (2002). *Workplace diversity: The key to survival and growth*. *Business Quest*, Retrieved from <http://www.westga.edu/~bquest/2002/diversity.htm>
- Friedman, H. H. & Fischer, D. (2021). What biblical leaders teach us about leadership in a global society. *Analysis and Metaphysics*, 2, pp.7-30. doi:10.22381/AM2020211
- Friedman, H. H. & Gerstein, M. (2015). Loving the stranger: The key to prosperity. *Journal of Ethics & Entrepreneurship*, 5(1), Spring, 49-65.
- Friedman, H. H., & Gerstein, M. (2017). Leading with compassion: The key to changing the organizational culture and achieving success. *Psychosociological Issues in Human Resource Management* 5(1), 160–175.
- Friedman, H. H. & Lipman, S. (2023, January 27). Cancelling "cancel culture." *Five Towns Jewish Times*. 41-42. Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4349065 and <https://www.5tjt.com/cancelling-cancel-culture/>
- Grandin, T. (2023, May 23). When great minds don't think alike. *Harvard Business Review*. Retrieved from <https://hbr.org/2023/05/when-great-minds-dont-think-alike>

- Griffin, A. (2022, May 3). What is the true meaning and power of the Hebrew word 'chesed'? *Christianity.com*. Retrieved from <https://www.christianity.com/wiki/bible/what-is-the-true-meaning-and-power-of-the-hebrew-word-chesed.html>
- Harriot, M. (2022, December 21). War on wokeness: The year the right rallied around a made-up menace. *Guardian*. Retrieved from <https://www.theguardian.com/us-news/2022/dec/20/anti-woke-race-america-history>
- Hooven, C. (2023, June 21). Academic freedom is social justice. *Tablet Magazine*. Retrieved from <https://www.tabletmag.com/sections/arts-letters/articles/academic-freedom-social-justice>
- Hunt, V., Layton, D. & Prince, S. (2015, February). Diversity matters. *McKinsey & Company*. Reflections from <https://www.mckinsey.com/~media/mckinsey/business%20functions/people%20and%20organizational%20performance/our%20insights/why%20diversity%20matters/diversity%20matters.pdf>
- Jacobson, R. (2014). Psychotropic drugs affect men and women differently. *Scientific American*. Retrieved from <https://www.scientificamerican.com/article/psychotropic-drugs-affect-men-and-women-differently/>
- Kauffman, E. (2023, June 22). The indoctrination of the American mind. *Free Press*. Retrieved from <https://www.thefp.com/p/how-american-schools-indoctrinate-kids>
- King, M. P. (2023). Three reasons why diversity, equity and inclusion efforts fail. *Forbes*. Retrieved from <https://www.forbes.com/sites/michelleking/2023/01/18/three-reasons-why-diversity-equity-and-inclusion-efforts-fail/>
- Korn, E. (2021). *How to be a holy people: Jewish tradition and ethical values*. Urim Publications.
- Lukianoff, G. & Haidt, J.(2019). *The coddling of the American mind: How good intentions and bad ideas are setting up a generation for failure*. Penguin Press.
- McChesney, K. Y. (2015). Teaching diversity: The science you need to know to explain why race is not biological. *Sage Open*, October-December 1-13. Retrieved from <https://journals.sagepub.com/doi/10.1177/2158244015611712>.
- Miller, J. (2023, May 16). Why some companies are saying 'diversity and belonging' instead of 'diversity and inclusion.' *New York Times*. Retrieved from <https://www.nytimes.com/2023/05/13/business/diversity-equity-inclusion-belonging.html>
- Odabas, M. & Aragao, C. (2023). School district mission statements highlight a partisan divide over diversity, equity and inclusion in K-12 education. *Pew Research Center*. Retrieved from <https://www.pewresearch.org/social-trends/2023/04/04/school-district-mission-statements-highlight-a-partisan-divide-over-diversity-equity-and-inclusion-in-k-12-education/>
- Paluck, E. L. (2006). Diversity training and intergroup contact: A call-to-action research. *Journal of Social Issues*. V 62(3), 577--595
- Phillips, K. W. (2014). How diversity makes us smarter. *Scientific American*. Retrieved from <https://www.scientificamerican.com/article/how-diversity-makes-us-smarter/>.
- Plaut, V. C., Garnett, F. G., Buffardi, L. E., & Sanchez-Burks, J. (2011). "What about me?" Perceptions of exclusion and whites' reactions to multiculturalism. *Journal of Personality and Social Psychology*, 101(2), 337–353. <https://doi.org/10.1037/a0022832>
-

- Puhl, R. (2008). Weight discrimination: A socially acceptable injustice. OAC. Retrieved from <https://www.obesityaction.org/resources/weight-discrimination-a-socially-acceptable-injustice>
- Rae, S. B. (2004). Calling, vocation, and business. *Religion & Liberty*, 14(6), 6-8.
- Redstone, I. (2021, January 11). Splitting: The psychology behind binary thinking and how it limits a diversity of opinions. *Forbes*. Retrieved from <https://www.forbes.com/sites/ilanaredstone/2021/01/11/splitting-the-psychology-behind-binary-thinking-and-how-it-limits-a-diversity-of-opinions/>
- Rinderle, S. (2021, March 18). The enemies of inclusion: cancelling, consensus, and perfection. *TLNT.com*. Retrieved from <https://www.tnt.com/articles/the-enemies-of-inclusion-cancelling-consensus-and-perfection>
- Rohwerder, B. (2017). Diversity and inclusion within organizations. K4D Helpdesk Report. Brighton, UK: Institute of Development Studies.
- Rowinski, M. (2022, November 30). Three ways to check more than boxes when adding diversity to your organization. *Newsweek*. Retrieved from <https://www.newsweek.com/three-ways-check-more-just-boxes-when-adding-diversity-your-organization-1763217>
- Rufo, C. F. (2023, July 28). University DEI efforts work against liberal education. *New York Times*, A22.
- Sacks, J. (2002). *The dignity of difference: How to avoid the clash of civilizations*. Continuum.
- Sansone, R. A., & Sansone, L. A. (2015). Workplace bullying: A tale of adverse consequences. *Innovations in Clinical Neuroscience*, 12(1-2), 32-37. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4382139/>
- Savchuk, K. (2023). A new look at immigrants' outsize contribution to innovation in the US. *Insights*. Retrieved from <https://www.gsb.stanford.edu/insights/new-look-immigrants-outsize-contribution-innovation-us>
- Staddon, J. (2023, June 20). Science is rotting from the top. *Minding the Campus*. Retrieved from <https://www.mindingthecampus.org/2023/06/20/science-is-rotting-from-the-top>
- Singal, J. (2023, January 17). What if diversity training is doing more harm than good? *New York Times*. Retrieved from <https://www.nytimes.com/2023/01/17/opinion/dei-trainings-effective.html>.
- Urwin, P., Parry, E., Dodds, I., Karuk, V., & David, A. (2013). *The Business Case for Equality and Diversity: a survey of the academic literature* (BIS OCCASIONAL PAPER NO. 4). Department for Business Innovation & Skills & Government Equalities Office. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/49638/the_business_case_for_equality_and_diversity.pdf
- Villines, Z. (2022, October 20). What is splitting in borderline personality disorder (BPD)? *Medical News Today*. Retrieved from <https://www.medicalnewstoday.com/articles/bpd-splitting>
- Wright, A., Michielsens, E., Snijders, S., Kumarappan, L., Williamson, M., Clarke, L., & Urwin, P. (2014). Diversity in STEM: establishing a business case. University of Westminster. <https://royalsociety.org/~media/policy/projects/leading-the-way/diversity-business-case-june-2014.pdf>
- Zalis, S. (2017, November 30). The truth about diversity -- And why it matters. *Forbes*. Retrieved from <https://www.forbes.com/sites/shelleyzalis/2017/11/30/the-truth-about-diversity-and-why-it-matters/#1460ef5b66e7>.

Teaching Latinx Traditional Medicine *Curanderismo* in Higher Education

Eliseo Torres

University of New Mexico, United States,  <https://orcid.org/0009-0000-5189-3011>

Mario Del Angel-Guevara

University of New Mexico, United States,  <https://orcid.org/0009-0002-8535-4248>

Abstract: For more than 20 years, traditional medicine of Mexico, the U.S. Southwest and other countries has been taught as a series of academic course at the University of New Mexico in Albuquerque in the United States. These courses focus on traditional uses of healing plants and rituals for students in higher education and the community. These courses discuss the incorporation of diverse Hispanic and Indigenous ancestral methods of healing based on experiential learning through a series of traditional medicine classes offered at the University of New Mexico. This pedagogy is a unique approach to the reclaiming of ancestral perspectives into the university curriculum that have an enduring impact in the students enrolled in these courses. This article provides a definition of *curanderismo* and mentions three major historical figures that have impacted traditional medicine in Mexico and the United States. The article also discusses the impact that these classes have on the diverse students at a Hispanic-Serving, Level I Research American university. Finally, we discuss the development of these courses in the university system and how a program has been created that also allows community members and staff in diverse health professions to enroll in the summer face-to-face institute through the Center for Continuing Education.

Keywords: Curanderismo, Traditional Medicine, Higher Education, Latinx.

Citation: Torres, E. & Angel-Guevara, M. D. (2023). Teaching Latinx Traditional Medicine *Curanderismo* in Higher Education. In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023-- International Conference on Social and Education Sciences* (pp. 414-424), Las Vegas, NV, USA. ISTES Organization.

Introduction

It is a pleasure for us, Dr. Eliseo Cheo Torres and Dr. Mario Del Angel-Guevara, professors in the academic department of Chicana/o Studies at the University of New Mexico to discuss a series of unique courses on “*Curanderismo*, Traditional Medicine of Mexico”, the U.S. Southwest and other countries. In this article, we will address our personal experience with traditional medicine that has been institutionalized in the university curriculum, the history of the teaching of *Curanderismo* at the University of New Mexico, publications for the *curanderismo* classes, free coursera courses on this topic, the translation and dubbing of these courses to Spanish, and the future of *curanderismo* in higher education.

Personal Experience with Traditional Medicine

Both of us, authors of this article, grew up with a knowledge and experience of traditional medicine, *curanderismo*, in South Texas and Northern Mexico. I, Eliseo Torres, grew up in rural South Texas and my mother, Olivia, treated all 8 members of the Torres' family with herbal medications and healing rituals since our home was about 40 miles from the nearest health clinic. "Cheo" was my nickname given at birth by my mother. At the age of 8 she said "You are ready to learn the usage of medicinal plants" and I was taught how to prepare the many medicinal plants in my mother's garden such as chamomile *manzanilla*, rue *ruda*, basil *albahacar*, peppermint *yerbabuena*, and rosemary *romero*. Most of the time, these plants were boiled and given to the family for different ailments. At times, the plants such as *ruda*, rue, as well as cannabis, were placed in alcohol and used for my father's arthritic pains. In addition to the plants, my mother explained the many rituals that she used for various ailments such as the evil eye, *mal de ojo*; magical fright, *susto*; and constipation, *empacho*. Later on, I met Cresencio Alvarado, known as *Chenchito*, who was one of the well-known *Fidencista* healers (a movement of followers of the late healer *Niño Fidencio*) from northern Mexico. *Chenchito* was my teacher and mentor for over 30 years before his death at the age of 90 in 2018. These experiences allowed me to continue the teachings, research and writings of traditional medicine of Mexico and the Southwest.

I, Dr. Mario Del Angel-Guevara, Assistant Professor in the department of Chicana/o studies came to the United States in 2013 to study at the University of New Mexico in Albuquerque. Before coming to the United States, I was a resident in the city of Monterrey, in the state of Nuevo León, Mexico. Traditional medicine was part of our life on a daily basis. Since I was a child, my mother would take me to the local market *Mercado Juárez*, in downtown Monterrey, where hundreds of medicinal plants, votive candles, amulets, oils, and magical potions could be purchased. This experience was part of our daily life in Mexico. Even though my mom is a university graduate specializing in psychology, her strong belief system was engrained in the usage of rituals and plants for healing. After performing a ritual with an egg for the evil eye, *mal de ojo*, my mother would break it in a glass of water, and I would question why this was done. Being a psychologist, she would tell me that the egg was one of the largest living cells absorbing the negative vibrations of the body and that the form of the egg and the water was a way to discover what was causing the illness. My grandmother, also, strongly believed in the traditional medicine system and would explain to us why it was important to keep it in our culture. Not far from Monterrey, is the town of Espinazo, state of Nuevo León, where the famous *curandero* traditional healer Niño Fidencio lived and practiced his healings in the early 1900's. He was considered by many "the healer of healers". Living in Monterrey, I would hear about the festivals in honor of the famous healer from the small community of Espinazo, about 40 miles from my hometown, to celebrate his birth and his death, and about the people and believers that would attend these festivals. Even though El Niño Fidencio died in 1938, like the *Fidencista* followers, I was part of the Mexican norm of using two types of medicine in Mexican culture healing through traditional methods in addition to seeking the advice of allopathic doctors and physicians. These experiences motivated me to work and research with Professor Torres in developing academic courses in traditional medicine, *curanderismo*, taught completely in Spanish at the University of New Mexico. This may be

the first course on traditional medicine in the United States completely taught in the Spanish language at a university.

Definition of Curanderismo Traditional Medicine

Curanderismo is a holistic approach to healing the mind, body and spirit that includes various treatments, rituals and elements of nature such as plants, resins, smoke, earth, fire to treat the patient (Torres, 2019). *Curanderismo* derives from the Spanish word *curar* which means “to heal”. Treating the spirit can be used in a religious context, however, it is also used to refer to the person’s energetic field, and/or vibrations within and around the body which are believed to be disrupted or affected (Torres & Del Angel-Guevara, 2023). A person can become a *curandero/a* by being an apprentice of someone else who practices this medicine. It is also believed that a person can possess a gift, *un don*, to heal. There are also schools in other countries that specialize in the teaching of traditional medicine. In Mexico, various schools provide certifications on Mexican traditional healing oftentimes with the state and/or the federal government’s recognition. Some of these schools are CEDEHC, *Centro de Desarrollo Humano hacia la Comunidad*, an institute of human development in Cuernavaca, Morelos, Mexico; Institute Tzapin and Chapingo University in Texcoco, Estado de Mexico, Mexico; and Intercultural University (a tribal university) in San Felipe del Progreso, Estado de Mexico, Mexico.

Some of the courses offered at the University of New Mexico focus on *curanderos/as*, traditional healers, who have had an impact in two countries, Mexico and the United States. According to Torres & Sawyer (2014) the following are considered great *curanderos/as* in history who have impacted both countries and who are included in the courses offered.

Teresita Urrea is one of the early great *curanderas*, female healers, who became internationally known and whose life has been documented mainly as one of the earliest feminists, known advocate, for female and indigenous rights in Mexico (Torres & Del Angel-Guevara, 2022). She was born in Sonora, Mexico, practiced in Chihuahua and was exiled to the United States at an early age by Mexican President Porfirio Díaz who expelled her from Mexico for her political involvement with the Yaqui and Mayo natives of Sonora. Teresa lived in El Paso, Texas as well as Arizona, California, New Mexico and New York where she attracted a following of people seeking healing. Teresita’s fame ended at the early age of 33 in 1906 when she died and was buried in Clifton, Arizona.

Don Pedrito Jaramillo came from the state of Jalisco, Mexico to the United States at an older age and settled in Los Olmos Ranch outside of the town of Falfurrias, Texas. He had thousands of followers and his methods of healing included prescribing the use of simple elements such as water and plants which were free and available to most people during a time of a great drought and poverty. Don Pedrito died in 1907 and he is buried at his shrine in Los Olmos Ranch next to the town of Falfurrias with the first bilingual historical marker in the state of Texas that reads “The Benefactor of Humanity”.

The last of the three great healers, José de Jesús Fidencio Constantino Sintora, known as El Niño Fidencio, is considered the “healer of healers” in Mexico. He became famous after healing the President of Mexico, Plutarco Elías Calles in 1928. Currently, there are two celebrations to honor his birth and death in the small town of Espinazo, Nuevo León, Mexico. He currently has thousands of followers called *Fidencistas* throughout northern Mexico and the United States. There are religious temples in many Mexican and U.S. communities to honor the famous healer. Although El Niño Fidencio never visited the United States, his movement and followers are found in many major cities throughout the United States with a large Latinx population. El Niño died in 1938 and was buried in Espinazo, Nuevo León, Mexico.

History of Teaching Curanderismo Traditional Medicine

For more than 20 years, I, Eliseo “Cheo” Torres, Professor in Chicana/o Studies at the University of New Mexico have taught a series of courses on traditional medicine of Mexico and the U.S. Southwest. After retiring from the university, I continue co-teaching this course with my colleague Dr. Mario Del Angel-Guevara. These courses started with about 30 students during the summer of 2000 as a two-week intensive class. Online credit courses for university students were offered in the Fall and Spring semesters a few years later. In the summer of 2019, the summer face-to-face course grew to almost 200 students coming from throughout the United States. In the summer of 2020, because of the COVID-19 pandemic, Dr. Del Angel-Guevara and I decided to offer a summer online course. After the pandemic, we have returned to the 2-week summer face-to-face course in June and continue offering to the community a 3-week online continuing education course in July. The contents of the online courses include a number of videos recorded in the university media studios during previous summer classes of well-known traditional healers from Mexico, Peru, Cuba, Puerto Rico, Africa, and the United States. Other videos emphasized modules of famous healers from Mexico who had impact in both countries Mexico and the United States, such as; Teresita Urrea, Don Pedrito Jaramillo, and El Niño Fidencio, who lived and practiced in the late 1800’s and early 1900’s.

The high demand for the courses taught in English allowed us to create and offer a Spanish course under the Department of Spanish and Portuguese. The Spanish course was well-received by students who speak and/or are learning the Spanish language and are interested in reclaiming their roots and learning about Hispanic traditions and culture. Therefore, in 2019, I, Dr. Mario Del Angel-Guevara, began developing a Spanish curriculum for *Curanderismo* traditional medicine and expanding the existing English courses.

For over 20 years, the summer course, “Traditional Medicine without Borders: *Curanderismo* in the Southwest and Mexico”, has grown in popularity throughout the United States and other countries (see figure 1) such as Mexico, Peru, Ecuador, Guatemala, El Salvador, and Brazil; and efforts to offer a certificate program and academic minor have started. The Fall and Spring semesters offer degree-seeking students at the university two additional online courses that enroll over a hundred students and are cross-listed with a number of academic departments including: Chicana/o Studies, Language, Literacy and Sociocultural Studies, Anthropology, History, Latin American Studies, Native American Studies, Religious Studies, Women and Gender and

Sexuality Studies and Africana Studies. The Fall semester courses is, “*Curanderismo I: The Art of Mexican Folk Healing*” and the Spring semester course is “*Curanderismo II: Global Perspectives of Traditional Healing*”.



Figure 1. Dr. Torres with students of *Curanderismo* at UNM (Courtesy of Curanderismo Program)

Publications for the Curanderismo Courses

In the early 1980's, I, Professor Torres, sent a manuscript to a number of publishing companies in the United States for a book on herbal remedies. I was denied the publication of this short book, and I decided to self-publish and created Nieves Press. The first book was “Green Medicine: Traditional Mexican-American Herbal Remedies” and was a complete success. This publication discussed the preparation of medicinal plants, highlighted cautions, and provided a glossary of more than a hundred popular plants used in traditional medicine. A second self-published book was “The Folk Healer: The Mexican-American Tradition of *Curanderismo*”. This book included a history of *curanderismo*, ailments, rituals, folk beliefs, and a biography of healers including Don Pedrito Jaramillo, Niño Fidencio, and Teresita. In 1996, I was employed at the University of New Mexico, where both of these publications were combined and updated into a new book called “Healing with Herbs and Rituals: A Mexican Tradition” published by the University of New Mexico Press. Soon after this publication, a second book was written on my personal experiences with traditional medicine called “*Curandero: A life in Mexican Folk Healing*” also published by the University of New Mexico press. Many students whose parents only spoke Spanish requested that I considered publishing a book written in their native language. Again, no publisher was interested in publishing the book in Spanish, therefore, the translation and publication of this book was done in Mexico and called “*Curandero: Una vida en la medicina tradicional mexicana*”.

In 2015, I was encouraged to offer the traditional medicine courses online. I was fortunate to record a number of videos in the university's production studios of the many *curanderos/as* that present topics of traditional healing

during the summer class. Therefore, in addition to the face-to-face summer classes, the videos of *curandero/as* and their healings were used for the two online courses, one in the Fall and the second one in the Spring semester. The online courses allowed me to publish two additional books by Kendall Hunt Publishing Company called “*Curanderismo: The Art of Traditional Medicine without Borders*” and “*Curandero: Traditional Healers of Mexico and the Southwest*”. Dr. Mario Del Angel-Guevara who is faculty and a certified translator and interpreter, expressed interest in offering the courses in Spanish. These two books were translated by him and published for his courses. As interest and demand from students for these courses and materials to be available in Spanish grew, I, Dr. Mario Del Angel-Guevara, collaborated with Professor Torres in the translation of both books in order to develop two new courses to be taught in Spanish for a growing Spanish-speaking student population and Spanish language learners. Many of the students who were interested in taking these courses in Spanish were seeking to reclaim their cultural roots, practices, and rituals from their ancestors (see figure 2). Other students sought to gain an appreciation of Hispanic culture through the knowledge of their traditional medicine heritage. For this reason, two new courses in Spanish were developed which are currently offered online to students at the University of New Mexico. The Spanish publications are now shared with the extended families of Hispanic students. Class evaluations indicate that the students are pleased with all of the publications and that they feel a pride and awareness of their traditional medicine *curanderismo* culture.

Community courses on Traditional Medicine

The summer two-week intensive credit course is also offered for a modest fee through the University of New Mexico’s Center for Continuing Education. This center offers continuing education units, if requested, for community members from New Mexico as well as other states and other countries. The Center for Continuing Education registers the students, and the course curriculum is the same as for those enrolling for credit hours with the exception of not requiring exams or term papers for the community members. In the past, students from throughout the United States and other countries have expressed a desire to attend the classes offered in Albuquerque but do not have the means for transportation to New Mexico and 2-week lodging. Therefore, community members now have the option of enrolling in a fully live online summer course in the month of July. Information can be found at curanderismo.unm.edu. The university also contracted through the international Coursera platform to offer a number of free, if audited, short traditional medicine courses under an agreement with the University of New Mexico. These courses emphasize traditional healing of the body; traditional healing using plants; traditional healing of the mind, energy and spirit; global and cultural influences of traditional medicine; and a Spanish course focusing on global influences, (Curanderismo courses, n.d.) Plans are to add additional Coursera online Spanish courses.

Traditional healing of the body includes educational modules that emphasize a number of traditional methods impacting illnesses of the body such as intestinal blockage, *empacho*, which involves a stomach massage and a pulling of the skin in the back of the body in order to dislodge what is blocking the intestines and causing the constipation. There is a *manteadas* module, which is manipulation of the body using a cotton cloth such as shawl, *rebozo*, or any cotton fabric that manipulates the body to alleviate certain symptoms. This is effective

with special populations such as the elderly whose bones are brittle and skin is sensitive or pregnant women who may have a bridge baby that needs to turn in a proper position before birth. Another module is on the traditional bonesetter, *huesero*, a profession that was popular in earlier years, but is now almost extinct. Some say that the *huesero* was the first folk chiropractor before this profession was recognized. The *huesero* is still found in certain regions of Mexico, Central, and South America in order to meet the needs of the Latinx populations especially in rural areas. There are other videos that discuss Mayan abdominal massage, body adjustments, spinal alignment, healing with water called Hydrotherapy, and treatments for infants and the aging community.



Figure 2. Dr. Del Angel-Guevara at the course closing ceremony as a way to reclaim cultural practices.
(Courtesy of Curanderismo Program)

The second Coursera class focuses on traditional healing using plants of the Southwest, and those for the digestive and nervous system. A popular module is one that demonstrates how to prepare alcohol-based tinctures and water-based microdoses using fresh or dry herbs for healing purposes. Additional themes in this class include the preparing of juice and clay therapy. This class ends with the usage of herbal oils and herbal smoke (*moxa*) to address certain ailments.

The third Coursera course addresses spirituality as a means to meet the patient's energetic psychological needs. The students are able to view a number of energetic and spiritual cleansings, *limpias*. A traditional healer from Oaxaca, Mexico, Laurencio López Núñez, demonstrates this kind of cleansing using an egg to absorb negative vibrations; aromatic plants to sweep away unwanted vibrations; and copal incense to allow the smoke to carry the negative spirits to the heavens. A second curandero from Cuernavaca, Mexico, uses the sound of a conch shell called *atecocolli*, in the native nahuatl language. These sound vibrations are part of the cleansing ritual. A comprehensive class addresses the traditional Mexican sweat lodge, *temazcal*, and how the ceremonies inside this sweat lodge are effective in addressing the individuals' spiritual and psychological needs. The *temazcal* has been revived not only in Mexico but throughout the Southwest as a way to rid the body toxins and address

psychological problems, and substance abuse such as alcoholism.

The fourth class addresses global and cultural richness and begins with the influences of *curanderismo* in the African and Afro-Latinx cultures. Two modules describe traditional medicine in the countries of Uganda and Gabon, Africa, and how they have used their healing methods for centuries. Two additional topics are Afro-Latinx medicine from Cuba and Puerto Rico and address how the healers from these countries use elements from their islands to perform their cleansings. A healer from the Amazon jungle of Peru, Mino Asheninka, uses sacred tobacco as a means to perform his own type of cleansing and healing. The Native-American influence in this class is the use of feathers to sweep away negative vibrations used by Native-Americans in the Southwest.

Finally, the Spanish course incorporates different elements and topics from the previous four English courses and enhances the new theme such as the Fidencista healing movement and creates a new module on traditional Guatemalan treatments for women.

Courses in the Spanish Language

In 2019, the Spanish and Portuguese academic department was approached by Professor Torres in order to offer the previously mentioned educational modules totally in Spanish. After meeting with the chair of the department, Dr. Mario Del Angel-Guevara, in the same department, was contacted as faculty liaison and translator for all the modules in order to adapt these classes in Spanish. Currently, Dr. Del Angel-Guevara teaches three courses in the Fall, Spring and Summer semesters totally to Spanish with excellent results as measured by student class evaluations.

For more than 20 years, the course on Traditional Medicine of Mexico and the Southwest was taught to thousands of students at the University of New Mexico in the English language. Students from different disciplines distributed across different academic departments and colleges enrolled in the class for credit and additional community members registered through the Center of Continuing Education during the summer session. These courses allowed community members to learn and experience several exceptional presentations and demonstrations that *curanderos/as* perform. Since most of the *curanderos/as* who present in class only speak Spanish, there was a need to utilize professional interpreters to be able to have a communication between the students and many of the healers that presented from Cuba, Guatemala, Peru and Mexico during the summer face-to-face course. Therefore, the summer courses now provide Spanish-English interpretation for credit-seeking students and community members enrolled in continuing education.

Initially, the traditional medicine courses were only available in the English language; thus, preventing students majoring in Spanish from practicing and improving their Spanish language skills and learning about the healing practices of their ancestors. For native Spanish-speakers and many Hispanic/Latinx students with limited Spanish proficiency, the course in English did not allow for a connection between the language of instruction and the manner in which they learned many of these practices and acquired this knowledge in their family

setting. In many instances, Spanish-speaking students would know the Spanish common names and were already acquainted with many treatments, maladies, plants, and remedies, but would be completely unfamiliar to the English terms used in the course. This may have caused some Spanish-speaking students to believe they did not know a lot of the content of the class, when, in fact, they had been exposed to much of this knowledge within their communities and families. Keeping in mind the need of students to practice the Spanish language while enrolling in this cultural course, and the connection that Hispanic/Latinx students can create when they are exposed to their cultural ancestry in a school setting, is the reason we decided to make the *curanderismo* course available completely in the Spanish language in addition to English. This task required intensive translations of texts and dubbing of the presentations from English to Spanish. This intensive work involved translating the required textbook materials, modules, course objectives, assignments, discussion boards as well as dubbing the video demonstrations, interviews, documentaries, presentations, and lectures in the course. A unique module regarding the history and life of “*Los Tres Grandes*” the three major healers in Mexico (Teresita, Don Pedrito, and Niño Fidencio) was also created. A new online course was also adapted, translated, and dubbed to Spanish and made available to students during the Spring, 2020.

The Future of the Teaching of Curanderismo

The Hispanic/Latinx makeup was estimated to be 18.5 percent of the total population in the United States by the Census Bureau in 2019 (U.S. Census Bureau QuickFacts: United States, n.d.) and showed a steady growth of migration of Hispanics from many Latin American countries. Therefore, courses like the one that we offer are in high demand by Hispanics/Latinx individuals. It is difficult to find a *curandero/a* traditional healer in many U.S. communities that are inhabited by a large Latinx population. The courses that we offer prepares many of the Latinx students to reclaim their culture, if they have lost it and empowers them to do their own healings using medicinal plants and rituals.

Introducing courses in traditional medicine empowers uninsured immigrants to treat themselves and their families of minor illnesses and to be able to seek medical attention in urgent care or emergencies rooms for major illnesses. Many second, third, and fourth, generation Latinx students remember their grandmothers, aunts, and other relatives using medicinal plants and performing rituals for certain needs; however, they have not continued some of these cultural practices and are eager to reclaim this part of their culture. Many of the class evaluations in our traditional medicine courses indicate that the students are appreciative of what they learned and are willing to even travel to Albuquerque, New Mexico and to Mexico to continue expanding their knowledge about traditional medicine. In comparing *curanderos/as* from Mexico who perform their healing role as full-time healers, to those in the United States, it becomes difficult to locate *curanderos/as* in American communities who dedicate fully to this profession. This could be due to *curanderismo* not being a recognized or certified profession in the United States or the fear of malpractice suits. Our prediction for the future is that many professions such as physicians, nurses, massage therapists, psychologists, and others, may incorporate some of the traditional medicine techniques into their practice. Also, the courses may empower the average Latinx to learn the rituals and to grow their own medicine plants and create their own medicine in order to meet

the minor health needs of their families.

Recently, there has been exchanges and collaborations between those in the U.S. wishing to pursue the practice of traditional medicine and healers practicing in Mexico and other Latin American countries. The future is to model Mexican traditional medicine practices with that of Ayurvedic medicine from India and Traditional Chinese medicine where patients have choices to use modern allopathic medicine, traditional *curanderismo* practices, or a combination of both.

Conclusion

Curanderismo, Mexican traditional medicine addresses a holistic approach to healing the mind, body, and the energy/spirit. There are similarities between Chinese and Mexican traditional medicine in modules such as acupuncture which was done by the Mayans and with the similar specific stimulation points of the body in both cultures that address chronic pain, especially in the low back, neck, knees, and other parts of the body. Similarities can also be found with Ayurvedic medicine from India which is one of the oldest holistic medicines emphasizing a balance between the mind, body, and spirit (Patwardhan, Warude, Pushpangadan, & Bhatt, 2005). This medicine promotes good health in order to prevent disease. The Mexican traditional medicine modules address similar concepts, preventive medicine with juicing (*Jugoterapia*), a number of seeds, nuts, fruits and vegetables to prevent illnesses. The belief of Ayurvedic medicine in correlating air, fire, water, and earth, is similar to the elements used to describe Mexican energetic/spiritual cleansings performed by *curanderos/as* from Mexico and others Latin American countries in a number of educational modules offered in the *curanderismo* courses.

The interest in the *curanderismo* courses has indicated the need to recognize the importance of the Hispano/Latinx culture and contributions to medicine in the U.S. and Latin American countries. One of the publications for the course is, “*Curandero: Traditional Healers of Mexico and the Southwest*”. This publication summarizes the contributions of *curanderos/as* of yesteryear, recent times, nowadays, and those of tomorrow. We hope that our experiences with traditional medicine and the development of *curanderismo* courses in English and Spanish will motivate Hispano/Latinx students and faculty to continue researching in this field.

References

- Curanderismo Courses*. (n.d.). Coursera. Retrieved September 1, 2023, from <https://www.coursera.org/search?query=curanderismo&>
- Patwardhan, B., Warude, D., Pushpangadan, P., & Bhatt, N. (2005). Ayurveda and Traditional Chinese Medicine: A Comparative Overview. *Evidence-Based Complementary and Alternative Medicine*, 2(4), 465–473.
- U.S. Census Bureau QuickFacts: United States. (n.d.). Retrieved September 1, 2023, from

<https://www.census.gov/quickfacts/fact/table/US/PST045222>

- Torres, E. (2019). *Curanderismo: The Art of Traditional Medicine without Borders* (2nd ed.). Kendall Hunt Publishing Company.
- Torres, E., & Del Angel-Guevara, M. (2022). The Contributions of Three Women to Curanderismo Traditional Medicine. *Chamisa: A Journal of Literary, Performance, and Visual Arts of the Greater Southwest*, 2(1), 124–132.
- Torres, E., & Del Angel-Guevara, M. (2023). Curanderismo: Latinx Spiritual/Energetic Rituals that Heal. In *Llewellyn's Complete Book of North American Folk Magic* (1st ed., pp. 267–273). Llewellyn Publications.
- Torres, E., & Sawyer, T. L. (2005). *Curandero: Una vida en la medicina tradicional mexicana*. University of New Mexico Press.
- Torres, E., & Sawyer, T. L. (2014). *Healing with Herbs and Rituals: A Mexican Tradition*. University of New Mexico Press.

Impact of the Lockdown during COVID-19 on the Opioid Crisis in the State of Louisiana

Ismatara Reena

University of Louisiana at Lafayette, United States,  <https://orcid.org/0000-0003-1054-8726>

Sushanta Sarkar

University of Louisiana at Lafayette, United States,  <https://orcid.org/0000-0002-7073-5382>

Shankari M. Dipti

University of Louisiana at Lafayette, United States,  <https://orcid.org/0009-0006-4002-6004>

Abstract: The opioid crisis began in the 1990s and escalated to epidemic level in the past decade. Opioid overdose deaths (OODs) have surged from 38,329 in 2010 to 70,360 in 2019. The impact of the opioid crisis exhibited variability throughout the nation, contingent upon socioeconomic factors. COVID-19 pandemic has increased the number of drug overdose deaths in the U.S. including opioid overdose deaths and emergency department visits. However, the extent to which the pandemic has impacted drug overdose deaths varied across the states is unclear. The aim of this study was to find the impact of the lockdown during the COVID-19 pandemic on the number of deaths from opioids and other drugs in the state of Louisiana. The study analyzed secondary data collected by the Louisiana Department of Health on all drugs, opioid or synthetic opioid-induced death. Descriptive statistics were calculated and interpreted the data. There were 2,356 deaths from opioids and synthetic opioids in 2019-2020; 1,861 (78.9%) were male, and 495 (21.1%) were female in Louisiana. In April 2020, there was a notable rise in mortality rates associated with opioids and synthetic opioids, as compared to April 2019. The worst effects were observed in the white male group. A better understanding of the contributing factors is needed to create interventions at the local and state levels to reduce the number of deaths from opioids and other drugs. Moreover, the findings of this study will help policymakers prepare for future disasters during public health crises like COVID-19.

Keywords: COVID-19, opioid, opioid crisis, synthetic opioid.

Citation: Reena, I., Sarkar, S., Dipti, S. (2023). Impact of the Lockdown during COVID-19 on the Opioid Crisis in the State of Louisiana. In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023--International Conference on Social and Education Sciences* (pp. 425-432), Las Vegas, NV, USA. ISTES Organization.

Introduction

The opioid crisis is a significant public health concern in the United States (Glober et al., 2020; Hoots et al., 2020). According to the Centers for Disease Control & Prevention (CDC) (2023), the drug overdose death was over six times higher in 2021 compared to 1999, there was a 16% increase from 2020 to 2021. In 2021, over 75% of drug overdose deaths in the United States involved opioid, with a notable increase in opioid-related deaths starting from 2016-2017 and beyond. Opioid-related overdose deaths have been an alarming aspect of the ongoing opioid crisis in the country (CDC, 2020; Wilson et al., 2020). These overdoses can involve various types of opioids, including:

- synthetic opioids (largely illicitly made fentanyl) and
- stimulants (such as cocaine and methamphetamine)

The overdose crisis has developed into a prominent epidemic during the past two decades, and COVID-19 pandemic played a role in its acceleration (DiGennaro et al., 2021). The pandemic exacerbated the opioid crisis in the United States and contributed to an increase in overdose fatalities (CDC 2020; Glober et al.).

Studies have shown that COVID-19 has caused a notable rise in drug overdose deaths and significant surge in emergency department visits, associated with opioid overdoses (Ataei et al., 2020; Farhoudian et al., 2020; Ghose et al., 2022; Rodda et al., 2020). Individuals who abuse opioids or have substance use disorders may be at higher risk of experiencing critical health outcomes after infection with the COVID-19 virus. At the same time, people with substance use history will take longer time to recover from COVID-19 virus infection (Gladden et al., 2019).

Social distancing measures which were necessary to control the virus, affect people with opioid use disorder in various ways (Ataei et al., 2020). Lockdown resulted in a significant economic burden at the community level and have triggered psychological challenges including increased substance abuse. Furthermore, as a marginalized group, individuals with opioid disorder are at a higher risk of contracting infections during the COVID-19 pandemic (Ghosh et al., 2022). Stigma associated with substance use often leads to social isolation and a reluctance to seek medical care. This reluctance could result in delays in COVID-19 testing, diagnosis, and treatment for individuals with opioid use disorder (Linan et al., 2021, Ghosh et al.).

The health status of the State of Louisiana is a matter of concern, as it consistently ranks at the bottom among all states in terms of health outcomes, according to the United Health Care Foundation's report (America's Health Rankings, 2020). This low ranking has persisted since 2009, highlighting the state's ongoing health challenges. One significant health issue in Louisiana is the higher rate of opioid prescriptions. According to the Centers for Disease Control and Prevention (CDC) in 2019, Louisiana had an opioid prescription rate of 79.4 for every 100 individuals, which is notably higher than the national average of 46.7 for every 100 individuals. This high

prescription rate has contributed to an increased risk of opioid overdose related (OOD) mortality in the state. Moreover, the mortality rate for drug-related cases is 41.2 (per 100,000 population) in the state of Louisiana (National Institute on Drug Abuse [NIDA], 2020; United Health Foundation. (2023)).

The state's pre-existing health challenges, including high rates of chronic diseases and substance abuse issues, have had a profound impact on its response to the COVID-19 pandemic. A state report on opioid epidemic in Louisiana stated that, Louisiana experienced a rapid surge in COVID-19 infections, leading to a strain on healthcare resources, high hospitalization rates, and an elevated mortality rate (Louisiana department of Health, n.d.a). The pre-existing health disparities and substance abuse issues in the state further exacerbated the pandemic's effects, resulting in disparities among different socioeconomic groups in Louisiana (Gladden et al., 2019; Louisiana department of Health, n.d.b).

The objective of the current study was to assess the impact of the lockdown during the COVID-19 pandemic on the number of deaths from opioids, synthetic opioids, and other drugs in the state of Louisiana. The lockdown period of the state of Louisiana was March 22nd through May 15th. It was hypothesized that COVID-19 pandemic potentially caused the increase in opioid crisis and other substance-related overdoses in comparison to the pre-pandemic period in LA.

Methodology

Data Source

This study used restricted secondary data which were obtained from the Louisiana Department of Health. To obtain the access of the restricted data, ethical approval was obtained from the Institutional Review Board (IRB) at the University of Louisiana at Lafayette. The dataset incorporated information from two consecutive years, specifically 2019 and 2020. Data were collected on a monthly basis, distinguishing between the pre-pandemic period in 2019 and the pandemic period in 2020. Information was categorized based on race, gender, age, and the types of drugs consumed and drugs related deaths during each month of these two years.

Participants

The study sample comprised a total of 3,009 participants, who were the resident of the state of the Louisiana. The age distribution was 0 to less than 65 years old.

Data Analysis

The analysis and interpretation of data were primarily conducted through descriptive statistics. For the analytical phase, we focused on three specific categories: "All drug deaths," "Deaths by opioids," and "Deaths by synthetic opioids." We selected the data from March 2019 as representative of the pre-pandemic period and the data from

May 2020 to represent the pandemic period.

Results

In the years 2019 and 2020, there were a total of 2,356 mortalities attributed to various forms of opioids in the state of Louisiana. Among these individuals, 1,861 were males, representing 78.9% of the total, while the remaining 495 were females, constituting 21.1% of the total deaths. White individuals has the higher number deaths in the context of all drugs, opioids, and synthetic opioids compare to Black individuals (Fig. 1-3). However, Lockdown has significantly increased the number of deaths for Black individual from 60 in 2019 (March -May) to 140 in the same time period in 2020 which 133% increase compared to 60% (210 in 2019 to 336 in 2020) increase for White individuals for all drugs deaths. Similarly, higher rates of increase found in both opioids and synthetic opioids related deaths.

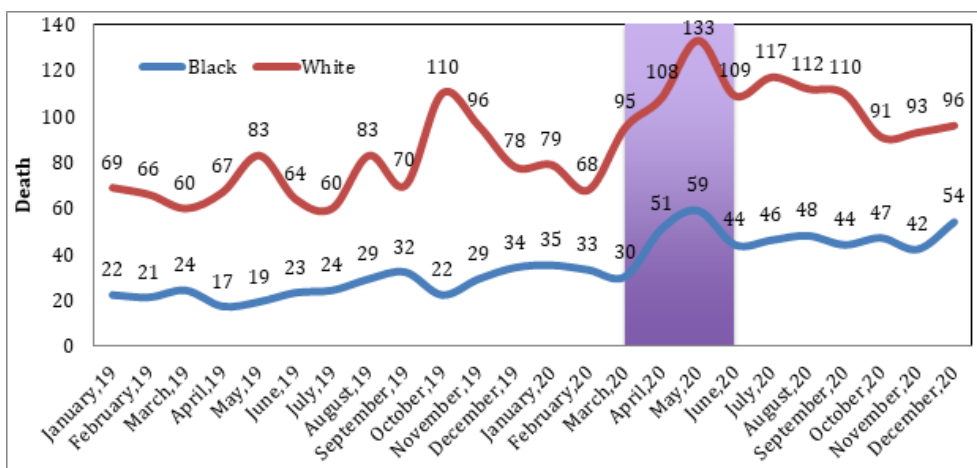


Figure 1. Number of deaths from all drugs in different racial per month in Louisiana (3rd category is “other”, is not shown in the graph).

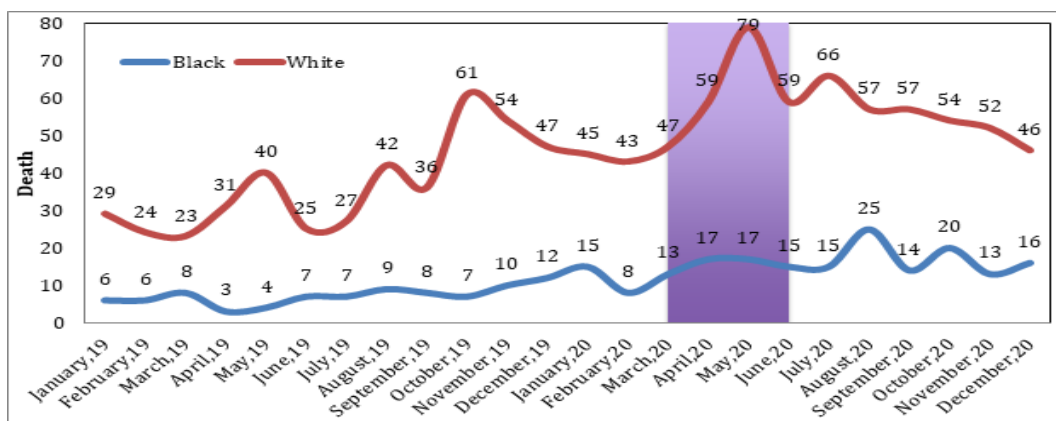


Figure 2. Number of deaths from opioid in different racial group per month in Louisiana (3rd category is “other”, is not shown in the graph)

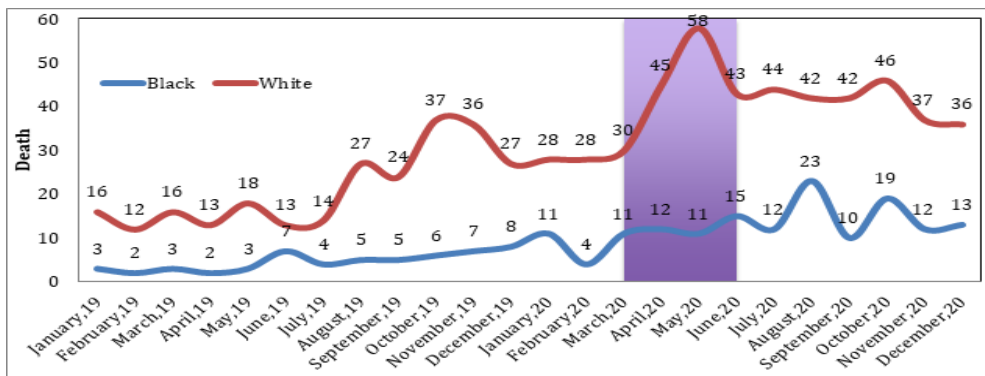


Figure 3. Number of deaths from Synthetic opioid in different racial group per month in Louisiana (3rd category is “other”, is not shown in the graph.)

An analysis of the data revealed a notable impact of the implementation of lockdown (March 22nd – May 15th) on the increase of deaths of all drugs, opioids, and synthetic opioids (Fig. 4, Fig. 5 & Fig. 6). Specifically, the number of male fatalities due to opioids and synthetic opioids experienced a huge surge, rising from 32 in April 2019 to 96 in April 2020, a 200% increase. Similarly, the number of female fatalities increased from 19 in April 2019 to 37 in April 2020, nearly 100% increase, in the context of opioids and synthetic opioids.

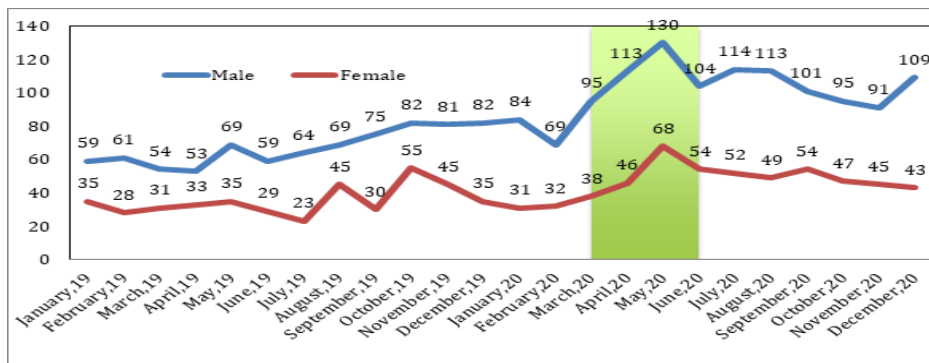


Figure 4. Number of deaths from all drugs in male and female from opioid overdose per month in Louisiana.

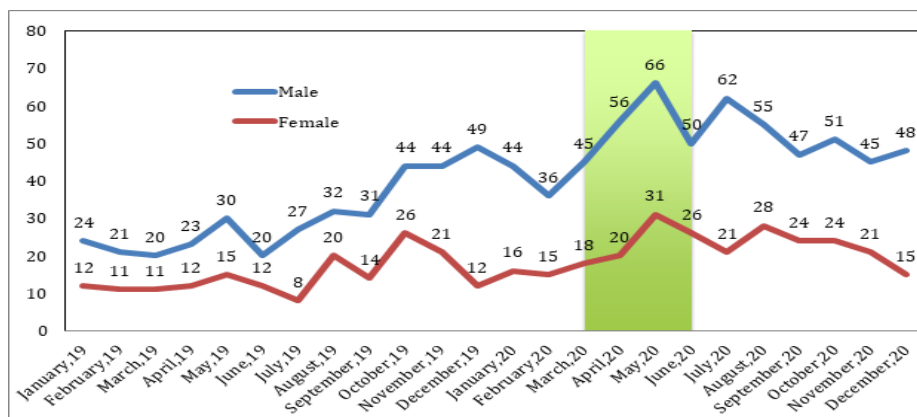


Figure 5. Number of deaths from opioid in male and female from opioid overdose per month in Louisiana.

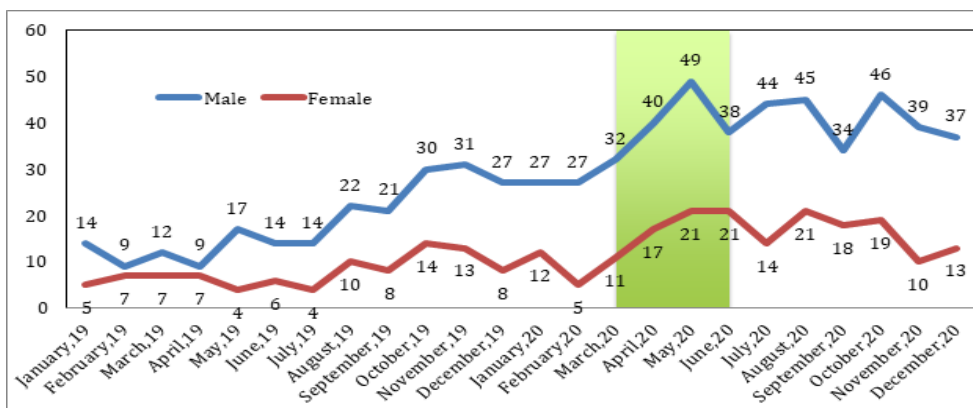


Figure 6. Number of deaths from Synthetic opioid in male and female from opioid overdose per month in Louisiana

Discussion

The effects of the COVID-19 pandemic on drug-related mortality of Louisiana have been both extensive and multifaceted, transcending demographic and socioeconomic boundaries. Research has revealed a notable surge in daily opioid-related fatalities subsequent to the initiation of the pandemic (Glober et al., 2020; Rodda et al., 2020). Additionally, there has been an observed increase in substance use as a means of coping with the manifold impacts of COVID-19 (Czeisler et al., 2020, DiGennaro et al., 2021).

In the course of our analysis, we noted a notably higher number of mortalities among the white male population. This finding diverged from previous study findings, which had suggested a higher incidence of deaths among the black male population (Ghosh et al.,2022). The observed disparity prompts the necessity for a more comprehensive and in-depth investigation. It is crucial to investigate the underlying factors and their implications within the broader opioid crisis context (Gladden et al., 2019).

Given the absence of comprehensive analysis of overdoses death throughout the state, we initiated an inquiry to assess the potential influence of lockdown measures on overdose deaths at the state level. The outcomes of this investigation revealed that the implementation of lockdown measures was associated with a surge in drug-related fatalities in Louisiana during the COVID-19 pandemic. However, it is important to note that this study did not establish a correlation between the COVID-19 case fatality rate and the increased OOD death rates. Consequently, there remains a need for further research to explore the potential connection between COVID-19 and drug-induced fatalities.

The opioid crisis is a multifaceted challenge that necessitates a comprehensive and multi-disciplinary approach. This approach should engage various sectors including healthcare, public health, law enforcement, and community initiatives to effectively address and mitigate the escalating rates of fatal overdoses and the broader repercussions of this crisis. To facilitate targeted interventions at the local, regional, and national levels, it is

imperative to gain a more comprehensive understanding of the underlying contributing factors.

Nevertheless, it's essential to understand that this study serves as a starting point for more in-depth research. There's an urgent requirement to dig deeper into the complex relationship between the COVID-19 pandemic and the ongoing opioid crisis. This will help us better grasp the combined impact of these factors in a more detailed and comprehensive manner.

Conclusion

In conclusion, rapid raising of deaths from drug overdose mor specifically opioid and synthetic opioid is alarming in the United States. Creating educational materials and policies to overcome this crisis is eminent. Findings of this study will inform policymakers who are responsible managing disaster similar to COVID-19 responses to make better decision Additionally, a multidimensional approach is needed to decrease opioid and stimulant overdose death rates during the public health crisis caused by COVID-19. Addressing disparities in drug overdose crisis during disastrous condition, more specifically the socially disadvantage groups is needed for equity. Post-pandemic data on opioid overdose deaths and mortality can provide a more precise understanding of the situation. Limitation of the study is using secondary data, small sample from one state with limited demographic information. Using data from different states with high health indicators may provide better overview of this public health crisis.

References

- Ataei, M., Shirazi, F. M., Lamarine, R. J., Nakhaee, S., & Mehrpour, O. (2020). A double-edged sword of using opioids and COVID-19: a toxicological view. *Substance Abuse Treatment, Prevention, and Policy, 15*(1), 1-4. doi:10.1186/s13011-020-00333-y
- Centers for Disease Control & Prevention (2020). *Opioid overdose: Understanding the epidemic*. <https://www.cdc.gov/drugoverdose/epidemic/index.html>. Accessed 1 June 2020.
- DiGennaro, C., Garcia, G. G. P., Stringfellow, E. J., Wakeman, S., & Jalali, M. S. (2021). Changes in characteristics of drug overdose death trends during the COVID-19 pandemic. *International Journal of Drug Policy, 98*, 103392. <https://doi.org/10.1016/j.drugpo.2021.103392>
- Farhoudian, A., Baldacchino, A., Clark, N., Gerra, G., Ekhtiari, H., Dom, G., Mokri, A., Sadeghi, M., Nematollahi, P., Demasi, M., Schutz, C. G., Hash-emian, S. M., Tabarsi, P., Galea-Singer, S., Carra, G., Clausen, T., Kouimtsidis, C., Tolomeo, S., Radfar, S. R., & Razaghi, E. M. (2020). COVID-19 and substance use disorders: Recommendations to a comprehensive healthcare response. an international society of addiction medicine practice and policy interest group position paper. *Basic and Clinical Neuroscience, 11*(2), 133. doi:10.32598/bcn.11.covid19.1
- Ghose, R., Forati, A. M., & Mantsch, J. R. (2022). Impact of the COVID-19 pandemic on opioid overdose deaths: A spatiotemporal analysis. *Journal of Urban Health, 99*(2), 316-327.

- Gladden, R. M., O'Donnell, J. Mattson, C. L., & Seth, P. (2019). Changes in opioid-involved overdose deaths by opioid type and presence of benzodiazepines, cocaine, and methamphetamine—25 states, July–December 2017 to January–June 2018. *Morbidity Mortality Weekly Report*, 68(34);737–744 <https://doi.org/10.15585/mmwr.mm6834a2>
- Glober, N., Mohler, G., Huynh, P., Arkins, T., O'Donnell, D., Carter, J., & Ray, B. (2020). Impact of COVID-19 pandemic on drug overdoses in Indianapolis. *Journal of Urban Health*, 97, 802-807. <https://doi.org/10.1007/s11524-020-00484-0>
- Hoots, B., Vivolo-Kantor, A., & Seth, P. (2020). The rise in non-fatal and fatal overdoses involving stimulants with and without opioids in the United States. *Addiction*, 115(5), 946- 958. <https://doi.org/10.1111/add.14878>.
- National Institute on Drug Abuse (NIDA). (2020). Massachusetts: Opioid-involved deaths and related harms. *Drug Overdose Death Rates*. Retrieved from <https://nida.nih.gov/research-topics/trends-statistics/overdose-death-rates>.
- Linas, B. P., Savinkina, A., Barbosa, C., Mueller, P. P., Cerdá, M., Keyes, K., & Chhatwal, J. (2021). A clash of epidemics: Impact of the COVID-19 pandemic response on opioid overdose. *Journal of Substance Abuse Treatment*, 120, 108158. <https://doi.org/10.1016/j.jsat.2020.108158>
- Louisiana Department of Health. (n. d.a) *Opioid Abuse, Prevention, Treatment and Policy*. Retrieved from https://ldh.la.gov/assets/opioid/OpioidAbsePrvntn_2017.pdf.
- Louisiana Department of Health. (n. d.b). *The opioid epidemic: evidence-based strategies legislative report April 2017*. Retrieved from <https://ldh.la.gov/assets/docs/BehavioralHealth/Opioids/LCPOAFinalReportPkg20170331.pdf>.
- Rodda, L. N., West, K. L., & LeSaint, K. T. (2020). Opioid Overdose–Related Emergency Department Visits and Accidental Deaths during the COVID-19 Pandemic. *Journal of Urban Health*, 97(6), 808-813. <https://doi.org/10.1007/s11524-020-00486-y>
- United Health Foundation. (2023). *Drug deaths in Louisiana*. Retrieved from https://www.americashealthrankings.org/explore/measures/drug_deaths_1yr/LA.
- Wilson, N., Kariisa, M., Seth, P., Smith IV, H., & Davis, N. L. (2020). Drug and opioid-involved overdose deaths—United States, 2017–2018. *Morbidity and Mortality Weekly Report*, 69(11), 290. <https://doi.org/10.15585/mmwr.mm6911a4>

The Effect of Education on Women Entrepreneurs' Success: Evidence from Vietnam's Economy

Orhan Kara

West Chester University, U.S.A.,  <https://orcid.org/0009-0007-1783-7359>

Mustafa Celikten

Erciyes University, Turkey,  <https://orcid.org/0000-0001-7966-3912>

Abstract: The purpose of this paper is to investigate the effect of education on women entrepreneurs' success factors in Vietnam. We used the survey instrument developed by H.M. Chu, which has been adopted in several small business studies. To determine the role and importance of education on the success of entrepreneurs, an ordered logit model is applied to the data gathered from women entrepreneurs participated in the study. Our ordered logit model revealed that number of years in this business, support of family and friends, marketing factors such as sale promotion, good customer service, location, ability to manage personnel, and reputation for honesty were the statistically significant success factors. Good customer service has the largest impact on the success of Vietnamese women entrepreneurs, which is followed by reputation for honesty, ability to manage personnel, the level of family support, and the number of years in current business. Finally, hard work, community involvement, maintenance of accurate records of sales and expenses, and access to capital were other factors that high impact on entrepreneurs' business success. The estimated coefficient for education is 0.03524, which gives 1.0359 odds ratio, this indicates that completing a higher level of education increases success level by 1.0359 times, implying a positive effect of education for Vietnamese women entrepreneurs.

Keywords: Education, Entrepreneurship success, Women entrepreneurs, Economic growth, Vietnam

Citation: Kara, O. & Celikten, M. (2023). The Effect of Education on Women Entrepreneurs' Success: Evidence from Vietnam's Economy. In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023-- International Conference on Social and Education Sciences* (pp. 433-447), Las Vegas, NV, USA. ISTES Organization.

Introduction

Small businesses entrepreneurs make up ninety percent of business and fifty percent of employment of the worldwide population (Kuratho and Audretsch, 2022). Furthermore, women accounts for forty percent of global labor force although they represent a minority of all entrepreneurs (Jakhar and Krishna, 2020; Foss, Henry, Ahl, and Mikalsen 2019). A consistent finding in the literature is that share of female owned business is much lower than men in general and the gap is wider in developing countries (Mersha and Sriram 2018). In

Asia, on average, thirty five percent of small and medium businesses are managed by women (Darmanto, Alagapper, and Xavier, 2021). Small businesses have just started recovering from the Covid-19 pandemic, facing more challenges, such as increasing cost of financing and access to equity markets around world, have entered to a new normal with inflationary problems which resulted in a financial tightening stemming from higher interest rates.

An increasing body of research directed towards Asian economies, one of which is Vietnam that has been transitioning from a centrally planned economy to a market-oriented economy. Following the adaptation of the “Doi Moi” reform in 1986, Vietnam faced some challenges, such as restructuring the state-owned enterprises while trying to revitalize its private sector. The booming of private enterprises offered new and alternative job opportunities to women and empowered them to contribute to its high economic growth.

For instance, Vietnam passed “The Gender Equity Law” in 2006, which emphasized women’s equal rights in establishing and operating businesses and accessing capital and market information. Vietnam also developed a “National Strategy on Gender Equality” in 2010 to enhance women’s equality in political, economic, and social status with men. Although much progress has been achieved, women entrepreneurs seem to have limited economic opportunities to compete with male entrepreneurs.

Women’s entrepreneurial activities provide them with income in addition to increasing opportunities in creating jobs for other women to increase gender equality. However, Vietnam has yet to achieve a high female entrepreneurship and gender equality, which could be because of social and cultural values and traditions, policies, and legal environment. Several studies appeared investigating entrepreneurship in general; however, little research has been conducted on women entrepreneurs. Brush and Cooper (2012) stated that research about women entrepreneurs accounts for less than ten percent of all research in entrepreneurship area.

Furthermore, Dalic (2019) found out that only 0.51 percent research papers was on women entrepreneurship in the field of entrepreneurship after analyzing five year period of published manuscripts. Given the importance of entrepreneurship, especially on female entrepreneurs, an analysis of different entrepreneurial dimensions of women entrepreneurship may assist policy makers to formulate programs that enhance women’s entrepreneurship awareness and success and design more effective strategies. Furthermore, it also provides implications for policymakers to attract international investors to conduct businesses in Vietnam.

Therefore, this paper investigates the determinants of women entrepreneurs’ success with an emphasis on education in Vietnam to find the strength and importance of success factors while contributing further to the literature on women entrepreneurship. The results would provide insights into strategies that encourage and promote women entrepreneurial success. To that end, the next section reviews the literature, which is followed by methodology and data analysis. The final section concludes the study.

Literature Review

Although an interest on entrepreneurship started in in the 1980's, the existing literature mainly studied male-owned enterprises despite the increasing number of female entrepreneurs and their contribution to the economic growth (Greene et al., 2003). Three main research areas on women entrepreneurship focused on the motivations of female ownership of businesses, the challenges faced by female entrepreneurs, and the factors that contribute to the success of women owned enterprises.

What motivates individuals to be entrepreneurs has been the primary research area of interest as Kuratko et al. (1997) asserted that a crucial factor is the motivation that entrepreneurs start and sustain their venture, which led researchers to identify the motivations behind entrepreneurship (Chevalier, Aubouin-Bonnaventure, Coilet, and Fauquereau, 2022; Sethupathy and Moakumla, 2020). Earlier studies on women and entrepreneurship identified that women are motivated to establish their own business in order to gain independence, achieve self-fulfillment, and escape the “glass ceiling” (Scott, 1986; Carter & Cannon, 1992; Buttner & Moore, 1997). Balancing work and family responsibilities is another important factor on female entrepreneurs to start their business (Bajaro, 1981; Hisrich et al. 1997). Furthermore, studies on developing economies indicated that family needs and financial concerns might be the two primary motivation factors in addition to social environment, culture, and government related factors in explaining motivational difference across countries (Ufuk & Ozgen, 2001; Woldie & Adersua, 2004; Tambunan, 2009; Chhabra, Gera, Hassan, and Hassan, 2020; Sharma and Sharma, 2020).

In terms of the challenges faced by female entrepreneurs, they face various unique challenges (Jakhar and Krishna, 2020). Among the critical problems encountered by female entrepreneurs include: lack of business training and experience (Pellegrino & Reece, 1982; Hisrich & Brush, 1984), limited access to capital (Buttner & Rosen, 1989; Coleman, 2000; Marlow and Patton, 2005; Bellucci et al. 2010; Sethupathy and Moakumla, 2020), insufficient support networks (Weiler & Bernasek, 2001; Aidis et al. 2007), religious and cultural constraints (Tambunan, 2009; Jaim, 2022), lack of social acceptance (Singh et al., 2010; Holmén, Min & Saarelainen, 2011; Xie and Wu, 2022), and conflict with family responsibilities (Brush, 1997; Winn 2005; Mersha and Sriram, 2018).

With respect to entrepreneurs' success factors, existing research shows that researchers disagree as to what contributes to entrepreneurial success while entrepreneurship studies have identified success factors related to the psychological and behavioral traits of entrepreneurs, the managerial skills and training of entrepreneurs, and the external economic and physical environment (Gok, et al. 2021; Dhaliwal, 2019). Also, personal traits, such as education and previous experience, are determined to have positive impacts on the success of women businesses (Carter & Cannon, 1992; Cuba, Decenzo & Anish, 1983; Van der Sluis et al., 2008). Moreover, Buttner (1993) claimed that endurance and hard work were key success elements for female entrepreneurs to compete with their male counterparts.

Several researchers recognized management skills have been as a critical factor for business success (Benzing, Chu, and Szabo 2005; Benzing, Chu, and Bove 2005; Benzing, Chu, and Callanan 2005; Busch 1989; Gosh, Kim, and Meng 1993; Huck and McEwen 1991; Yusuf 1995; Lerner, Brush & Hisrich 1997; Hisrich & Brush, 1986). Likewise, in their study on Jamaican small business owners' success factors, Huck and McEwen (1991) identified management, planning/budgeting, and marketing/selling as the most important competency areas by referring to several specific competencies: maintaining financial records, networking skills, and establishing future goals and objectives. Similarly, South Pacific islanders indicated good management skills, access to financing, personal qualities, and adequate government support as the most critical success factors (Yusuf 1995). Madzikanda, Li and Dabuo (2022) identifies government policies and funding as two most important factors on success of foreign entrepreneurs in China. In addition, Romanian entrepreneurs placed friendliness to customers, reputation for honesty, and good customer service as the top three success factors (Benzing and Chu 2005). After investigating Vietnamese entrepreneurs' access to markets, human capital, a support system, regulatory framework, education and training, and cultural support, assumed to affect their perception and success, Khuong and Van (2022) found further evidence of success of startups. Family support and encouragement reduce work-related stress for female entrepreneurs and increase the success of the business (Maysami & Goby 1999; Lee & Stearns 2012). Furthermore, Darmanto, et al. (2021) found that entrepreneurial orientation and need for achievement showed positive effect on Indonesian female entrepreneurs' success. For Mexican entrepreneurs, three determinants of success were quality, technology and innovation (Molina-Sanchez, Garcia-Perez-de-Lema, Lopez-Salazar, and Godinez-Lopez, 2022). In terms of natural relationships, family values have been recognized for its unifying role in Vietnamese society for centuries. Family support is extremely important during the business start-up process especially when capital-financing opportunities are limited. Family is the main source of start-up funds and required labor for the businesses when qualified employees are not available or difficult to hire due to financial restrictions as family members tend to work for a minimal compensation in exchange for future gain (Liao and Sohmen 2001).

Methodology

The sample in our study consisted of 170 female entrepreneurs in Vietnam where we included small and micro-sized enterprises while excluding non-profit organizations and businesses with over hundred employees from the sample. In Vietnam, the data were collected in Binh Duong and Binh Phuoc provinces and women entrepreneurs were randomly drawn from Chamber of Commerce directories. We conducted initial telephone contacts introducing and explaining the purpose of the study. After that, data were gathered by two Vietnamese students of Saigon University who administered the survey and interviews at the off peak time of selected businesses. We ensured that the administrators were trained with different interview techniques.

The survey instrument we used was originally developed by H.M. Chu (Hung & Katsioloudes 2002), which has been adopted in entrepreneurship studies in several countries since then. The instrument was originally written in English in five pages and consists of twenty-six main questions that cover the demographic information,

business characteristics, and factors related to motivations, success factors, and challenges with several sub questions. Five-point Likert scale is used to measure the responses, with 5 being “extremely important” and 1 being “unimportant”. The survey was translated into Vietnamese by checking for inter-translator consistency before distribution. Cronbach’s Alpha, one of the widely used reliability estimates to check the internal consistency of these instruments, ranged from 0.82 to 0.85, which is acceptable to ensure against a high level of reliability to ensure the internal consistency. One hundred and seventy study participants responded to a five-page, self-report questionnaire, including a cover page explaining the study's purpose. In the survey, motivation variables, perceived success variables, and problems were measured on an ordinal scale; gender and education are measured on a nominal scale; numbers of hours worked, age, and the number of employees employed were measured using an interval scale.

The strengths of perceived success factors were measured using a five-point Likert scale with a higher mean score for a factor indicating greater importance. To determine the role and importance of factors contributing to the success of entrepreneurs, an ordered logit model is applied to a sample of one hundred and seventy women entrepreneurs participated in the study. Since entrepreneurs ranked the success factors in order, an ordered logit model is the most suitable method to use (Greene, 2008). Following Kara, Hung, and Benzing (2010), the following equation is formulated:

$$\begin{aligned} Success_i = & \beta_0 Constant + \beta_1 Educ_i + \beta_2 HrsWrkd_i + \beta_3 Nemp_i + \beta_4 Nbusyr_i + \beta_5 Mar_i \\ & + \beta_6 Stres_i + \beta_7 SFact_i + e_i \quad i=1, \dots, 170, j=7, \dots, 24. \end{aligned} \quad (1)$$

Where Educ is education level completed, HrsWrkd is number of hours worked per week, Nemp is the number of employees, Nbusyr is number of years in this particular business, Mar is a marriage, Stres is stress level, and Sfact is the following success factors: good general management skills, charisma, friendliness to customers, satisfactory government support, appropriate training, access to capital, previous business experience, support of family and friends, marketing factors, good product at a competitive price, good customer service, hard work, location, maintenance of accurate records of sales/expenses, ability to manage personnel, community involvement, political involvement, and reputation for honesty. Finally, ϵ is error term, assumed to follow logistic distribution, and β s are coefficients to be estimated.

Results

Table 1 shows the general characteristics of the sample. In our sample, fifty-five percent of Vietnamese entrepreneurs are married while forty-five percent are single and the average age of them is thirty-five, which is in line of the results from other studies. For instance, Gerrard, Schoch, and Cunningham (2003) reported that 73.2 percent of Vietnam women entrepreneurs in their sample are between the ages of thirty and forty-nine. With respect to education level achieved, 19.2 percent of women entrepreneurs earned a college degree while the majority of women business owners in Vietnam completed high school (26.7 percent) or had some high

school education (21.5 percent), similar to the evidence from entrepreneurs in other countries (Zhu, Kara, Zhu 2019, Benzing, Chu, and Callanan 2005; Benzing, Chu, and Bove 2005; Benzing, Chu, and Kara 2009).

Table 1 Sample Characteristics of Women Entrepreneurs in Vietnam

Characteristics	Frequency	Percent
Marital status		
Married	93	55
Single	77	45
Education level achieved		
No formal education	5	2.9
Some grade school	5	2.9
Completed grade school	3	1.7
Some high school	37	21.5
Completed high school	46	26.7
Some college	28	16.3
Completed college	33	19.2
Some graduate work	9	5.2
A graduate degree	0	0.0
Not mentioned	6	3.5
Type of business ownership		
Established by you	8	4.7
Bought from another owner	21	12.2
Inherited	49	28.5
Independently owned	68	39.5
Franchise business	26	15.1
Owned in partnership	0	0.0
Incorporated	0	0.0
Type of business		
Retailing	67	39.0
Wholesaling	42	24.4
Service	39	22.7
Manufacturing	10	5.8
Agriculture	2	1.2
Other	21	12.2
Mean age of entrepreneurs	34.82 years	
Avg. working hours per week	62.76	

Retailing is the dominant industry for female entrepreneurs as thirty-nine percent engaged in that sector. While wholesaling accounts for 24.4 percent, service is made up 22.7 percent business of women entrepreneurs in Vietnam. Therefore, women entrepreneurial activity is mainly concentrated in low productivity sectors, which limits women’s potential and restricts women owned enterprises from sustainable growth. Our data indicated that 4.7 percent female entrepreneurs established their enterprises mainly by themselves, 12.2 percent bought from another owner whereas 28.5 percent inherited their business. In our sample, 39.5 percent of women entrepreneurs owned their businesses while 15.1 percent franchised with no partnership. On average, women entrepreneurs worked 62.76 hours per week in Vietnam.

Table 2. Success Factors

(5= extremely important, 4= very important, 3= mildly important, 2= not very important, 1= unimportant)

Success Factors	Mean	Std. Dev.
Charisma; friendliness to customers	4.46	0.77
Good Location	4.38	0.9
Good product at a competitive price	4.24	0.91
Good general management skills	4.1	1.01
Good customer service	4.02	0.86
Access to capital	3.94	1.02
Previous business experience	3.79	1.01
Ability to manage personnel	3.75	1.01
Hard-work	3.73	1.02
Support of family and friends	3.71	1.03
Maintenance of accurate records of sales/expenses	3.65	0.97
Appropriate training	3.63	1.19
Marketing factors such as sales promotion	3.6	1.17
Reputation for honesty	3.16	1.31
Satisfactory government support	2.96	1.09
Community involvement	2.56	1.06
Political involvement	2.27	1.12

The success factors are evaluated on a 5-point scale. There are seventeen specified factors variables with a score of 5 indicating “extremely important” and a score of 1 being “the least important”. According to results in Table 2, Vietnamese women entrepreneurs believe “charisma and friendliness to customers” and “good location” as the top two factors towards success. Since 63.4 percent of the women businesses concentrated on retailing and wholesaling sectors, it is plausible that “Charisma and friendliness to customers” and “good location” are leading factors to successful businesses in addition to a third highly ranked factor, “good product at a competitive price” (4.24 percent). Vietnamese women entrepreneurs agree that “good general management skills” enable them in achieving their goals as it was ranked the fourth most important success factor, which is also evidenced by other studies in other countries (Zhu, Kara, Zhu 2019; Zhu, Kara, Chu, and Chu 2015; Kara,

et al. 2010; Benzing, Chu, and Szabo 2005; Benzing, Chu, and Bove 2005; Benzing, Chu, and Callanan 2005; Chu, Kara, Benzing 2008; Chu, Kara, and Fiorentino, 2011; Busch 1989; Gosh, Kim, and Meng 1993; Huck and McEwen 1991; Yusuf 1995; Lerner, Brush & Hisrich 1997; Hisrich & Brush, 1986).

Moreover, Vietnamese businesswomen specify that “good customer service” is a significant component for a successful business with an average of 4.02 percent, which is followed by “access to capital” factor, ranked the sixth at 3.94 percent. However, fifty-three percent of Vietnamese women entrepreneurs indicate that their business capital is from personal saving and thirty percent is borrowed from family members with only seventeen percent from loans and grants. The financial constraint to an access to capital limits women entrepreneurs’ potential and may deter their entrepreneurship activities.

Additionally, they perceive previous business experience, ability to manage personnel, hard work, support of family and friends, maintenance of accurate records of sales/expenses, appropriate training, and marketing factors are very important in entrepreneurs’ success. The lack of business knowledge and skills introduce challenges to operate the business and prevent women entrepreneurs from successful business growth, which is also mentioned in the report from Vietnam Women Entrepreneurs Council (2007). Although Vietnamese women entrepreneurs specify “reputation for honesty” is a relatively important contributing factor for success, “community involvement” and “political involvement” are the least important factors contributing success to their entrepreneurship success.

To determine the role and importance of factors contributing to the success of entrepreneurs, an ordered logit model is applied to the equation (1), which is estimated by maximum likelihood method for one hundred and eighty entrepreneurs participated in the study, adopted from Kara, et al. 2010. The estimates are shown in Table 3. According to the table 5, the model is satisfactory as χ^2 and log likelihood diagnostics are acceptable.

Given that the ordered logit method does not produce familiar F-test and in the absence of a standard F-test, a likelihood ratio test is used to examine the overall explanatory power of the model. The value of χ^2 test statistic, 51.5646, implies that the model fits well and the independent variables are jointly significant. Similar to the F-statistic case, dividing the estimated coefficient by the standard error does not give the usual t-statistics. For that reason, we used the term z in table 5 to avoid any confusion.

Because interpretation of the estimated coefficients of ordered logit model is not straightforward as in the case of regular regression (ordinary least square or OLS estimates), a coefficient indicates a change in the log of the odds ratio (Kara, et al. 2010). Hence, first we need to transform the coefficient by using the exponential function to find antilog (e^β), and then, we can use the value, which is calculated from transformation to predict the odds ratio. Since we estimated the coefficient for family support as 0.34913, which gives 1.4178 as the odds ratio. This, in turn, indicates that an increase in the support from family and friends from low to medium increases success level by 1.4178 times, illustrating the importance of the family support for Vietnamese women entrepreneurs.

Table 3. Ordered Logit Model Estimates

Variables	Odd Ratios	Coefficient	Std. Error	P[Z >z]
Constant		2.5038*	1.4138	0.0766
Education	1.0359	0.03524	0.1306	0.7873
Number of hours worked	1.0136	0.01346	0.0115	0.2434
Number of employees	1.0001	.000078	0.0012	0.9463
Number of years in the business	1.1520	.14148***	0.0385	0.0002
Married or single	0.6549	-0.42321	0.4146	0.3073
Perceived business stress	0.9460	-0.05553	0.1922	0.7726
Good general management skills	0.8170	-0.20211	0.2138	0.3445
Charisma; friendliness to customers	0.8647	-0.14538	0.2681	0.5876
Satisfactory government support	0.9465	-0.05498	0.1864	0.7680
Appropriate training	0.8510	-0.16133	0.1873	0.3891
Access to capital	1.1139	0.10785	0.2039	0.5969
Previous business experience	0.8884	-0.11835	0.2422	0.6250
Support of family and friends	1.4178	.34913*	0.1995	0.0801
Marketing factors such as sales promotion	0.6927	-.36720*	0.1893	0.0523
Good product at a competitive price	1.0689	0.06665	0.2375	0.7790
Good customer service	1.6107	.47669*	0.2706	0.0782
Hard work	1.3029	0.26462	0.1973	0.1799
Location	0.5328	-.62953***	0.2204	0.0043
Maintenance of accurate records of sales/expenses	1.2279	0.20534	0.2328	0.3778
Ability to manage personnel	1.4549	.37493*	0.2133	0.0788
Community involvement	1.2983	0.26107	0.2404	0.2776
Political involvement	0.7508	-0.28655	0.2381	0.2287
Reputation for honesty	1.4524	.37324**	0.1723	0.0303
Mu(1) -Threshold parameter		3.48650***	0.34938	0
Mu(2) -Threshold parameter		7.42641***	0.39113	0

Dependent Variable: Perceived Business Success

Log likelihood function = -136.2386

Restricted log likelihood = -162.0208

$\chi^2 = 51.5646$

***, **, *: Significance at 1%, 5%, 10% level.

Seven estimated variables are statistically significant at ten percent or below significance level, namely number of years in this business, support of family and friends, marketing factors such as sale promotion, good customer service, location, ability to manage personnel, and reputation for honesty. Furthermore, good customer service

has the largest impact on the success of Vietnamese women entrepreneurs as the odd ratio is the highest. Similarly, reputation for honesty and ability to manage personnel are the next major impact factors on women entrepreneurs' business success with odd ratios of 1.4524 and 1.4549 respectively.

Likewise, the level of family support with a 1.4178 odd ratio, the fourth significant success factor, which is followed by the number of years in current business at 1.152. The remaining statistically significant success factors, marketing factors such as sale promotion and location, have lower impact on women entrepreneurs' business success in Vietnam. Although they were not statistically significant at ten percent and below, hard work, community involvement, maintenances of accurate records of sales and expenses, and access to capital tend to have higher impact on Vietnamese female entrepreneurs' business success. Since we estimated the coefficient for education as 0.03524, which gives 1.0359 odds ratio, this indicates that completing a higher level of education increases success level by 1.0359 times, implying a positive effect of education for Vietnamese women entrepreneurs. Finally, the rest of the success factors included in the model exhibited relatively smaller effect on the success of female entrepreneurs in Vietnam.

Conclusions

This study investigates the success factors of Vietnamese women entrepreneurs experienced by examining 170 small business owners in Vietnam with an emphasis on education. Over seventy-three percent of Vietnamese female entrepreneurs reported satisfaction with their current level of success in business while above twenty-three percent was somewhat satisfied. Due to the economic reforms in Vietnam, the number of women enterprises has increased dramatically; however, entrepreneurial activity is mainly concentrated in low productivity sectors, such as wholesaling and retailing in our sample. Vietnamese women entrepreneurs believe "charisma and friendliness to customers" and "good location" as the top two factors towards business success. In addition, they reported that good product at a competitive price, good managerial skills, good customer service, and access to capital as the next very important factors contributing to their business success.

Furthermore, our ordered logit model revealed that number of years in this business, support of family and friends, marketing factors such as sale promotion, good customer service, location, ability to manage personnel, and reputation for honesty were the statistically significant success factors for Vietnamese female entrepreneurs. Good customer service has the largest impact on the success of Vietnamese women entrepreneurs, which is followed by reputation for honesty, ability to manage personnel, the level of family support, and the number of years in current business. The estimated coefficient for education, 0.03524, which gives 1.0359 odds ratio, indicating that completing a higher level of education increases success level by 1.0359 times, implying a positive effect of education for Vietnamese women entrepreneurs. Finally, hard work, community involvement, maintenance of accurate records of sales and expenses, and access to capital were other factors that high impact on Vietnamese female entrepreneurs' business success.

References

- Aidis, R., Welter, F., Smallbone, D. and Isakova, N., (2007). Female entrepreneurship in transition economies: the case of Lithuania and Ukraine. *Feminist Economics*, 13(2), pp.157-183.
- Bajaro, A.S., 1981. Entrepreneurial self-assessment. *Entrepreneur's handbook*, pp.1-9.
- Bellucci, A., Borisov, A. and Zazzaro, A., (2010). Does gender matter in bank–firm relationships? Evidence from small business lending. *Journal of Banking & Finance*, 34(12), pp.2968-2984.
- Benzing, C., Chu, H. M., and Bove, R. (2005). The motivation, problems and perceived success of entrepreneurs in Romania. *Journal of the Academy of Business Administration*, Spring/Fall 10(1-2): pp. 73-88.
- Benzing, C., Chu, H. M. and McGee, C. (2007). Ghanaian and Kenyan Entrepreneurs: A Comparative Analysis of Their Motivations, Success Characteristics, and Problems, *Journal of Developmental Entrepreneurship* 12 (3): pp. 295-322.
- Benzing, C., Chu, H. M., and Kara, O. (2009). Entrepreneurs in Turkey: A Factor Analysis of Motivations, Success Factors, and Problems. *Journal of Small Business Management*, 47 (1): pp. 58-91.
- Benzing, C., Chu, H. M. and Szabo, B. (2005). Hungarian and Romanian entrepreneurs in Romania- motivation, problems, and differences. *Journal of Global Business* 16: pp. 77-87.
- Benzing, C., Chu, H.M. and Callanan, G., (2005). A regional comparison of the motivation and problems of Vietnamese entrepreneurs. *Journal of Developmental Entrepreneurship*, 10(01), pp.3-27.
- Brush, C.G., (1997). Women-owned businesses: Obstacles and opportunities. *Journal of Developmental Entrepreneurship*, 2(1), pp.1-24.
- Busch, E.T. (1989). Small business hurdles in Ecuador. *Journal of Small Business Management* 27: pp. 70-73.
- Brush, C.G. and Cooper, S.Y., (2012). Female entrepreneurship and economic development: An international perspective. *Entrepreneurship & Regional Development*, 24(1-2), pp.1-6.
- Buttner, E.H., (1993). Female entrepreneurs: how far have they come? *Business Horizons*, 36(2), pp.59-65.
- Buttner, E.H. and Rosen, B., (1989). Funding new business ventures: Are decision makers biased against women entrepreneurs? *Journal of Business Venturing*, 4(4), pp.249-261.
- Buttner, E.H. and Moore, D.P., (1997). Women's organizational exodus to entrepreneurship: self-reported motivations and correlates with success. *Journal of small business management*, 35(1), pp.34-46.
- Carter, S. and Cannon, T., (1992). *Women as entrepreneurs: A study of female business owners, their motivations, experiences and strategies for success*. Academic Press.
- Chevalier, S. Aubouin-Bonnaventure, J., Coilet, H. and Fauquereau, E. (2022). Ready to start a business? Unraveling the motives for entrepreneurship. *Society of Consulting Psychology*, 74 (1), pp. 99-115.
- Chhabra, M, Gera, R. Hassan, R., and Hassan, S. (2020). An exploratory study of cognitive, social and normative dimensions of female entrepreneurship within transition economies: Evidence from India and Vietnam. *Pakistan Journal of Commerce and Social Sciences*, 14 (4), pp. 1012-1042.

- Chu, H. M. and Katsioloudes, M.I., (2002). Cultural context and the Vietnamese-American entrepreneurial experience. *Journal of Transnational Management Development*, 7(2), pp.37-46.
- Chu, H.M., Kara, O., Benzing, C. (2008). An empirical study of Nigerian entrepreneurs: Motivations, success factors, problems, and stress. *International Journal of Business Research* 8 (2), pp. 102-116.
- Chu, H. M., Kara, O., and Fiorentino, C. (2011). Bulgarian Entrepreneurship: an exploratory study *International Journal of Business and Public Administration* 8 (1), pp. 89-106
- Chu, H.M., Kara, O., Zhu, X. and Gok, K., (2011). Chinese entrepreneurs: Motivations, success factors, problems, and business-related stress. *Journal of Chinese Entrepreneurship*, 3(2), pp.84-111.
- Cooke, F. L. and Xiao, M. (2021). Women entrepreneurship in China: Where are we now where we are heading. *Human Resource Development International*, (24) 1, pp. 104-121.
- Coleman, S., (2000). Access to capital and terms of credit: A comparison of men-and women-owned small businesses. *Journal of Small Business Management*, 38(3), pp.37.
- Council, V.N.W.E. (2007). Women's entrepreneurship development in Vietnam. *International Labor Organization, Vietnam*.
- Cuba, R., Decenzo, D. and Anish, A., (1983). Management practices of successful female business owners. *American Journal of small business*, 8(2), pp.40-45.
- Dalic, I. (2019). What can we expect in the future of academic research? Most common research problems analyzed in the top journals in the field of entrepreneurship. *The European Journal of Applied Economics*, (16)2, pp.122-138.
- Darmanto, S., Alagappar, P. N. and Xavier, J. A. (2021). Women entrepreneurial career maturity towards success of business in Semarang, Indonesia. *Journal of Pengurusan* 61, pp. 43-55.
- Dhaliwal, A. (2019). Factors influencing the success of women entrepreneurs in factor driven economies. *Productivity*, 60(1), pp. 20-31
- Gerrard, P., Schoch, H. and Cunningham, J. B. (2003). Values and skills of female entrepreneurs in Vietnam: an exploratory study. *Asia Pacific Business Review*, 10(2), pp.139-159.
- Gliem, R.R. and Gliem, J.A., (2003). *Calculating, interpreting, and reporting Cronbach's alpha reliability coefficient for Likert-type scales*. Midwest Research-to-Practice Conference in Adult, Continuing, and Community Education.
- Gok, K., Kara, O., Lakshman, S., Demirtas, O. and , Chu, H. M. (2021). A Factor Analysis of the Entrepreneurial Success, Motivation and Problems Faced: The Case of Chinese Entrepreneurs. *Journal of Entrepreneurship and Innovation in Emerging Economies*, 7 (2), pp. 165-193.
- Gosh, B.C., Kim, T.S. and Meng, L. A. (1993). Factors contributing to the success of local SMEs: an insight from Singapore. *Journal of Small Business and Entrepreneurship* 10 (3): pp. 33-45.
- Greene, W. H. (2008). *Econometric Analysis*. 6th Ed. Prentice Hall.
- Greene, P.G., Hart, M.M., Gatewood, E.J., Brush, C.G. and Carter, N.M., (2003). Women entrepreneurs: Moving front and center: An overview of research and theory. *Coleman White Paper Series*, 3, pp.1-47.
- Hernandez, L., Nunn, N. and Warnecke, T., (2012). Female entrepreneurship in China: opportunity-or necessity-based? *International Journal of Entrepreneurship and Small Business*, 15(4), pp.411-434.

- Hisrich, R. and Brush, C., (1984). The woman entrepreneur: Management skills and business problems. *Journal of Small Business Management*, 22(1), pp. 30-37
- Hisrich, R.D. and Brush, C.G., (1986). *The woman entrepreneur: Starting, financing, and managing a successful new business*. Lexington Mass.: Lexington Books.
- Hisrich, R., Brush, C., Good, D. and DeSouza, G., 1997. Performance in entrepreneurial ventures: Does gender matter. *Frontiers of Entrepreneurship Research*, pp.238-239.
- Holmén, M., Min, T.T. and Saarelainen, E., (2011). Female entrepreneurship in Afghanistan. *Journal of Developmental Entrepreneurship*, 16(03), pp.307-331.
- Huck, J. F., and McEwen, T. (1991). Competencies needed for small business success: perception of Jamaican entrepreneurs. *Journal of Small Business Management* 3: 90-93.
- Jaim, J. (2022). All about patriarchal segregation of women regarding family? Women business-owners in Bangladesh. *Journal of Business Ethics*, 175, pp. 231-245.
- Jakhar, R. and Krishna, C. (2020). Women entrepreneurship: Opportunities and challenges (A literature review). *International Journal of Management and Information Technology*, 5(2), pp. 38-42.
- Kara, O., Hung, C. M. and Benzing, C. (2010). Determinants of Entrepreneurs' Success in a Developing Country. *Journal of Business and Entrepreneurship*, 22 (2), pp. 1-15.
- Khuong, M. N. and Van, N. T. (2022). The influence of entrepreneurial ecosystems on entrepreneurs' perceptions and business success. *Gadjah Mada International Journal of Business*, 24 (2), pp. 198-222.
- Kuratko, D.F., Hornsby, J.S. and Naffziger, D.W., (1997). An examination of owner's goals in sustaining entrepreneurship. *Journal of small business management*, 35(1), pp.24.
- Kuratko, D.F. and Autretsch, D. B., (2022). The future of entrepreneurship: the few or the many? An examination of owner's goals in sustaining entrepreneurship. *Small Business Economics*, 59, pp.269-278.
- Lee, S.S. and Stearns, T.M., (2012). Critical success factors in the performance of female-owned businesses: A study of female entrepreneurs in Korea. *International journal of management*, 29(1), pp.3-18.
- Lerner, M., Brush, C. and Hisrich, R., (1997). Israeli women entrepreneurs: An examination of factors affecting performance. *Journal of Business Venturing*, 12(4), pp.315-339.
- Liao, D., and P.Sohmen. (2001). The development of modern entrepreneurship in China. *Stanford Journal of East Asian Affairs* 1: pp. 27-33.
- Madzikanda, B., Li, C. and Dabuo, F. T. (2022). Foreign entrepreneurs success in China: The role of entrepreneurial cognition in opportunity recognition. *International Journal of Management, Accounting and Economics*, 9 (6), pp. 322-353.
- Marlow, S. and Patton, D., (2005). All credit to men? Entrepreneurship, finance, and gender. *Entrepreneurship Theory and Practice*, 29(6), pp.717-735.
- Maysami, R.C. and Goby, V.P., (1999). Female business owners in Singapore and elsewhere: A review of studies. *Journal of Small Business Management*, 37(2), pp.96-105.
- Mersha, T. and Sriram, V. (2018). Gender, entrepreneurial characteristics, and success: Evidence from Ethiopia. *Thunderbird International Business Review*, 61(2), pp. 157-167.

- Molina-Sanchez, R., Garcia-Perez-de-Lema, D., Lopez-Salazar, A. and Godinez-Lopez, R. (2022). Determining Factors in MSMEs success: An empirical study in Mexico. *Small Business International Review*, 6 (1), pp. 1-13.
- Pellegrino, E.T. and Reece, B.L., (1982). Perceived formative and operational problems encountered by female entrepreneurs in retail and service firms. *Journal of Small Business Management (pre-1986)*, 20(2), p.15.
- Robichaud, Y., McGraw, E. and Alain, R., (2001). Toward the development of a measuring instrument for entrepreneurial motivation. *Journal of developmental entrepreneurship*, 6(2), pp.189-201.
- Ryan, R.M. and Deci, E.L., (2000). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary educational psychology*, 25(1), pp.54-67.
- Scott, C.E., (1986). Why more women are becoming entrepreneurs. *Journal of Small Business Management*, 24, p.37.
- Sethupathy, K. and Moakumla, Ao. (2020). Exploring critical success factors for Naga women entrepreneurs in Nagaland-a review study. *International Journal of Management and Information Technology*, 5(1), pp. 47-52.
- Sharma, M. K. and Sharma, P. (2020). Small business survival and success: An explanation of socioeconomic motivators and restraints. *Journal of Business Strategy*, 17(4), pp. 7-24
- Singh, S., Mordi, C., Okafor, C. and Simpson, R., (2010). Challenges In Female Entrepreneurial Development—A Case Analysis Of Nigerian Entrepreneurs. *Journal of Enterprising Culture*, 18(04), pp.435-460.
- Tambunan, T., (2009). Women entrepreneurship in Asian developing countries: Their development and main constraints. *Journal of Development and Agricultural Economics*, 1(2), pp.027-040.
- Terjesen, S.A. and Lloyd, A., (2015). *The 2015 female entrepreneurship index*. The Global Entrepreneurship and Development Institute
- Ufuk, H. and Özgen, Ö., (2001). The profile of women entrepreneurs: A sample from Turkey. *International Journal of Consumer Studies*, 25(4), pp.299-308.
- Van der Sluis, J., Van Praag, M. and Vijverberg, W., 2008. Education and entrepreneurship selection and performance: A review of the empirical literature. *Journal of economic surveys*, 22(5), pp.795-841.
- Weiler, S. and Bernasek, A., (2001). Dodging the glass ceiling? Networks and the new wave of women entrepreneurs. *The Social Science Journal*, 38(1), pp.85-103.
- Winn, J., (2005). Women entrepreneurs: can we remove the barriers?. *The International Entrepreneurship and Management Journal*, 1(3), pp.381-397.
- Woldie, A. and Adersua, A., (2004). Female entrepreneurs in a transitional economy: Businesswomen in Nigeria. *International Journal of Social Economics*, 31(1/2), pp.78-93.
- Xie, X. and Wu, Y. (2022). Doing well and doing good: How responsible entrepreneurship shapes female entrepreneurship success. *Journal of Business Ethics*, 178, pp. 803-828.
- Yang, J.Y. and Li, J., (2008). The development of entrepreneurship in China. *Asia Pacific Journal of Management*, 25(2), pp.335-359.
- Yueh, L. (2007). *China's entrepreneurs, Discussion Paper Series*. Pembroke College, University of Oxford.

- Yusuf, A. (1995). Critical success factors for small business: perceptions of South Pacific entrepreneurs. *Journal of Small Business Management* 33 (2): pp. 68-74.
- Zhu, L., Kara, O., Chu, H. M., and Chu, A. (2015). Female Entrepreneurship: Evidence from Vietnam. *Journal of Business and Entrepreneurship*, 26(3), pp. 103-128.
- Zhu, L., Kara, O. and Zhu, X. (2019). A comparative study of women entrepreneurship in transitional economies: The case of China and Vietnam. *Journal of Entrepreneurship in Emerging Economies* 11 (1), pp.66-80

Assisting Construction Plan Comprehension Through the Use of Augmented Reality Technology

Jeffrey Kim

Auburn University, United States,  <https://orcid.org/0000-0001-7048-2402>

Yilidaer Yilifeina

Auburn University, United States

Abstract: This research aimed to explore the effectiveness of using augmented reality (AR) technology to enhance construction management students' understanding of construction plans. Specifically, the study employed a controlled experimental approach, utilizing pre-assessment and post-assessment measures to evaluate the impact that the AR tool had on students' comprehension of construction plans. The methodology for this study was developed following an analysis of previous similar studies and by recognizing that the construction industry is in the early stages of utilizing AR technologies to scaffold comprehension of construction details with constituents that are often not adept at this process. The controlled experiment demonstrated a positive impact on the students' spatial skills, with improved accuracy and proficiency at interpreting construction plans. Additionally, student feedback revealed a high level of satisfaction with the use of AR technology as a learning tool in construction management education. Lastly, this research contributes to the existing body of knowledge by highlighting the potential of AR technology to improve the comprehension of construction details which is a necessary skill for the construction industry.

Keywords: Augmented Reality, Construction Industry, Construction Details, Spatial Skills, Visualization

Citation: Kim, J. & Yilifeina, Y. (2023). Assisting Construction Plan Comprehension through the use of Augmented Reality Technology. In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023--International Conference on Social and Education Sciences* (pp. 448-457), Las Vegas, NV, USA. ISTES Organization

Introduction

With accelerated urbanization and a rapidly developing world-wide economy, the construction industry is experiencing unprecedented opportunities for advancement. Yet, this positive outlook comes at the expense of a workforce that is struggling to keep pace with the industry's growth. The construction industry has been notoriously slow at adopting new technology (JBKnowledge, 2020). Historically, the construction industry has been hesitant to embrace new technology, often due to intense competition resulting in narrow profit margins. Moreover, the prevailing ethos in the industry has been to stick with traditional methods that have historically

led to success.

The industry's seasoned workforce is steadily retiring in vast numbers (Hildebrandt, 2014) and is being replenished with a younger, less experienced workforce. The positive aspect of this generational shift is that the younger workforce is more open to the benefits of technology. This is encouraging for educators who play a crucial role in shaping the careers of these new practitioners. Educators must advance knowledge and instill the idea that there are often more effective ways of doing things. This research seeks to address contemporary challenges in the construction industry, particularly in educating the new generation, through an experimental approach.

As the demand for construction practitioners continues to rise, the rapid education and training of this workforce becomes paramount. Unfortunately, like many industries, construction skills are primarily honed through practical experience rather than classroom instruction. One of the most critical skills for a construction worker is the ability to read and interpret construction plans, which are typically two-dimensional (2D) representations of building projects. Interpreting these plans requires individuals to read 2D lines on paper and mentally transform them into three-dimensional (3D) interpretations, enabling the actual construction of the project. As construction projects become more complex, the need for precise plan interpretation becomes even more crucial. Currently, this primary training occurs in traditional classrooms, with limited support systems to enhance the learning process (Sweller, 2011).

Augmented reality (AR) has been effectively used in classrooms as a scaffolding tool for learning experiences. In this study, AR is employed as a scaffold for construction management students to assist them with reading and interpreting construction plans. The primary aim of this research is to determine whether AR is an effective scaffold (Sweller, 2011) for improving construction management students' ability to accurately interpret construction plans.

Literature Review

AR technology is increasingly being used to enhance student learning experiences in various educational settings (Kim & Irizarry, 2020). These applications span multiple industries, often serving to compensate for the absence of real-world experience in a classroom environment. AR technology can be deployed through user-worn headsets or commonly available mobile devices. It operates by overlaying virtual objects onto the real-world environment, as explained by Azuma et al. (2001). AR technology operates by superimposing virtual objects onto the real-world environment. Figure 1 illustrates the use of AR to see additional virtual objects when the camera of a mobile device observes a special paper document known as a *marker*.

Figure 1 demonstrates how AR offers a new perspective by overlaying virtual objects on the real-world view displayed on a mobile device's screen. The subsequent sections of the literature review explore AR's

applications in education, its role in aiding students learning to interpret construction plans, and the impact of cognitive load on the learning experience, all of which contribute to the foundation of this research.

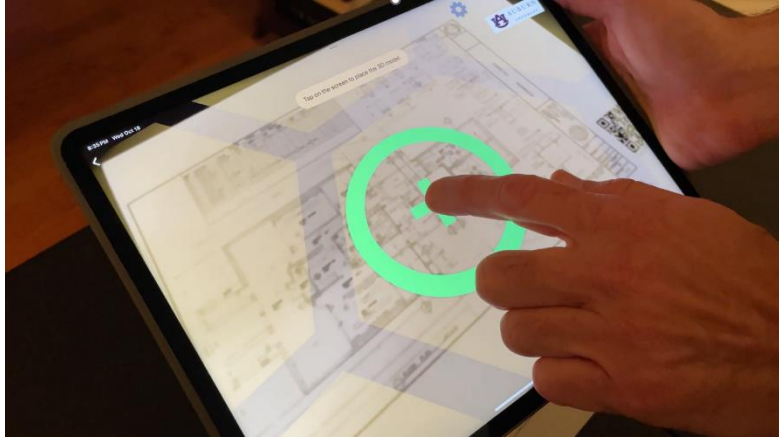


Figure 1. Sample AR being used to show students a 3D representation of a 2D object (Kim & Irizarry, 2020)

Augmented Reality Used in the Classroom

AR is most effective when it seamlessly integrates with the real world, creating a unified experience where users are unaware of the distinction between the virtual and physical worlds (Azuma et al., 2001), often referred to as *connectedness*. Consequently, many educational studies utilize markers to enhance the user's AR experience (Shirazi et al., 2014). These markers can take the form of pages in a book (Shirazi et al., 2014) or printed documents with special QR codes (Kim & Irizarry, 2017). Present-day students are visually inclined and media-savvy (Moskal et al., 2004), making them well-suited to technology-enhanced learning experiences. Students are often familiar with AR and have ideas about how it can be incorporated into their education, requiring instructors to bridge the gap between technology and practical applications in their teaching (Shirazi et al., 2014). For instance, in construction management education, it is reasonable to employ devices that students are already comfortable with to harness the potential of AR during their lessons.

Understanding and Interpreting Construction Plans

Interpreting construction plans is a critical skill in the construction industry, as these plans provide essential information about building design and construction. Accurate interpretation of construction plans is imperative for successful project execution, as emphasized by Clough et al. (2015). The significance of education and training in enhancing workers' understanding of construction plans is highlighted by Wang et al. (2021) and emphasizes the role of engineering plans in conveying critical structural information, and Clevenger et al. (2014) discuss the importance of shop drawings (plans) in guiding the fabrication and installation of building components. These sources collectively support the notion that a comprehensive understanding of construction plans is an essential skill for anyone in the construction industry.

Distractions to Student Learning

A significant problem to consider when using technology in the classroom is how it may distract students from the intended learning objectives. Therefore, the deployment of technology during a scaffolded learning experience must be measured to determine if there was increased cognitive load during the experience (Sweller, 2011).). This increase in cognitive load, if not checked, could negate the possible benefits of using the AR tool.

There are a variety of ways to measure this cognitive load and one such method uses the NASA TLX self-perceived load index (Human Performance Research Group, 1986). This self-reported survey measures perceived effort on six subscales, mental effort, physical effort, temporal effort, performance, overall effort, and frustration. When used, this tool can identify potential extraneous loads that may be detrimental to the learning process.

Rationale

It is reasoned from the literature that using AR in the proper manner has the potential to affect the student's learning. This effect could be positive if the tool used does not overload their cognitive abilities. A measured and controlled experiment would be able to assess the short-term student's learning while a survey tool could be used to measure their perceived effort during the study. The outcome of this study will demonstrate the capability of AR as a scaffolding tool and identify considerations for how to use it in a classroom environment.

Methodology

This research adopted a mixed-methods approach to investigate the effectiveness of AR technology for enhancing the understanding of construction plans among construction management students. By combining quantitative and qualitative research methods, this study aimed to provide a comprehensive and multifaceted understanding of the research topic. A quantitative research method was employed to measure and quantify the impact of AR technology on students' spatial skills. Pre-assessment and post-assessment tests were used to evaluate the improvement in students' understanding of construction plans after using the AR tools.

The quantitative data collected allowed for statistical analysis and objective conclusions regarding the effectiveness of AR technology in enhancing spatial skills. A qualitative research method was utilized to explore students' perceptions, experiences, and attitudes towards the use of AR technology as a learning tool and to indirectly measure cognitive load. Interviews, observations, and student feedback provide rich and in-depth insights into the subjective aspects of using AR in construction management education. The qualitative data collected allowed for a deeper understanding of the students' perspectives and sheds light on the utility and potential challenges of AR technology in this context.

Research Design

The proposed research aimed to investigate the effectiveness of using AR technology to help construction management students understand construction plans. The research utilized a single-blind experiment design, with a pre-test and post-test survey, to compare the effectiveness of using AR technology versus traditional methods of interpreting construction plans. Figure 2 illustrates the workflow of the experiment that was conducted.

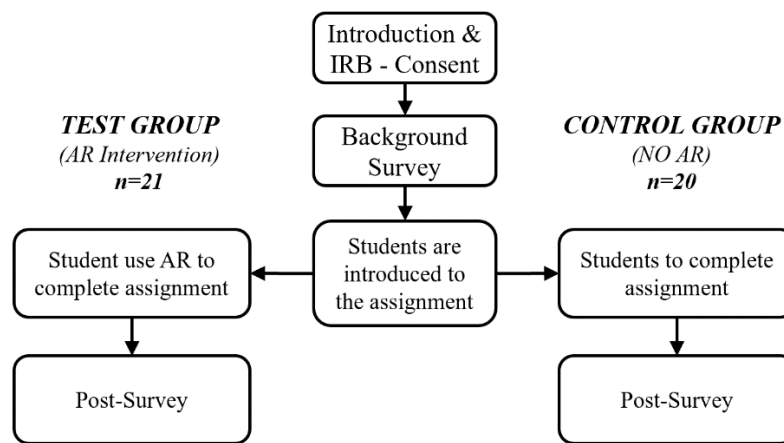


Figure 2. The Experiment Workflow

The Single-Blind Experiment

The experiment involved administering a background survey to the participants before dividing them into two groups: a control group that received traditional 2D construction plans and a test group that received the same plans but with the additional AR technology to scaffold their learning experience. The data collected from the background survey was analyzed to investigate whether any demographic or experiential factors were associated with participants' understanding of construction plans and the effectiveness of the AR technology. The participants were then assigned specific tasks, which included identifying key components, determining spatial relationships, and interpreting dimensions and materials from the construction plans. These tasks required the participants to analyze and comprehend the plans accurately. The participants' performance in these tasks was measured and compared between the control and test groups to assess the impact of AR technology on their understanding of construction plans. By specifically evaluating the participants' performance in these tasks, the experiment aimed to provide more detailed insights into the effectiveness of AR technology for supporting their interpretation and comprehension of construction plans.

The participants were then divided into two groups: the control group and the test group. The control group worked with traditional 2D construction plans, while the test group worked with the same plans but with additional AR technology. The AR technology provided the participants with a 3D visualization of the construction project, allowing them to interact with the project in a more immersive way. The participants then

completed a series of tasks related to understanding the construction plans, including identifying key components, determining spatial relationships, and interpreting dimensions and materials from the construction plans.

Pre-test and Post-test Measuring Tools

To assess the effectiveness of using AR technology in helping students understand construction plans, participants completed a pre-test and post-test survey consisting of multiple-choice questions. The multiple-choice questions assessed the participants' knowledge of construction plans, including their ability to interpret symbols and annotations commonly used in construction plans. These questions provided a quantitative measure of participants' knowledge and were scored based on the number of correct answers.

The Augmented Reality Intervention (Independent Variable)

The AR software used in this study was Augment (<http://www.augment.com>); a commercially available mobile software package used to scan a *marker* (fiducial) and render a 3D model on the screen of a mobile device. A student, along with a mobile device and the AR software, would scan the paper-form of the marker using the AR software. Once the image was recognized and matched with the inventory of stored marker images from the server, the mobile device's AR software would call the corresponding 3D model from the server and would combine it along with the image of the marker being captured by the mobile device's back-facing camera. The combined image on the mobile device would show the marker with a 3D AR model displayed on it as shown in Figure 3.

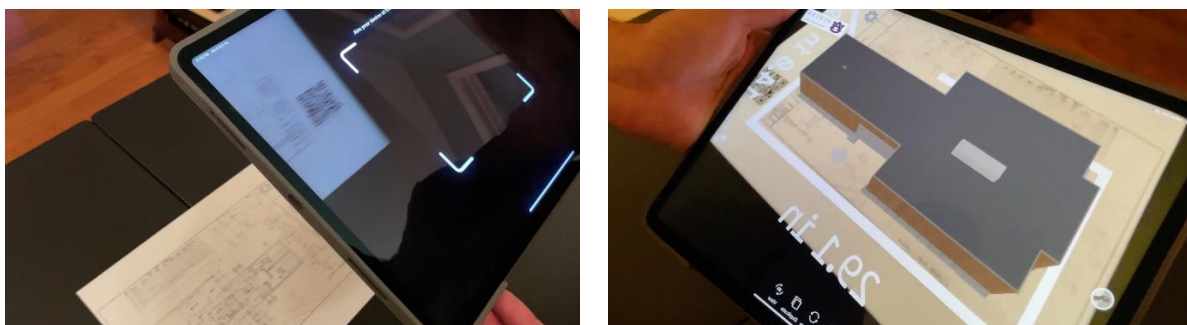


Figure 3. Scanning for AR Image Used by the Test Group
(Scan Process on the Left and AR Image on the Right)

Lastly, the 3D model that would display on the mobile device's screen would be superimposed over, and attached to, a live image of the marker that is being displayed by using the mobile device's back facing camera. The students could then interact by moving the mobile device or the paper-form marker.

The NASA Task Load Index (Human Performance Research Group, 1986) is a reliable measuring tool for self-

perceived effort and has been used in academic research to indirectly measure cognitive load. It was included as part of the post-test survey to measure student’s workload and cognitive effort. By incorporating the NASA TLX, this research aimed to capture participants' subjective experiences regarding the mental demands, physical demands, and overall perceived workload associated with the tasks performed during the experiment.

Results & Discussion

Demographics

The students that participated in this study were selected from a four-year post-secondary construction management program in the Southeastern United States. The characteristics of these students are somewhat predictable in that they commonly possess practiced skills in reading and interpreting construction plans. In addition, these experiences may also come from past work experiences or from having close relatives that work in the industry. These factors were collected by having the students complete a background survey at the start of the experiment. The results of this survey are enumerated in Table 1. The results indicate that the issues concerning the student’s background and experiences were somewhat evenly distributed between the control and the test group. This distribution would allow for results that were not biased by the student’s prior histories on the subject.

Table 1. Student Background Demographics

CHARACTERISTICS	TEST GROUP N = 21	CONTROL GROUP N = 20
GENDER		
Male	18 (86%)	18 (90%)
Female	3 (14%)	2 (10%)
PRIOR CONSTRUCTION EXPERIENCE		
None	9 (43%)	10 (50%)
Some	9 (43%)	9 (45%)
Extensive	3 (14%)	1 (5%)
FAMILY BACKGROUND in CONSTRUCTION		
Yes	16 (76%)	14 (70%)
No	5 (24%)	6 (30%)

Testing Results

Before the intervention, a pre-test was administered to both groups to assess their baseline spatial skills. In terms of accuracy, the control group scored an average of 62.75 correct points while the test group scored an average of 61.19 correct points. These close scores indicate that the two groups were statistically equal in terms of their initial spatial skills aptitudes. After the students in both groups completed their respective work assignments (the

test group was assisted by using AR and the control group was not), a post-test was given to measure the effectiveness of the work assignment at improving their spatial skills. The control group scored an average of 63.75 correct points while the test group scored an average of 68.10 correct points. Both groups scored better in their post-test; the control group improved by +13.3% and the test group improved by +1.6%. Therefore, the test group improved their accuracy by +11.7% more than the control group. While this numerical difference appears to be an improvement, a two-tailed t-test with a confidence interval of 95% ($CI=95\%$) where $t_{(22)} = -1.36459$ resulted in $p = 0.180205$ (p is not less than 0.05) indicates that the improvement was not statistically different.

Furthermore, a more qualitative measure was used to measure the student's self-perceived performance and effort while completing the assignment prior to the post-test. The NASA TLX survey was administered to collect this feedback and the results have been enumerated in Table 2.

Table 2. NASA TLX Perceived Workload

Sub-Scale	TEST GROUP		CONTROL GROUP		Variance $\Delta = \text{CONTROL} - \text{TEST}$
	Mean	SD	Mean	SD	
Mental	0.2	5.4	1.5	5.2	1.3
Physical	-8.7	2.7	-7.7	5.2	1.0
Temporal	-5.3	3.5	-5.8	5.0	-0.5
Performance	6.3	2.8	4.4	5.6	-1.9
Effort	1.6	6.1	0.8	4.0	-0.8
Frustration	-7.2	3.4	-7.5	3.0	-0.3

Variable Range is -10.0 through +10.0

The students in both groups roughly perceived similar levels of effort for temporal (-0.5), overall effort (-0.8), and frustration (-0.3). However, for mental (1.3), physical (1.0), and overall performance (-1.9), the test group indicated less self-perceived effort for these sub-scales while using the AR tool to scaffold their learning.

It has been suggested that a certain measure of applied technology in the classroom can have an interfering effect on the learning experience (Cristia et al., 2012). When deploying new technology in the classroom, will its use equate to a better and more active learning experience (Shirazi et al., 2014)? Less effort in the NASA TLX results means that the scaffolding works as an intervention and does not distract students from their learning despite it not proving to be a significant intervention in terms of direct assessment scores.

Conclusion

AR research in education is maturing and we are seeing more research that supports its use in the classroom. Across many disciplines, AR is used as a visualization tool to improve known processes. In this research study the aim was to explore if there was a benefit to using AR in the construction management classroom to help

post-secondary students learn how to interpret 2D plans into a mental 3D representation. It was identified that this is a critical skill for practitioners in this industry.

The research found that while the accuracy could not be determined to be significant, there was no interference to the student's learning experience. In fact, their results indicated that the students perceived an increased level of performance while expending less mental effort. Arguably this is a positive finding for using this in the CM classroom. It is presumed through this research that improvement in technology will encourage others to continue this research as the technology begins to address some of the shortcomings found in this study.

While the researchers sought to control as many variables as possible, there were some limitations that the authors would like to share. Due to budgetary constraints, the researchers allowed the students to use their own mobile devices. These devices were not consistently of the same manufacture, size, or quality. This ultimately resulted in some inconsistent experience for some of the students. In the future, providing devices to the students would eliminate this concern. Lastly, due to time constraints, the students were not assessed for long-term retention. In future studies, measurement of longer-term retention may provide alternative insights in how the AR tool affects the student's learning. Lastly, student learning when the attention is spatial skills is a difficult skill to improve if not conducted in an active learning environment. This study attempted to add that element through the use of AR technology which encourages the students to ask the all-important *why* questions.

References

- Azuma, R. T., Baillot, Y., Behringer, R., Feiner, S., Julier, S., & MacIntyre, B. (2001). Recent Advances in Augmented Reality. *IEEE Computer Graphics & Applications*, 21(6), 34. <https://doi.org/10.1109/38.963459>
- Clevenger, C. M., & Khan, R. (2014). Impact of BIM-enabled design-to-fabrication on building delivery. *Practice Periodical on Structural Design and Construction*, 19(1), 122-128.
- Clough, R. H., Sears, G. A., Sears, S. K., Segner, R. O., & Rounds, J. L. (2015). Construction contracting: A practical guide to company management. John Wiley & Sons.
- Cristia, J., Ibarrarán, P., Santiago, C., Santiago, A., & Severin, E. (2012). Technology and Child Development : Evidence from the One Laptop per Child Program. IZA Discussion Paper No. 6401, 6401. <https://doi.org/10.2139/ssrn.2032444>
- Hildebrandt K. (2014) Age Safe : How an Aging Workforce Impacts the Construction Industry. *Constructor: The magazine of the Associated General Contractors of America 2014*. Accessed on 2023-10-26: <http://www.naylornetwork.com/ngc-constructor/articles/?aid=253843&issueID=31705>
- JBKnowledge. (2020). The 9th Annual Construction Technology Report 2020. Accessed on 2023-10-26: <https://jbknowledge.com/2020-construction-technology-report-survey>
- Sweller, J. (2011). Cognitive Load Theory. *Psychology of Learning and Motivation*, (pp. 37–76, 55).

<https://doi.org/10.1016/B978-0-12-387691-1.00002-8>

- Kim, J., & Irizarry, J. (2020). Evaluating the Use of Augmented Reality Technology to Improve Construction Management Student's Spatial Skills. *International Journal of Construction Education and Research*. <https://doi.org/10.1080/15578771.2020.1717680>
- Kim, J., & Javier Irizarry. (2017). Assessing the Effectiveness of Augmented Reality on the Spatial Skills of Postsecondary Construction Management Students in the. *34th International Symposium on Automation and Robotics in Construction (ISARC 2017)*.
- Moskal, B., Lurie, D., & Cooper, S. (2004). Evaluating the effectiveness of a new instructional approach. *ACM SIGCSE Bulletin*, 36(1), 75–79.
- Human Performance Research Group. (1986). NASA Task Load Index User Manual v. 1.0 (p. 19).
- Shirazi, A., & Behzadan, A. H. (2014). Design and Assessment of a Mobile Augmented Reality-Based Information Delivery Tool for Construction and Civil Engineering Curriculum. *Journal of Professional Issues in Engineering Education and Practice*, 4014012. [https://doi.org/10.1061/\(ASCE\)EI.1943-5541.0000229](https://doi.org/10.1061/(ASCE)EI.1943-5541.0000229)
- Wang, T., Abdallah, M., Clevenger, C., & Monghasemi, S. (2021). Time–cost–quality trade-off analysis for planning construction projects. *Engineering, Construction and Architectural Management*, 28(1), 82-100.

What Are the Elements That Make Up an Official Museum Video? An Analysis of the Official Video Content of the Museum on the Bilibili Video Website

Xuwei Ren

Nottingham Trent University, Nottingham

Abstract: This research delves into the constituent video elements embedded within micro-documentaries disseminated via the official museum video account on the Bilibili video platform. By joining video format with video content and combining pedagogy with amusement, the study scrutinizes the inclination of online viewers toward consuming museum videos. Using content analysis, a group of 21 museum official accounts and 187 video instances is selected from the Bilibili video platform. These are subsequently subjected to meticulous examination of video attributes (including captions, animations, and special effects) and video content aspects (encompassing thematic orientation, narrative structure, and didactic significance). The findings underline that longer museum videos tend to encapsulate a more significant amount of knowledge, with audiences showing a tendency to engage after possession. Additionally, the complexity of constituent elements influences the spectator's inclination to engage. Notably, audiences' preference leans towards the formal aspects rather than the substantive content. This highlights the potential for museums to enhance the range of video formats, seamlessly merging video content with light-heartedness. This, in turn, leads to the creation of videos enriched with educational value and captivating. The overarching aim is to enhance viewer traction.

Keywords: Bilibili; Museum Video; Content analysis; Video form; Video content

Citation: Ren, X. (2023). What Are the Elements That Make Up an Official Museum Video? An Analysis of the Official Video Content of the Museum on the Bilibili Video Website. In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023-- International Conference on Social and Education Sciences* (pp. 458-479), Las Vegas, NV, USA. ISTES Organization.

Introduction

Museum-uploaded videos offer educational and entertaining content in line with their objectives, drawing online viewership (Gladysheva et al., 2014). In recent times, museums have progressively shifted their focal point towards the public, embracing fresh social responsibilities that align with their societal mission. Presently, museums have embraced a novel societal role as delineated by the International Council Of Museums (ICOM; affiliated with UNESCO) in 2022: "A museum is a non-profit, enduring establishment in service to society, engaged in researching, amassing, conserving, interpreting, and displaying both tangible and intangible heritage. Accessible and all-encompassing, museums foster diversity and durability. They function and communicate

ethically and proficiently, with community involvement, providing a range of experiences geared towards education, gratification, contemplation, and knowledge exchange." Simultaneously, with the evolution of new media, the museum sector has experienced a pivotal expansion on the Internet, transitioning from purely physical exhibitions to an ongoing digitization process. This extension enables museums to access a more comprehensive online audience, facilitating the diffusion and progression of traditional culture in the digital realm. Hooper-Greenhill (2020) asserts that museums are not impartial spaces but actively facilitate the generation of meaning. They function as repositories for artifacts, allowing visitors to exhibit, construe, and encounter them. It is pivotal for museum administrators to educate and enlighten visitors, inciting discourse to acquire feedback and insights (Arends et al., 2009). Concurrently, online museum videos have the capacity to motivate audiences to physically visit museums (Vorderer, 2001). In the contemporary milieu of new media, Uttal & Doherty (2008) propose that visualization is near-ubiquitous, with its potency often stemming from visual perception rather than abstract or symbolic cognition.

Museums are capitalising on the rapid advancements in digital technology to convey cultural knowledge through succinct videos. Commencing in 2020, numerous museums have established their official presence in Bilibili, yielding commendable outcomes. Of note is the Palace Museum, which has captured paramount attention, amassing a following of 91.5w (bilibili.com/). Streamlining short video production has democratized online visibility, enabling a broader spectrum of museums to engage in the digital domain. Nonetheless, the gradual simplification and proliferation of video creation have resulted in a preponderance of museum videos centering on mundane scenarios, characterised by comprehensive editing and fragmented presentation. The style of video presentation hinges upon the amalgamation of constituent elements.

A substantial divergence is discernible regarding page views for videos originating from China's official museums. Periodic variances in page view counts are evident even when videos from the same museum are concurrently released. Particular museum videos command more pronounced attention than others. Illustratively, among the video repertoire on Bilibili, those disseminated by the China National Silk Museum span from a pinnacle playback volume of 114w to a modest 37 (bilibili.com/). Analogous fluctuations manifest within the confines of the same official account. Against this backdrop, the present inquiry embarks on deconstructing the content encapsulated within select videos propagated by 21 official museums in Bilibili. The aspiration is to discern the elemental constituents of these videos, investigate the audience's involvement with them, and elucidate their predilections. Concurrently, the study endeavors to identify overarching characteristics that typify official museum videos and identify facets that are receptive to augmentation.

Literature Review

Video Narrative

Visual arts proficiently convey information and facilitate retention (Spiegel et al., 2013). In contrast to conventional film, video emerges as a more economical and accessible medium, empowering filmmakers to

craft without requiring substantial financial resources or extravagant equipment (Adesanya, 2000). This medium ardently pursues high-caliber audio-visual narratives well within the grasp of unremarkable communicators for autonomous production. Moreover, succinct video clips commandeer attention and evoke a fascination for online content (Liu et al., 2018). Pera (2016) and Liu et al. (2018) posit that concise videos engender emotional bonds with viewers, cultivating a collectively shared experience. Although entertainment is the predominant impetus in media consumption, the quest for knowledge acquisition also assumes a prominent role (Bryant & Vorderer, 2013). Bilgram et al. (2008) expound, "Intrinsic motivation emerges from the activity itself, bequeathing users a sense of delight, exploration, and creation, thereby enabling them to realise their full potential." This augments audience interest, nurtures curiosity, and heightens attentiveness (Falk & Needham, 2011).

Museum Video

Within museum learning and education departments, digitization, operating as an open network system, adeptly aligns itself with the foundational tenets, methodologies, and roots prevalent in community arts and outreach. These facets, in various fashions, prefigure the Cultural Values of Inclusion, Participation, and Network Culture (Walsh et al., 2014). In order to navigate and thrive in the digital epoch, museums necessitate the exhibition of heightened innovation and adaptability (Maria, 2020). The visual characteristics of museum videos exert a pronounced sway over users' emotional perception of these spatial contexts. Engaging with museum videos incites aesthetic gratification, replete with descriptors embracing concepts of beauty, style, meticulous craftsmanship, and visual magnificence (Gladysheva et al., 2014).

Exploiting the distinct bidirectional essence intrinsic to the Internet, museum videos harbour the potential to kindle augmented allure for geographically removed museum patrons (Spadaccini, 2001). When executed with precision, these videos can evoke a more profound user engagement, propel the advocacy of museums, and germinate digital communities (Kidd, 2010). Nonetheless, despite the all-encompassing pervasiveness of the Internet within the contemporary museum milieu, an encompassing research inquiry addressing its assimilation and reflective ramifications remains, as yet, a scholarly endeavor requiring further elucidation and expansion (Gladysheva et al., 2014).

In summary, the progression of museum videos holds the potential to augment museums' prominence and allure a broader demographic. As the online sphere is championed, it yields data that can be leveraged to deduce the efficacy of promotional endeavours contingent upon audience predilections. Thus, while emphasising educational and cultural communicative roles, museums are advised to concurrently direct their attention towards the constituent elements encapsulated within the videos and strategies for garnering heightened attention. Hence, the primary objective of this investigation is to comprehend the constituent elements woven into official museum videos, to assess their impact on the audience, and thus, to unveil the overarching traits and current state characterising official museum videos.

Method

Data Collection

To address the research inquiries, a selection of 21 official museum accounts from the Bilibili video website, each amassing a following of over 10,000 enthusiasts from 2020 to 2023, has been extracted (refer to Appendix I). Additionally, 187 micro-documentary video samples, each possessing a runtime not exceeding 5 minutes, were chosen randomly from this cohort of 21 accounts for content analysis. The rationale underlying the selection of the Bilibili video website stems from several considerations: Primarily, it constitutes a prominent online video-sharing platform within China, boasting an expansive user base. According to the Sohu website's 2023 first-quarter report, the platform recorded an average of 315 million monthly active users, dedicating 96 minutes to daily engagement. As a video-centric platform, it enjoys robust viewership and attention. Additionally, features such as sharing, liking, and bookmarking are augmented by the display of page view statistics. This multiplicity of functions renders it inclusive of a comprehensive audience and adept at expediently accessing pertinent data conducive to quantitative analysis. Aside from these merits, the platform is relatively nascent, rendering it an appealing choice for researchers endeavouring to undertake a pioneering exploration of contemporary Chinese youth culture.

In selecting a suitable video account, the initial step involves searching on the Bilibili website for the museum's official video account, with particular attention directed towards identifying noteworthy disparities in fan numbers. This examination reveals that certain subjects command a substantial following, encompassing up to 910,000 followers, while others exhibit a modest count, with a mere seven adherents. Alignment in the number of videos disseminated, along with their content and temporal release, is deemed imperative. To achieve a more comprehensive research outlook, video content from museum accounts boasting over 10,000 followers is extracted. Concurrently, a stochastic approach is adopted in selecting museum accounts, with videos conforming to prescribed duration parameters at most 5 minutes. During the account screening process, some concerns regarding video editing emerged. For instance, the China Advertising Museum, with a fan base of 134,000, uploads dated advertising videos to the platform, lacking the requisites of refinement and editing. This disparity makes further refinement indispensable to align the video content with the stipulated criteria. Consequently, despite having fulfilled the criterion of achieving the mandated follower count, the museum video content needs to be more inadmissible for sampling. Subsequently, the progression transitions to viewing and categorising the 187 selected video samples (n=187).

Coding Schema of Content Analysis

The course of content analysis adheres to the quintessential five-step framework articulated by McMillan (2009), encompassing the (1) formulation of the research inquiry, (2) identification of the object of scrutiny, (3) establishment of the coding structure, (4) compilation of data, and (5) scrutiny of the amassed data. With the intention of instilling objectivity into the recording and quantification of information within museum videos, a

meticulous content analysis framework is methodically devised, complemented by framework metrics. Dobrian and Sekar et al. (2011) posit that both the configuration and content of videos wield influence over user engagement. They ascertain that videos of augmented resolution tend to command prolonged viewership periods. Consequently, a conclusive determination is made to undertake a quantitative assessment of qualitative content encompassing diverse textual, visual, auditory, and symbolic components (Krippendorff, 2018). Florin et al. (2011) advance the notion that video data analysis should be executed from a dual vantage point, spanning video structure and content. This bifurcated approach is envisaged to comprehend how videos holistically impact user engagement comprehensively.

Table 1 presents the quantitative data about the tally of likes, page views, collections, and duration attributed to museum short videos. The patterns above hold the capacity to elucidate the video performance dynamics. The temporal extent indicates the video's intended length. In contrast, the proclivity of the audience towards the video can be gleaned from metrics such as the number of likes, page views, and collections. The content mentioned above necessitates the infusion of empirical data to effectuate a substantive analysis of video popularity, thereby facilitating the derivation of concrete insights.

Table1. Number of likes, page views, collections and duration of short museum videos

Coded Content	Description	Labeled content
Likes	The number of likes of the video	Direct annotation information
page views	The number of views of the video	Direct annotation information
Collections	The number of collections of the video	Direct annotation information
Video Duration	The duration of the video	Direct annotation information

Table 2 delineates the quintet of perspectives constituting the objective format of videos, encompassing Audible, Textual Form, Video Format, Video Screen Style and Video editing style. As exemplars of visual artistry, succinct museum videos prove proficient in conveying information (Spiegel et al., 2013), concurrently affording viewers the opportunity for aesthetic gratification. Such admiration manifests in their discernment of visual embellishments characterised by beauty, elegance, and well-crafted visual elements (Gladysheva et al., 2014). Consequently, the video's objective format is amenable to analysis grounded in both the auditory and visual domains. Disparities in constituent elements within museum videos are manifest, presenting variations in their compositional attributes.

The study aims to investigate the use of music or sound effects in museum videos, the consideration of diverse audience acceptance through the addition of text information, the use of real-time filming in official museum

videos, and the audience's interest in videos with more visual effects. Thus, we put forward this schema.

Table2. Video Objective Format

Video format	Description	Labeled content	Reference	
Audible				
	Background music and sound effects (B & S)	Whether the video has background music	Has background music = 1 No background music = 0	
	Narration or Simultaneous voice (N or SV)	Whether the video is narrated or accompanied by a voice-over	With voice-over or simultaneous sound = 1 No voice-over or simultaneous sound = 0	(Krippendorff, 2018)
visually				
	Opening and Ending Theme (O & E)	Whether the video has a prominent description of the topic in the opening and closing credits	Highlight the theme = 1 Does not have a prominent theme = 0	
Textual Form	Subtitle	Whether the video has subtitles	Has subtitles = 1 No subtitles = 0	(Krippendorff, 2018)
	Title	Whether the video presents a clear title	Has clear title = 1 No clear title = 0	
	Note	Whether the video has added caption annotations	Has a subtitle annotation = 1 No subtitle annotations = 0	
Video Format	Video frame	Whether the video is in landscape or portrait	Landscape = 1 Vertical = 0	(Florin et al., 2011)
	Video resolution	What is the resolution of the video	Direct annotation information	
Video screen style	Live shooting	Whether the video has added live action	Has live-action footage = 1 No live action = 0	
	Data lens	Whether the video has added profile shots	With profile picture = 1 No profile picture =	

Video format	Description	Labeled content	Reference
		0	
Animation	Whether the video has added animation effects	Has animation = 1 No animation effect = 0	
Video editing style	Transition effect	Whether or not the video has a transition effect added	Has a transition effect=1 No transitions = 0
	Special effects	Whether or not the video has added special effects	Has special effects = 1 No special effects = 0
			(Florin et al., 2011)

Table 3 presents the constituents of video content, scrutinized through the tripartite lenses of video subject, narrative structure, and video purpose and significance. The visual attributes inherent to museum videos profoundly influence the audience's emotional perception. Scholars posit that entertainment constitutes a pivotal facet of the online visitor experience while concurrently serving as an educational instrument (Gladysheva et al., 2014). The content discussed above suggests that museum videos are a form of visual art that effectively conveys information and provides aesthetic pleasure to viewers. The video objective format can be analyzed from both visual and auditory perspectives, and differences in elements can be observed in museum videos. It is worth exploring whether museum videos may feature objects as the main subject, follow the three logic lines of contemporary museum exhibitions, incorporate narrative features to establish an emotional connection with viewers and whether museum video dissemination has specific purposes and meanings.

Table3. Video Subjective Content

Video content	Description	Labeled content	Reference
Video body			
	Narrative subject (NS)	What is the narrative subject of the video, a person or an object	A narrative subject is a person = 1 A narrative subject is an object = 0
Narrative structure			
Narrative logic	Time and space development logic (T&S)	Whether the video has a temporal and spatial development logic	Has a temporal and spatial developmental sense = 1 (Ren, 2014)

Video content	Description	Labeled content	Reference
		Does not have spatiotemporal development logic = 0	
Symbolic classification logic (SCL)	Whether the video has symbolic classification logic	Has symbolic categorization logic = 1 No symbolic classification logic = 0	
Contextual interpretation logic (CIL)	Whether the video has contextual interpretation logic	Has contextual interpretation logic = 1 No contextual interpretation logic = 0	
Narrative Features	Storytelling	Whether the video has a storytelling logic	Has a story = 1 No storytelling = 0
	Thematic	Whether the video is thematic	Has a theme = 1 Does not have a theme = 0
	Educational	Whether the video is educational or not	Educational = 1 Does not have educational qualities = 0
The purpose and meaning of the video			
	Spreading effect (SE)	Whether the video is directly communicating about the museum and related exhibitions or indirectly communicating about the museum using content such as artifacts and collections	Museum of Direct Communication = 1 Indirect Communication Museum = 0 (Rosendale & Longcore, 2015)
	Video meaning (M)	Whether the video is for entertainment or	Entertainment = 1 Cultural heritage = 0 (Gladysheva et al., 2014)

Video content	Description	Labeled content	Reference
	cultural heritage	= 0	

Coding, Reliability, and Creating Diagrams

During the period spanning July 21 to August 7, 2023, a comprehensive analysis of N=187 video samples is conducted by two skilled coders. These videos, each not exceeding five minutes, are randomly selected from the roster of museums possessing official video accounts on the Bilibili video website. The codification process is undertaken by the coders above, both of whom have undergone prior training in adherence to the stipulated coding manuals. The said manual delineates explicit criteria governing the video codification process.

A multitude of video attributes, including factors such as video duration, video page views count, video likes count, video footage, video subject, video's educational utility, and video's entertainment value, are subject to codification. To establish the veracity of the coding manual, the video samples are independently coded by both coders. It is noteworthy that no inter-coder communication is facilitated during the coding exercise. After the conclusion of the coding process by each coder, a joint verification is executed. Upon rigorous evaluation, the codebook attains a commendable level of reliability, denoted as $M(\alpha K) = 87.50\%$ (Refer to Appendix II).

Subsequent to data acquisition, the data is subjected to a systematic classification process. To illustrate, the sample content is categorised based on video duration, delineating distinct segments: less than one minute, one to two minutes, two to three minutes, three to four minutes, and four to five minutes. This categorisation facilitates a nuanced data analysis to discern potential correlations between video length and viewers' proclivities for viewing. Furthermore, the data encompassing video likes, collections and page views within specified intervals is examined. This inquiry seeks to ascertain whether the constituent elements of videos influence audience preferences.

Results

Overall Characteristics

Figure 1 illustrates the distribution of various encoded data categories across the spectrum of 187 videos. Notably, the highest proportion of 100% pertains to both Contextual Interpretation Logic and Thematic attributes, underscoring their ubiquity across all videos. The data also reveals relatively elevated proportions for Symbolic Classification Logic, Opening and Ending Theme, and Educational elements, corresponding to 99.47%, 99.47%, and 97.86%, respectively. Conversely, the categories with less substantial representation encompass the Museum of Direct Communication (17.65%) and Entertainment (3.21%). Animation, Special Effects, and Transition Effects command relatively elevated proportions in visual effects, registering at 41.71%, 53.48%, and 79.68%, respectively.

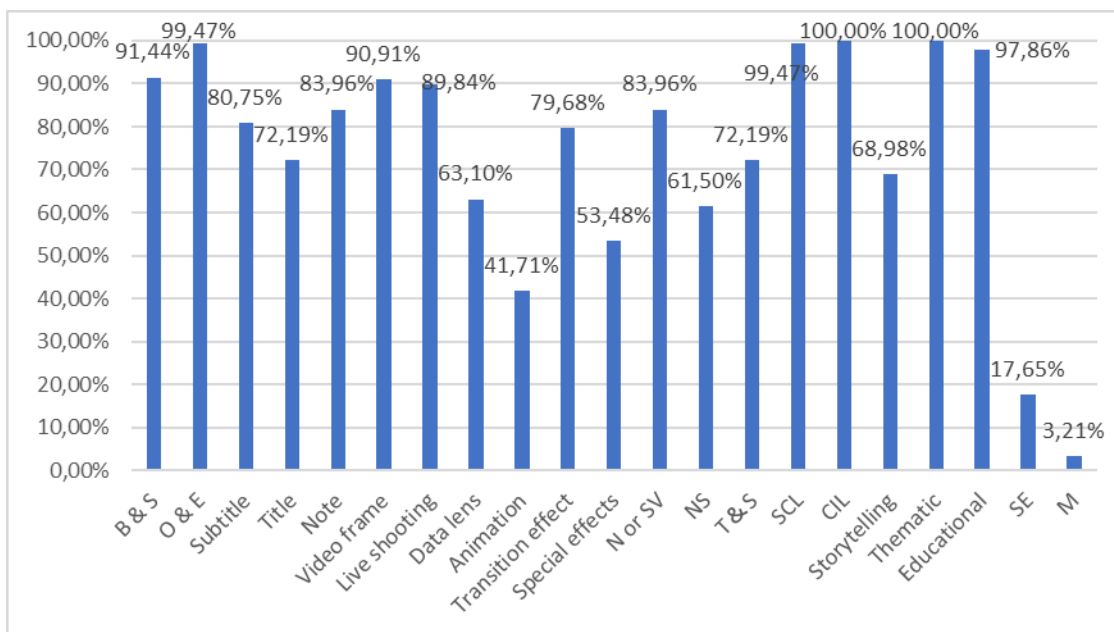


Figure 1. Percentage of elements in all samples (n=187)

Figure 2 explains the frequency distribution of video objective format elements across videos of distinct durations. Meanwhile, Figure 3 delineates the frequency distribution of subjective video content elements within videos of varying lengths. The discernible pattern in the data indicates an inclination towards heightened element complexity as videos extend in duration.

Across all videos, the most prevalent elements encompass Background Music and Sound Effects (87.5% - 95.65%), Opening and Ending Theme (97.37% - 100.00%), Subtitles (70.18% - 84.78%), Annotations (50.00% - 89.74%), Horizontal Screen Video (50.00% - 97.83%), Live Shooting (84.21% - 100.00%), Narration or Simultaneous Voice (50.00% - 89.74%), Contextual Interpretation Logic and Thematic (97.37% - 100%), and Educational Content (94.74% - 100%). Conversely, the least prevalent elements encompass the Museum of Direct Communication (8.70% - 26.32%) and entertainment as a Communication Mechanism (0.00% - 25.00%).

A conspicuous distinction in element frequency is discernible between videos lasting 0-1 minute and those surpassing 1-minute duration. Elements such as Background Music and Sound Effects, Opening and Ending Theme, Subtitles, Live Shooting, Symbolic Classification Logic, Contextual Interpretation Logic, Thematic and Educational Content are more pronounced in videos ranging from 0 to 1 minute.

Some elements are less commonly observed in this duration bracket, such as Title, Data Lens, Animation, Transition Effect, Special Effects, and Time and Space Development Logic. Prolonged museum videos are characteristically more intricate, accommodating various elements. This propensity can be attributed to the additional temporal allowance for narrative and character development, thus permitting more intricate audio-visual constituents.

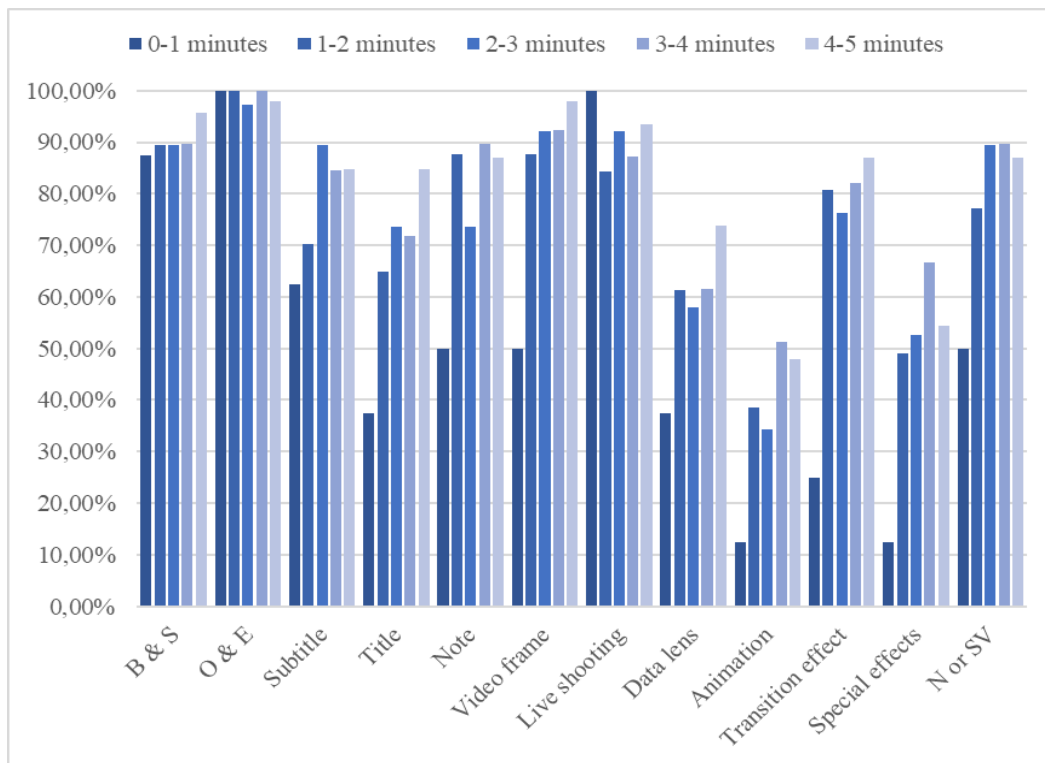


Figure 2. Percentage of video objective form elements of different durations

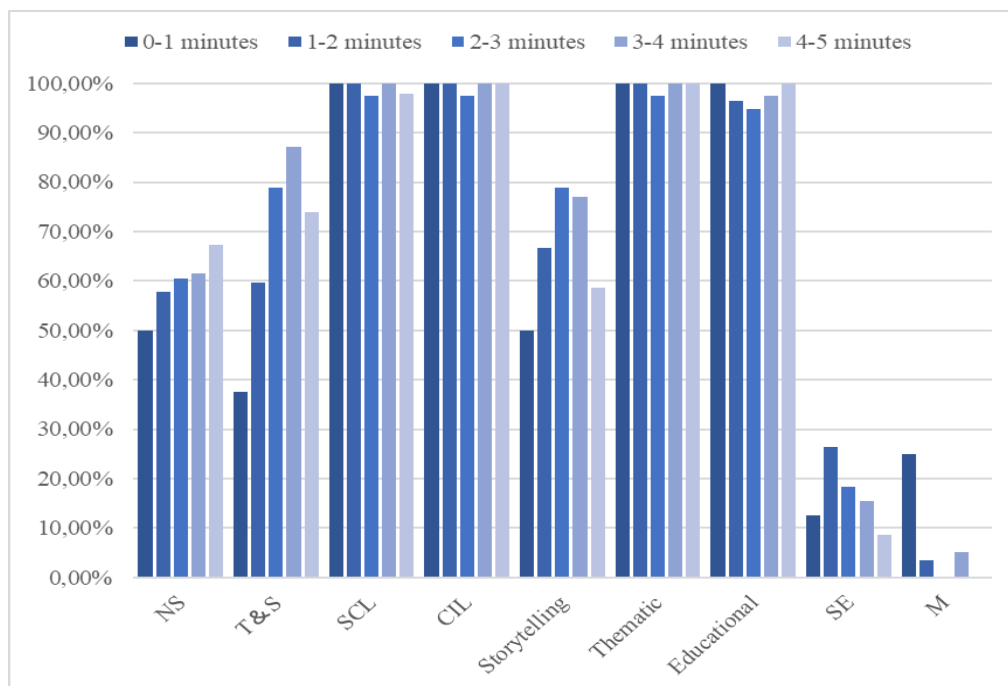


Figure 3. Percentage of video subjective content elements of different durations

Video Differences with Different Likes, Page Views, Collections

Figure 4 illustrates the mean counts of likes, page views, and collections across videos of varying durations. The

data reveals a positive correlation between video length and viewer engagement metrics. As video length extends, there is a commensurate increase in both page views and collections garnered. Specifically, videos spanning 0 to 1 minute exhibit the lowest mean likes count, averaging 1071. In contrast, videos spanning 4 to 5 minutes exhibit the highest mean page views count, averaging 35376.57. Additionally, the same 4 to 5-minute videos demonstrate the highest mean counts for likes, page views, and collections. On the other hand, videos in the 0 to 1-minute category record the lowest mean figures for likes, page views, and collections. The data distinctly underscores that museum videos with 4 to 5-minute durations are more predisposed to amassing appreciable likes, multiple viewings, and inclusions within collections.

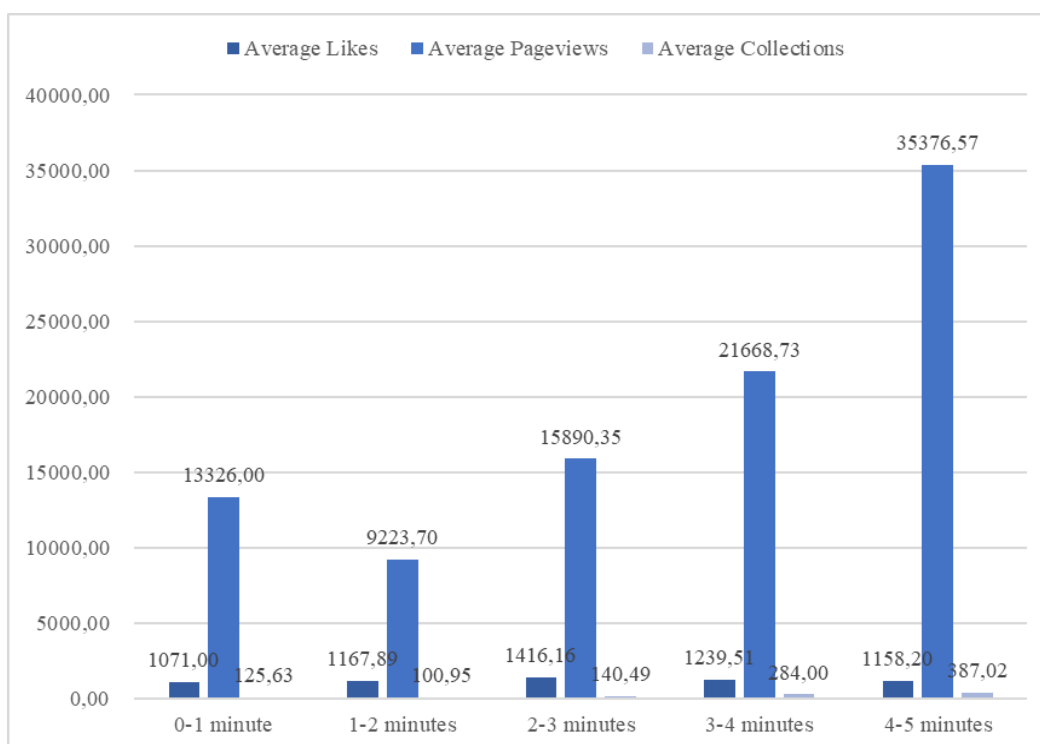


Figure 4. The average amount of likes, page views, and collections for different durations of all samples (n=187)

Figure 5 delineates the disparities in video elements between videos accumulating less than 50 likes and those amassing over 1000 likes. Notably, videos garnering more than 1,000 likes exhibit a relatively heightened proportion of Data Lens employment, Live Shooting integration, and Subtitles inclusion compared to videos with fewer likes. Conversely, Figure 6 presents the contrast in element prevalence within videos eliciting less than 500 pageviews and those yielding more than 5000 pageviews. In this context, videos garnering over 5000 pageviews manifest a comparatively elevated representation of Titles, Data Lens application, Subtitles integration, Animation incorporation, Transition Effects utilization, and Special Effects integration, in contrast to videos with fewer pageviews. Akinly, for videos experiencing modest viewing volumes, the proportion of Museum Direct Communication significantly outstrips that of videos with high viewing volumes, registering at 30.23%, as depicted in Figure 6. Figure 7 further illuminates the variations in video elements between videos securing fewer than ten collections and those accumulating more than 100 collections. Notably, videos amassing

over 100 collections exhibit a relatively augmented percentage of Title usage, Annotations inclusion, Subtitles integration, Animation incorporation, Data Lens application, Transition Effects utilization, and Special Effects incorporation compared to videos with fewer collections. Notably, videos characterized by a standard collection volume exhibit a markedly more significant proportion of Museum Direct Communication than those with high collection volumes, registering at 28.81%. The remaining elements exhibit marginal discrepancies.

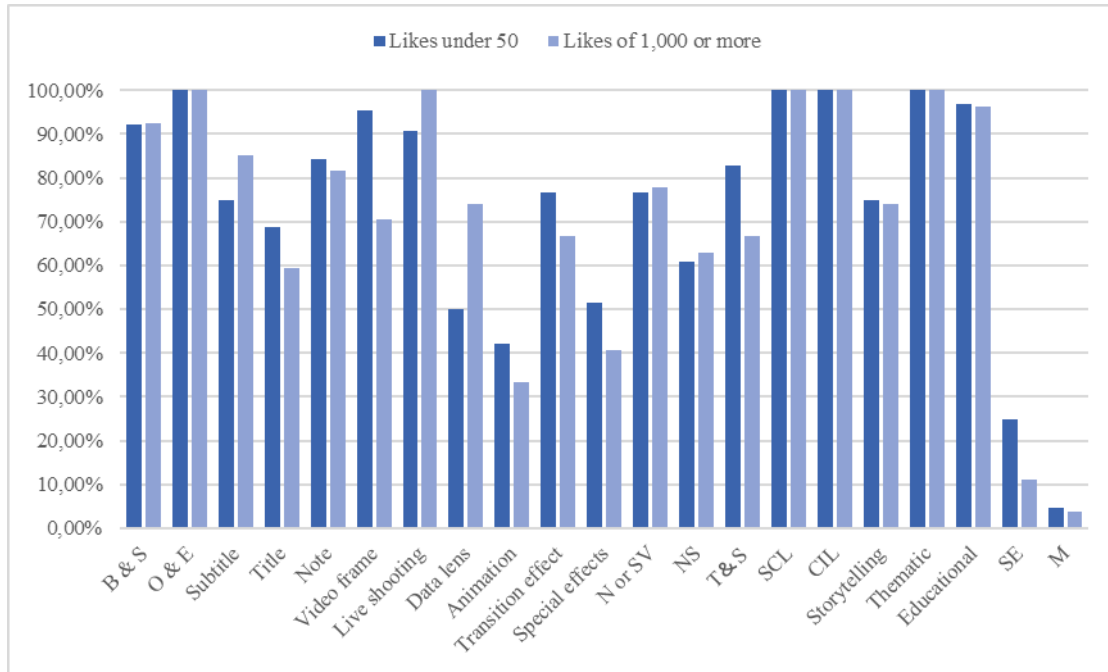


Figure 5. Comparison of elements contained in videos with less than 50 likes and more than 1000 likes

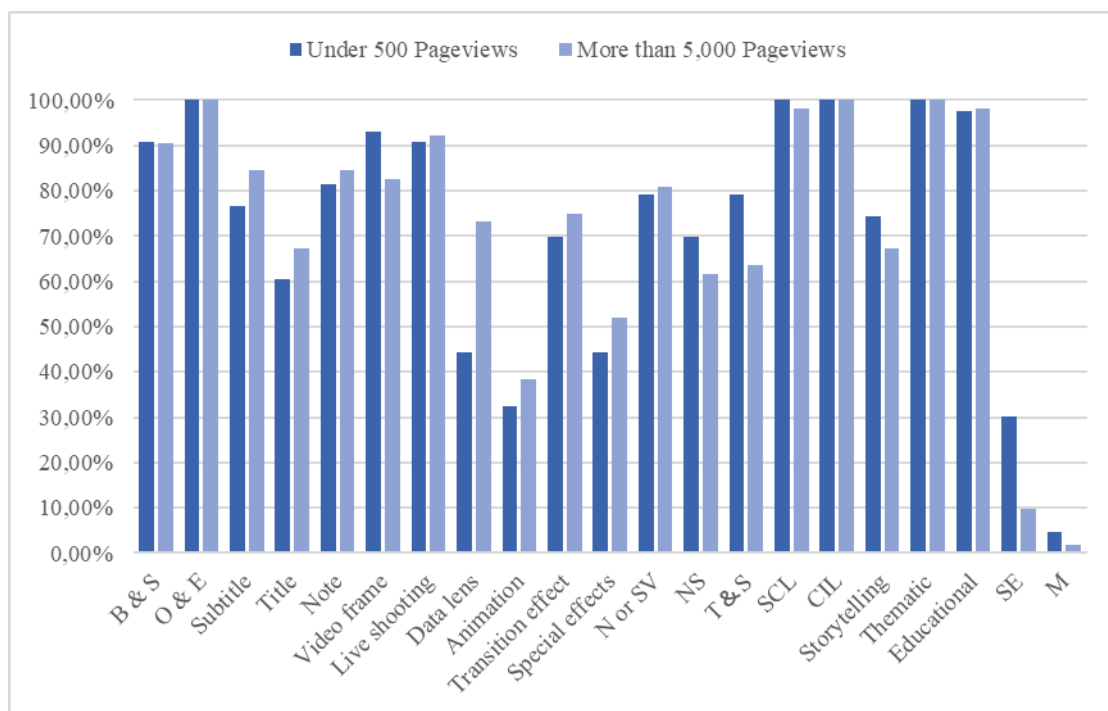


Figure 6. Comparison of elements contained in videos with page views below 500 and above 5000

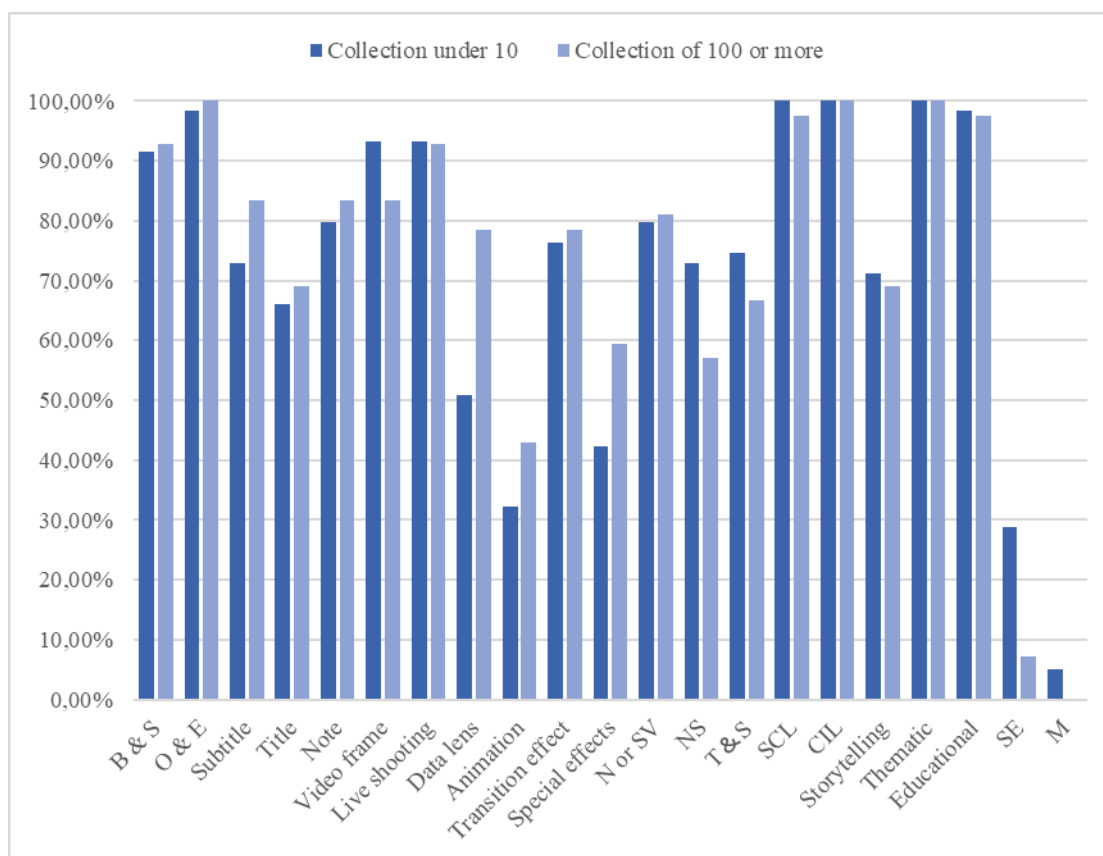


Figure 7. Comparison of elements contained in videos with collections below 10 and above 100

Discussion

Overall Characteristics of Museum Videos

The ongoing discourse examines the fundamental features intrinsic to museum videos, drawing from analyzing their constituent elements and distinct traits. Notably, this discussion clarifies that museum videos, especially those of concise duration, often exhibit qualities reminiscent of folk short videos. In contrast to more elaborate counterparts characterized by substantial financial investments and meticulous production akin to micro-movies, these museum videos often forgo embellishments like animation, special effects, and transitional devices. Instead, they lean towards naturalistic portrayals, imbuing them with a lifelike semblance. The effectiveness of short videos as a conduit for online content dissemination can be gleaned from existing literature. Liu et al. (2018) illuminate the potential of short videos to function as a potent mechanism for online promotional endeavors. This aspect expands the scope of communication outreach, reaching beyond museums and scholarly circles to accommodate a broader audience spectrum, including individuals with a moderate educational backgrounds.

Furthermore, the economic viability of this medium and its enhanced accessibility compared to cinematic equivalents is emphasized by Adesanya (2000), empowering filmmakers to create imaginative output without the need for extravagant financial allocations or sophisticated equipment. The convergence of education and

entertainment forms a pivotal axis around which museums' disseminated videos revolve. As articulated by Gladysheva, Verboom, and Arora (2014), these productions blend educational elements with aesthetic allure, enticing users to engage with artistic content in the digital realm. This convergence also places a significant responsibility on contemporary new media professionals, compelling them to identify and present projects rooted in primary thematic goals, a notion elaborated by Marty (2007). Hence, a distinct inclination emerges where most museum videos are infused with specific themes, primarily aimed at propagating traditional cultural values. The combined attributes in museum videos crystallize a unique paradigm where succinct presentations mirror characteristics inherent in folk short videos. This penchant for naturalistic depictions and the extended reach facilitated by short video platforms underpin a strategic shift in audience engagement. By uniting educational and entertainment elements, these videos traverse a trajectory highlighting artistic merit and educational imperatives, all while foregrounding traditional cultural heritage. This discourse underscores the prominent attributes that collectively shape the landscape of museum videos within the contemporary digital milieu.

Audience Viewing Habits of Museum Videos

Conversely, for lengthier museum videos, spectators may bookmark them before viewing. Extended videos encompass a wealth of information that requires multiple viewings for comprehensive absorption. Bilgram et al. (2008) expound on how "intrinsic motivation emanates from the activity itself, fostering a sense of enjoyment, exploration, and creation, enabling individuals to harness their full potential." While media engagement is evidently buoyed by entertainment, the desire for knowledge acquisition persists (Bryant & Vorderer, 2013). While amusement predominantly propels media consumption, the pursuit of enlightenment holds significant sway, particularly in the context of museum videos. Here, the viewers' journey through ancient cultures, historical narratives, and artifacts kindles an avid inquisitiveness. These videos offer a convenient and alluring conduit for satiating intellectual curiosity and broadening cultural cognizance. This intrinsic motivation manifests particularly when grappling with protracted, informative museum videos. Audiences experience a sense of achievement and contentment as they navigate the video, assembling fragments of information to construct a more holistic mental tapestry. Nevertheless, extended museum videos often encompass heightened knowledge density, prompting viewers to engage in iterative viewings to fully assimilate the content. The iterative viewing approach facilitates a more profound digestion of content, yielding insights into the essence of the presentation's culture and history. Furthermore, Gladysheva et al. (2014) and Kidd (2010) posit that social networking platforms fostering online word-of-mouth are potent instruments of marketing outreach. If adroitly executed, these digital domains can engross audiences comprehensively, propel museum advocacy, and give rise to virtual communities. Such platforms are efficacious in nurturing audience engagement and fostering communal bonds. This interconnection augments the allure of museum videos. Viewers are drawn to the content's popularity, as attested by likes and favourites, thereby eliciting a self-perpetuating cycle that engenders heightened participation and exploration.

However, in shorter videos, information might be comparatively succinct. Users derive satisfaction or fulfillment from online museum videos (Gladysheva et al., 2014). Although these videos may encompass modest informational content, they aptly address short attention spans and immediate informational cravings. Viewers garner a sense of accomplishment and gratification from these concise experiences, often resolving specific queries or piquing momentary curiosity. Nevertheless, such gratification is ephemeral, and the constrained temporal scope of shorter videos inevitably curtails the depth of inquiry and comprehension achievable through more extensive, comprehensive content. Marking longer museum videos as favourites embodies viewers' recognition of the profundity of dispensed knowledge and their aspiration to glean its maximal value through repeated viewings. The intricate interplay between intrinsic motivation, the quest for enlightenment, and the astute deployment of social media underscores the multifaceted character of media consumption and the nuanced manners by which audiences interface with educational and illuminative content.

The Relationship between Museum Video Duration and Form Differences

Moreover, with the elongation of video duration, its constituent elements may become correspondingly intricate. Both Gladysheva et al. (2014) and Dobrian et al. (2011) postulate that video format and content influence user engagement. The visual attributes of museum videos wield significant sway over the audience's emotional perception of these spatial contexts, and the distinct forms and content of videos exert substantial and autonomous impacts on audience engagement. The video's form encompasses its structural components, encompassing auditory, visual, and multimedia integration. In contrast, video content encapsulates the actual thematic matter expounded within the video, encompassing narratives, dialogues, imagery, and an array of information. Collectively, these facets coalesce to define the overall impact of the video on its audience. In the context of museum videos, they afford audiences a virtual portal into historical artifacts, cultural realms, and pivotal narratives. This immersive quality bestows viewers a sense of being ensconced within a museum ambiance, fostering an intensified affinity with the content and heightening engagement levels. Concurrently, the visual aesthetics of the video play a pivotal role in conveying the cultural resonance of the scrutinized artefacts and locales, ensuring the retention and recollection of the presented information.

Furthermore, users often derive aesthetic gratification from viewing museum videos, wherein notions of beauty, style, and meticulously designed visual effects come to the fore (Gladysheva et al., 2014). This augments the viewing experience, giving it a heightened sense of satisfaction. Visual excellence within a video holds a distinct aptitude for captivating and sustaining the audience's focus. When visual components are meticulously orchestrated, audiences are more prone to maintain sustained attention throughout the video, thus assimilating the conveyed information more effectively. Moreover, aesthetically compelling videos tend to stir positive emotions, ignite curiosity, and instill a sense of marvel within the viewership. This enhances perceptual engagement, fortifying the connection with the thematic content and leaving an indelible imprint within their memory. Furthermore, viewing these videos engenders a sense of gratification among the audience, incentivizing further exploration from the same source. Integrating aesthetics into museum videos necessitates a judicious equilibrium between design elements and content. These facets foster an immersive and captivating

viewing milieu, from visual effects to harmoniously interwoven video content. When spectators derive aesthetic contentment from their museum video experience, the likelihood of forging a profound nexus with the video's content escalates, nurturing sentiments of awe, curiosity, and reverence for the cultural and historical narratives underpinning the presentation.

The Form and Content of Museum Videos

The configuration of video form within museum videos holds a pronounced influence over the audience, often surpassing that of the content itself. The efficacy of visual arts in effectively conveying information and facilitating the retention of novel insights has been evidenced (Spiegel et al., 2013). This holds heightened significance within museum videos, where spectators can apprehend and encounter visual stimuli, obviating the need for abstract, symbolic contemplation (Uttal & Doherty, 2008). In this era of technological advancement and digital progression, the imperative for enriched visual experiences has concurrently intensified (Gladysheva et al., 2014). Consequently, audiences exhibit a heightened predilection for videos replete with special effects, animations, and transitions, engendering affirmative reactions. This trend underscores that these videos effectively amalgamate informative discourse with visually opulent and captivating presentations. Museum videos mediate intricate concepts and historical chronicles proficiently by harnessing imagery, animation, and visual enhancements. Furthermore, the interplay of visual effects and animation can impel multi-sensory stimulation, evoking profound and enduring impacts upon the audience. This invokes sentiments of awe, resonance, and curiosity and further augments the sense of active engagement. Cognizant of these dynamics, museums have been observed to reshape visitors' perceptions of science and their affinity towards scientific subjects (Rennie & Williams, 2002). Consequently, certain museums adeptly leverage the distinctive bidirectional attributes of the Internet, captivating online audiences (Spadaccini, 2008). A corollary strategy highlighted by Vorderer (2001) accentuates the strategic deployment of museum videos to invigorate virtual visitors' transition into physical attendees, motivating them to experience the museum milieu tangibly. This strategic maneuver strives to bolster the museum's educational dissemination and social service roles, thus effectively expanding its purview and influence beyond its physical confines.

In pursuit of advancing the educational and social outreach aspects, incorporating digitization as an expansive network framework harmoniously aligns with the undertakings of museum learning and educational domains. Their underpinning ethos, methodologies, and community-centric orientations resonate with the cultural values of inclusivity, participation, and the equitable distribution of cultural worth (Walsh et al., 2014). This collective synergy underscores a pervasive network culture that extends beyond traditional boundaries. Consequently, museum videos operate as catalytic agents that galvanize virtual visitors toward an experiential rendezvous with the museum. Virtual engagement is an enticement, motivating visitors to delve deeper through physical attendance and direct immersion in the exhibits. Museums function as transformative spaces, and through their amplified online presence, they attain an extended reach, thereby accentuating their social service function. The channel of video becomes instrumental in the conveyance of knowledge and information. Audiences are thus enabled to engender a profound understanding of scientific concepts and themes, consequently augmenting their

comprehension and engagement with science. In addition to this, the virtual sphere obliterates geographical confines, with museum videos substantiating an effective vehicle for museums to discharge their social service and educational obligations. This medium facilitates cultural encounters for individuals needing more means to engage with a physical museum.

Limitation

As with any empirical investigation, our study does entail certain limitations. Although the content analysis in our study was executed by a mere two coders, the procedural framework was characterized by systematic, objective, and quantitative criteria. Our efforts yielded commendable outcomes in terms of inter-rater reliability and the internal consistency of aggregated metrics. However, we acknowledge the intrinsic challenge associated with scrutinizing official museum accounts and video content on online platforms. The manual compilation of data by human coders introduces the potential for data collection oversight; thus, we must concede that some information may have been inadvertently omitted.

Furthermore, it is pertinent to note that the data collection window spanned from July 21 to August 7, 2023. Within this timeframe, web content is prone to alteration, a standard facet faced by research endeavors in the realm of the Internet. This inherent instability of digital information necessitates the judicious interpretation of our findings. Concurrently, we underscore the necessity for heightened granularity in the existing analysis. The examination encompasses solely a subset of video elements, rendering the sample size relatively modest. A prospect for future inquiry lies in expanding the scope of detection to engender a more comprehensive exploration of the subject matter.

Conclusions

In conclusion, the formulation of official museum micro-videos exhibits a discernible inclination towards a folk-oriented approach, characterised by relatively modest prerequisites for attaining audience acceptance. Moreover, lengthier videos possess the potential to encompass a greater magnitude of knowledge than audiences can feasibly assimilate in a single viewing, thereby motivating their inclination to bookmark and revisit the content on multiple occasions. Correspondingly, the augmentation of video duration correlates with an escalating complexity of its constituent elements, thus exerting a direct influence on the extent of audience engagement. The implications of this heightened complexity underscore the intricate equilibrium necessitated between sustaining audience interest while avoiding the risk of overwhelming them.

Remarkably, audience interest is conspicuously swayed by the structure of the video format and the manner of presentation, eclipsing the role of the content itself. This accentuates the significance of visual delivery and aesthetics in capturing and sustaining audience attention. China's emphasis on museums emulates the burgeoning surge in museum video production. These videos are poised to significantly cultivate cultural

awareness, foster education, and engendering historical comprehension. Moving forward, our trajectory involves a sustained focus on museum videos, with an overarching intent to broaden the ambit of our analysis. This enlargement will incorporate a broader and more diverse spectrum of samples, thereby fostering an enriched understanding of the manifold determinants that mold audience engagement. Throughout this trajectory, an encompassing and meticulous exploration of museum video elements and their ramifications on audience dynamics is anticipated to furnish valuable insights, ultimately facilitating the optimization of audience engagement and bolstering the educational potency of these endeavors.

Notes

1. http://news.sohu.com/a/682309233_120478947
2. <https://icom.museum/en/resources/standards-guidelines/museum-definition/>
3. <https://www.bilibili.com/>

References

- Adesanya, A. (2000). From film to video. *Nigerian video films*, 37-50.
- Arends, M., Goldfarb, D., Merkl, D., & Weingartner, M. (2009). Interaction with Art Museums on the Web. In: *Proceedings of the IADIS Int'l Conference WWW/Internet*, Rome, Italy, 2009, pp. 117-125.
- Bilgram, V., Brem, A. & Voigt, K.-I. (2008). User-centric innovations in new product development – systematic identification of lead users harnessing interactive and collaborative online tools. *International journal of innovation management* 12 (3), 419-458.
- Bryant, J., & Vorderer, P. (Eds.). (2013). *Psychology of entertainment*. New York: Routledge.
- Dobrian, F., Sekar, V., Awan, A., Stoica, I., Joseph, D., Ganjam, A., ... & Zhang, H. (2011). Understanding the impact of video quality on user engagement. *ACM SIGCOMM computer communication review*, 41(4), 362-373.
- Falk, J., & Needham, M. (2011). Measuring the impact of a science center on its community. *Journal of Research in Science Teaching*, 48(1), 1–12. doi: 10.1002/tea.20394
- Gladysheva, D, Verboom, J, & Arora, P.A. (2014). The Art Tube: Strategies, perceptions and outcomes of museums' online video portals. *Digital Culture and Education*, 6(4), 393–408. Retrieved from <http://hdl.handle.net/1765/77416>
- Hooper-Greenhill, E. (2020). *Museums and the interpretation of visual culture*. Routledge.
- Kidd, J. (2010). Enacting engagement online: framing social media use for the museum. *Information, Technology & People* 24 (1), 64–77.
- Krippendorff, K. (2018). *Content analysis: An introduction to its methodology*. Sage publications.
- Liu, X., Shi, S. W., Teixeira, T., & Wedel, M. (2018). Video content marketing: The making of clips. *Journal of Marketing*, 82(4), 86-101.

- Marty, P.F. (2007). The changing nature of information work in museums. *Journal of the American Society for Information Science and Technology* 58 (1), 97–101.
- Maria, A. (2020) . MUSEUMS DURING LOCKDOWN. *Arts Museology and Curatorship*, 181
- McMillan, S. J. (2009). The challenge of applying content analysis to the World Wide Web. *The content analysis reader*, 60–67.
- Pera, R., & Viglia, G. (2016). Exploring how video digital storytelling builds relationship experiences. *Psychology & Marketing*, 33(12), 1142-1150.
- Ren Lin. (2021). From Cultural Relics and Art to Historical Stories: Narrative Trends, Reasons and Reflections of Museum Exhibition Design in my country. *Southeast Culture*(04),158–163.
https://kns.cnki.net/kcms2/article/abstract?v=3uoqIhG8C44YLTIOAiTRKibYIV5Vjs7iy_Rpms2pqwbFRRUtoUImHV8XQhYSbiSf3SbS7zuEg159aAy2n9uwqgWrtEvmf884&uniplatform=NZKPT
- Rennie, L., & Williams, G. (2002). Science centers and scientific literacy: Promoting a relationship with science. *Science Education*, pp. 86, 706–726. doi: 10.1002/ sce.10030
- Rosendale, J. and Longcore, A. (2015). On Hard versus Soft News: A Content Analysis of Reporting by Three Nationally-Televised Evening News Programs. *Open Journal of Social Sciences*, 3, 57-61. doi: 10.4236/jss.2015.311008.
- Spadaccini, J. (2001). Streaming Audio and Video: New Challenges and Opportunities for Museums.
- Spiegel, A. N., McQuillan, J., Halpin, P., Matuk, C., & Diamond, J. (2013). Engaging teenagers with science through comics. *Research in science education*, 43, 2309-2326.
- Uttal, D. H., & Doherty, K. O. (2008). Comprehending and learning from 'visualizations': A developmental perspective. In *Visualization: Theory and practice in science education* (pp. 53–72). Dordrecht: Springer Netherlands.
- Vorderer, P. (2001). It's all entertainment – sure. But what exactly is entertainment? Communication research, media psychology, and the explanation of entertainment experiences. *Poetics* 29, 247–261.
- Walsh, V, Dewdney, A, Pringle, E, Tate, A. & LSBU (2014). Modelling Cultural Value within New Media Cultures and Networked Participation. Tate Royal College of Art/AHRC/Tate.

Appendix I. List of Museums

Serial number	Account	Attention	Sources
1.	Palace Museum	91.5w	https://space.bilibili.com/630399926?spm_id_from=333.337.0.0
2.	National Museum	77.8w	https://space.bilibili.com/668633019?spm_id_from=333.337.0.0
3.	Assistant at military museum	68w	https://space.bilibili.com/1070859358?spm_id_from=333.337.0.0
4.	National Museum of Classics	9.9w	https://space.bilibili.com/1661724329?spm_id_from=333.337.0.0
5.	Henan Museum	9.5w	https://space.bilibili.com/2069714048?spm_id_from=333.337.0.0
6.	China Silk Museum	6.8w	https://space.bilibili.com/492634749?spm_id_from=333.337.0.0
7.	Shanghai Natural History Museum	6.4w	https://space.bilibili.com/522599991?spm_id_from=333.337.0.0
8.	Official of Shaanxi History Museum	5.3w	https://space.bilibili.com/587983619?spm_id_from=333.337.0.0
9.	Chinese Character Museum	5.2w	https://space.bilibili.com/2114220618?spm_id_from=333.337.0.0
10.	Yunnan Provincial Museum	4.7w	https://space.bilibili.com/521892222?spm_id_from=333.337.0.0
11.	National Museum of Zoology	4.4w	https://space.bilibili.com/1138425339?spm_id_from=333.337.0.0
12.	Shanghai Power Station of Art	4.3w	https://space.bilibili.com/521610382?spm_id_from=333.337.0.0
13.	ShangHai museum	4.1w	https://space.bilibili.com/586852858?spm_id_from=333.337.0.0
14.	China Aerospace Museum	3.8w	https://space.bilibili.com/2072755420?spm_id_from=333.337.0.0
15.	Nanjing Museum	3.1w	https://space.bilibili.com/453923139?spm_id_from=333.337.0.0
16.	Suzhou Museum	2.6w	https://space.bilibili.com/513921922?spm_id_from=333.337.0.0
17.	Nanyue King Museum	2.5w	https://space.bilibili.com/486471890?spm_id_from=333.337.0.0
18.	Luoyang Museum	2.3w	https://space.bilibili.com/699221430?spm_id_from=333.337.0.0
19.	Tsinghua University Art Museum	2.3w	https://space.bilibili.com/591164459?spm_id_from=333.337.0.0
20.	Liangzhu Museum	1.7w	https://space.bilibili.com/574482597?spm_id_from=333.337.0.0
21.	Wuzhong Museum	1.7w	https://space.bilibili.com/625644321?spm_id_from=333.337.0.0

Appendix II. Intercoder reliability of variables

Serial number	Account	M (α K)
1.	Background music and sound effects	100%
2.	Opening and Ending Theme	100%
3.	Subtitle	97.30%
4.	Title	74.30%
5.	Note	87.70%
6.	Video frame	98.90%
7.	Live shooting	92%
8.	Data lens	80.70%
9.	Animation	85%
10.	Transition effect	89.30%
11.	Special effects	78.10%
12.	Narration or Simultaneous voice	97.90%
13.	Narrative subject	98.40%
14.	Time and space development logic	84.50%
15.	Symbolic classification logic	84%
16.	Contextual interpretation logic	74.30%
17.	Storytelling	81.80%
18.	Thematic	79.70%
19.	Educational	81.30%
20.	Spreading effect	89.80%
21.	Video meaning	82.40%
		87.50%

Lingua Cultural Concept as a Language, Culture, and Person Descriptive Methodology

Gayane Paul-Kirokoyants

Dallas College, Richland Campus, USA,  <https://orcid.org/009-0001-6996-0793>

Vladimir Vorobyov

The People's Friendship University of Russia, Russia,  <https://orcid.org/0000-0002-5906-3773>

Abstract: The functioning of any language is regulated not only by linguistic rules, but also by norms of social and cultural life. Nowadays, development of lingua cultural approach in worldwide education is conditioned by a re-construal of culture phenomena as a specific form of human existence. Until now, we have been dealing with an absence of sufficient quantity of widescale proceedings on systematization of lingua cultural methods and methodology. Being a relatively new metascience, linguaculturology existed for a couple of decades on a solely theoretical level. However, lately linguaculturology is getting a status of an applied science and its methods are successfully used in the process of teaching foreign languages. The culture of the country of the acquired language is represented as a part of communicative requirements for students. That means that the didactic material must be allocated purposefully and consequentially to form lingua cultural competence of every student. By presenting students with a holistic complex of cultural key concepts of studied language, a more precise picture of the world of studied language can be constructed.

Keywords: Linguaculturology, Concept, Methodology, Linguacultureme, Dictionary

Citation: Paul-Kirokoyants, G. & Vorobyov, V. (2023). Lingua Cultural Concept as a Language, Culture, and Person Descriptive Methodology. In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023 - International Conference on Social and Education Sciences* (pp. 480-495), Las Vegas, NV, USA. ISTES Organization.

Introduction

In the 80s and 90s of the 20th Century, there emerged a necessity for a new discipline which would unite the abilities of several scientific branches. Ronald Langacker talked about the necessity of a new discipline called cultural linguistics, and at the end of the 90s Harry Palmer wrote a fundamental work called "Toward the theory of cultural linguistics". At about the same time in Europe emerged a new science called linguaculturology.

The functioning of any language is regulated not only by linguistic rules, but also by the norms of social and cultural environment of an individual. The concept of social cultural determination of linguistic events was

prepared by the works of European scientists centuries ago. Their names are Wilhelm Humboldt in Germany, A. Meillet and E. Beneviste in France, and A. Potebnya in Soviet Union.

Nowadays the development of the lingua culturological branch of linguistics is conditioned by aiming to construe phenomena of culture as a specific form of human and societal existence. A triad of language, culture, and the identity/personality is put more actively forward as one of the most important factors of contemporary science. In mass cognition language, culture and personality are not associated with some kind of isolated branch of scientific research existing in scientific or other isolated areas. Interest towards that topic is getting more and more actual. Understanding of different types of mentalities is turned into political or even economic resources, and into key elements of development of our environment: popularity of linguistic politics, linguistic taste of time, dialogue of cultures, polycultural education, culture, language and personality. All those topics are actively researched from the position of theoretical lingua culturology.

Lingua culturology as a science has a goal to represent in systematic and holistic way units of language and culture in their correlation and mutual functioning. Linguaculturology should become oriented on the new system of contemporary cultural values, one of the whole and objective interpretation of the facts and events of cultural life. Linguaculturology is a multidimensional area of knowledge which pretends to be a methodology of the whole system of science about language and culture and personality, a new type of meta science. Linguaculturology functions on the deep level of semantics taking into account systematic and integrative approach to the phenomena of language and culture.

Lately, a new paradigm of linguaculturology has been established, and it is based on three branches: cognitivistics, semiology and hermeneutics. Position on the edge of linguistics, ethnolinguistics, humanities, and language gives linguaculturology status mechanisms of language and culture. Initially, this science was supposed to be purely theoretic and its goal was to define connection of language and culture; it was not oriented on the use in the teaching process. For a couple of decades, linguaculturology existed on a solely theoretical basis. However, lately, this branch of science is getting more applied status in the process of teaching foreign languages. A picture of a country of a taught language becomes one of the parts of communicative needs of students; it is an extralinguistic component based on the communicative situations and realized by verbal scenarios. By studying cultural content of verbal units, lingua culturology can observe them from the point of understanding those units in the fullness of their content and shades, in a degree closest to the maximum comprehension of the native speaker and carrier of the native culture.

Applied linguaculturology is an area of methodological knowledge; practically oriented knowledge about mutual functioning of language, culture and personality in various contexts; theory and practice of management of teaching process; culturological provision of foreign language lessons with specially selected material which is valuable not only from the point of grammar sentences but also from the point of national culture.

The linguaculturological approach gives us an opportunity to avoid simplification and fragmentation of material

given to students. Certain logically selected aspects of culture of the studied language presented in classroom give students the opportunity to form a full picture of the foreign reality with the help of research and non-linguistic content of selected areas.

This way lingua culturological research should refine an important area of management of linguistic teaching process in which lexical material should be tightly connected with tasks of cognizing culture. This should specify that the conceptual approach of just studying foreign language is typical for courses created with goals of forming linguaculturological competence of a student. When we present to foreign students a holistic unity of key concepts of studied language, we can help to construct the student's cognition of a different picture of the world of a studied language. Ideally, we should create coursebooks whose main units will be units of cognitive level of a language personality or a language picture of the world, opening mutual connections of lexemes in an aspect language-world, and units of the pragmatic level characterized by relation of a person with the world. However, it's a very difficult task to create a course book in which will be represented not only verbal, but also nonverbal, culturological units: conventional phrases and idioms, proverbs, et cetera. Some scientists think that it is not very realistic: It is impossible to input all the realities forming mentality of a certain nation into a cognition of a foreigner, because mentality of each nation is not the result of studying, but it is a result of life. Others think that identity is rigid and flexible, and to teach only easily comprehended ideas by any culture concepts without special peculiarities, features, and characteristics for a certain language and culture would be not worth trying. We should always select information taking into account the reality of cultural and national life, time, and historical epoch. Also, in the process of selecting linguaculturological materials, a special role is played by profiles of students, their level of education, their cultural identities, etc.

Linguacultural or languacultural approach is very important for multinational conversation based on the dialogue of cultures and it's really important for mutual functioning of language- culture-personality to form a subject of a multinational working.

Nowadays, theoretical and applied linguaculturology is resolved in forming independent subfields: conceptual-theoretical, comparative, and applied linguaculturologies. Despite the fact that establishing lingua culturology as a new humanitarian paradigm of scientific knowledge happened 40 years ago, its structure, typology, and terminology are still formed. A theoretical level of linguistic cultural knowledge is aimed at the formation and development of the theory of mutual functioning of language and culture, explanatory models and concepts of linguistic personality, and a linguistic picture of the world. Theoretical linguaculturology is focused on knowledge of languacultural events and processes, acquisition of new knowledge of language and culture as a whole, and about their independent components. The goal of applied linguaculturology is scientific support of some practical problems in the foreign language classroom. Applied linguaculturology tries to implement theoretical knowledge about language- culture- personality in the most efficient way and put it into everyday learning process.

Contemporary linguistic space is full of crisis and problem zones which makes languacultural knowledge

especially useful in its applied version.

Methodology

Philosophy defines methodology as a system of principles and methods in organization of theoretical and practical activity, therefore methodology is a study about this system. Methodology has a concept of scientific development and this concept is a methodology of transition from theory to practice. A method represents special approach to the studied phenomena, definite complex of approaches whose implementation creates the possibility to study given phenomena. That is why a method is always a system. Its specifics are defined by the object of study and the goal of the study. The specifics of any given method are defined by theoretical view on the object of the study and its goal. Methods of linguaculturology are a complex of analytical approaches, operations, and procedures, used by analyzing a mutual connection of language and culture. As soon as lingua culturology is an integrative area of knowledge which is absorbed in itself or its results of research in culturology and linguistics, ethnolinguistics and cultural anthropology, it uses a complex of cognitive methods and guidelines grouped around the meaning “language and culture”. In the process of linguaculturological analysis, methods of culturology and linguistics are used selectively.

Every scientific method has its restrictions and areas of use, but mutually functioning language and culture have so many aspects that cognizing their nature functions. The genesis with help of only one method is unrealistic. That is why there are a lot of methods complementing each other in the linguaculturological field.

In linguaculturology we use linguistic, culturological, and sociological methods, the method of content analysis, frame analysis, the narrative analysis of Propp, methods of field ethnography, open interviews used in psychology and sociology, the method of linguistic reconstruction of culture, experimental cognitive linguistic methods, and some others. The methods mentioned above complement each other with different cognitive principles, analysis, and approaches which allows lingua culturology to study its complex object-mutual functioning of language, culture, and personality.

The apparatus of metaphor analysis offered by George Lakoff obtains tremendous explanatory strength and allows to save results important for a problem of understanding mutual functioning of language and culture. This method allows to establish cognitively defined mismatches between compared languages. The special area of research-linguaculturological analysis of texts as they are authentic depositories of culture. That is why analysis of texts within a hermeneutic paradigm is very important. Within this paradigm, different methods and approaches are used, from interpretational to psycholinguistic.

Multiple goals of linguacultural research are evidence of multiple areas of linguaculturological studies. Those areas include studied phenomena which connect language and culture:

- 1) the meanings of language signs,

- 2) cultural connotations,
- 3) national-cultural components,
- 4) linguaculturemes;
- 5) background knowledge;
- 6) cultural semes;
- 7) cultural meanings and pre-meanings;
- 8) concept of culture;

As we can see, the object at which different methods of linguaculturology are aimed is linguistic/discursive activity considered from meaning and value point of view. The object of study and analysis is value-semantic space of language, the ways language embodies it in units and deposits and translates culture.

If we study the participation of language in constructing of material and spiritual culture, we use culturological methods and approaches: such as qualitative analysis, which includes the biographic method, psychological procedures, methods of stylistic analysis of personal documents and literature, methods of textology, and research of ethnic groups, and different mathematical and IT methods.

According to the linguaculturological concept, each language speaker is at the same time a carrier of culture; that means that language signs get an ability of fulfilling functions of signs of culture, so that way they serve as a means of presentation of main arrangements of culture. The advantage of linguaculturological studies is given to linguistic methods, approaches, and procedures:

diachronic method based on comparative analysis of various linguacultural units in time;

synchronic method comparing linguacultural units existing at the same moment;

structural-functional method presupposing a divide of cultural object on parts and detection of connections between those parts;

historical-genetical method, oriented on study of linguaculturological fact from the point of its origin, development, and its further existence;

typological method;

comparative-historical method aimed for comparison of native language cultural units in time and penetration and their essence;

communicative-pragmatic method allows to study live communication or discursive processes and its synchronous connection with ethnic mentality functioning and given cultural time frame;

cognitive discursive method allows to get inside of one of the most inner areas of culture-language cognition;

ethno-linguistic method, its methods and approaches allow us to discover isomorphism of structures and functions of forms of a language and types of national cultures;

psycholinguistic method which unfolds universal and ethnic cultural psychic mechanisms of emergence and comprehension of speech;

social linguistic methods contribute to comprehension of social factors influencing formation and development of a language personality and formation of national cultural component and semantic

language space.

The success of linguaculturological research at the beginning was ensured by synthesis of linguistic and culturological methods and approaches by studying lingua culturological objects. V. Vorobyov created the concept of linguaculturology and funded the school of linguaculturology in RUDN and introduced the concept of *linguaculturema*.

Lately, linguaculturologists design solely culturological methods of presenting cultural concepts based on the knowledge that methods of concept objectivation passing on hermeneutic circle give to a lingua culturologist a possibility of creating a speech-thinking “portrait of the cognized subject”. (E. Bartyminsky) In the process of creating the portrait, when separate fragments of the image of the subject are drawn, lingua cognitive selection and integration of separate culturally significant meanings occur (by origin, quality, appearance, functions, experiences) and their sign coding as semes of word’s semantic structure (phraseologism). Method of “*speech portrait*” (Ivanova, 2004) of language personality is used actively by linguists. In this method, they pair paradigms of linguaculturology and cognitive linguistics.

The search for optimal methods, approaches, and procedures in linguaculturology is still an ongoing process.

Theory and a Methodology of Creation of Linguaculturological Dictionary

The creation of a linguaculturological dictionary is very important for the process of foreign language acquisition. We suggest a linguaculturological dictionary which would combine in itself two types of dictionaries: ideographic (field arrangement of material) and academic (conceptual interpretation of words-realities). The dictionary would have a pronounced lingua didactic orientation which would be demonstrated by the selection of minimally sufficient material aimed at specific peculiarities of the culture of studied language, reflected in a certain way in lexica of a given language. The main topics of such a dictionary could be national culture, national history, national type, art, education, literature, philosophy, political, sports lives, etc.

Structure of the universal of a capability might be a base of its national variations which can take in account specific peculiarities off certain languages and cultures. By creating such a dictionary possibility of linguistic and cultural interference should be eliminated. Despite the limited amount of material, the linguacultural dictionary should aim to systematic and holistic interpretation of given linguacultural objects. It should overcome fragmented selectiveness which is a typical feature of similar vocabularies.

The object of linguacultural research is “conceptualized subject area and the language and culture”, and the method of this research should be a symbolological analysis of words defining the most important concepts or constants of national culture. Conceptual base of a lingua cultural dictionary is defined by principles we mention later. The main unit of the dictionary will be a *linguacultureme*.

Every national culture forms a unique system of values, models of behavior, lifestyles, and world images. As a cultural picture of the world as a complex of actual presentations of the world, environment, norms of morality, mentality of culture, correspondence with other cultures, models of behavior every culture is distinguished by its uniqueness. The picture of the world is reflected in language by forming what's the language picture of the world. Language units and their combinations reflect established in given national speaking community images and ideas of the world around and about human beings. These presentations express in specific resume of a form and the meaning, first of all in lexical units, in our system - linguaculturemes. The most frequently used linguaculturemes usually define the most important values of national culture. Those units are also regularly discussed in cultural texts. The amount of the most meaningful for the national culture linguaculturemes is not constant, as processes of globalization of cultures, integration of different cultures into the united world culture led to the formation of ideas, values, and forms of life equally important for the most cultures. As a result, the dictionary of meaningful ideas and concepts for the national culture is constantly enlarged. The depths of these processes are polycultural and poly logical tasks which are very actual for a lot of scientific disciplines and are very important for understanding of the way of life of contemporary peoples-representatives of different cultures.

A linguaculturological dictionary can be understood as the characterology of national culture from the lexical side. That means that a lexical composition of any language defines to a significant extent the “face” of the culture, its unique vision of the world. Lexical units which constitute the lingua cultural thesaurus are first of all linguaculturemes defining key concepts and ideas for the given national culture-concepts which correlate with the main values of the culture.

This idea of the linguaculturological dictionary is still new for contemporary linguistics. The task of the accurate defining of the composition of the thesaurus of any culture is on the first view seen as a very complicated task as we still don't have clear and precise criteria for assigning these or those lexical units to the most valuable of the given language of or culture. Usually, in western linguaculture lexical notions are viewed and researched as concepts. But the same concept could be represented by numeral lexical units, meanings of which are not constant. That is why concepts are usually presented by “*concept spheres*” which intersect with each other in their different parts.

The amount of language concepts which compose a dictionary of any national culture is it restricted. For example, in “The thesaurus of Russian culture” of 1997 are given only 50 main concepts as main values of Russian culture. Contemporary linguistics has developed an apparatus of methods for research on lexical composition of a language. But those methods are not meaningful enough for reception of the full picture for a lingua culturological thesaurus. Development and establishment of lingua culturology as a self-sufficient scientific discipline with its own methodological apparatus is able to unify interests of linguistics and culturology. That is why we define the approach we use as a linguaculturological approach by the used methods and why is the object of research.

The linguaculturological approach we can define as a characterological approach because the research is conducted on all the material of the national culture. It is well known that characterology is an expression of a phenomenological approach to the studied object. In our given case, phenomenological view supposed to be used in linguaculturological dictionary of a national culture as a composition of specific and general cultural features, but with an accent on national features which as a result gives characterological description of a national language.

V. Vorobyov suggested using as a main method of research hermeneutic-interpretational method which allows to identify essential culturally meaningful characteristics of lexical units of existing concepts as linguaculturemes. (Vorobyov, 1995)

Linguaculturology is a new discipline with its own means and methods of research. It describes the interconnection and the interaction of language and culture in a special field of research-linguaculture. The research is conducted on the base of the identification of the mechanisms of the 'language thinking' appropriate for a national culture of any type.

By linguacultureme we mean a unit of the thesaurus. The main meaning of linguaculturemes is in the multiple reflections within a given linguaculturological area about its noemic content, and this fact allows us to use hermeneutic-interpretational method for description of linguaculturemes. The hermeneutic-interpretational method makes it possible to reveal the way of meaningful existence of a lexical unit as a linguacultureme in the frames of linguaculturology.

The linguaculturological thesaurus can be successfully used in theoretical courses of linguistics, culturology, intercultural communication, and linguaculturology.

The Theory of Creation of the Linguacultural Dictionary

V. Vorobyov believes that the main goal of lingua culturology is to leave the one-sided determinism in the interpretation of the triad 'language-culture-personality'. Its mission is to explore those phenomena in their inseparable unity taking in account all facts of their mutual determinism. This task is rather complex as the phenomena: language, culture and personality are extremely complicated and multivocal in their nature.

For the detection of specifics of linguacultural approach, and in the given case, characterological approach in this branch of science, we should look into the way the problem of mutual interconnection of language, culture and personality is interpreted in adjacent with the linguaculturology linguistic disciplines, such as ethnolinguistics, sociolinguistics, cognitive linguistics, linguistic and regional studies. Those branches of linguistic studies might be considered as predecessors of linguaculturology.

Lingua culturology, claims V. Volobyov (Vorobyov 1997,30), is a scientific discipline of a synthesizing type,

located on the frontier between branches of science studying culture and linguistics.

The objects of linguaculturological studies are artefacts. The method of the field of linguaculturology allows us to describe the system of cultural values reflected in language. The method of linguaculturological field allows to describe the system of cultural values reflected in the language.

The base of categorical apparatus of lingua culturology is a notion of the linguacultural concept (Karasik, 2001). The linguacultural concept differs from other mental units used in various areas of science such as cognitive concept, frame, scenario, script, notion, image, archetype, gestalt, mneme, stereotype, by the accentuation of the value elements. The center of the linguaculturological concept is always the value because the concept ensures any cultural research, and the value principle underlies the culture. The linguacultural concept includes in itself not only the subject reference, but all communicative significant information. It primarily includes syndication of the place taken by this sign in the lexical system of the language: its paradigmatic syntagmatic and word formative connections- all that F. Saussure called 'significance' and that what reflects "linguistic value of the extra linguistic object" (Karasik, 1996). Another high probability component of the language concept semantics is the cognitive memory of the word: meaning characteristics of the language sign interconnected with its primordial purpose and the system of spiritual values of some native speakers. (Telia, 1996,230). The most essential from conceptual point of view is culturally ethnic component which defines the specifics of semantics of the natural language units and reflects the "language culture of the world" of its speakers.

Thus, the linguacultural concept is the culturally marked verbalized meaning represented in its expression by the whole line of its language realizations which form the corresponding lexical- semantic paradigm. The content of the linguacultural concept includes at least two rows of semantic signifiers. The first row includes semes common for all its language realizations which bind the lexical semantic paradigm and form its notional or prototypic base. The second row includes semantic features common for at least the part of its realizations which are marked by lingua cultural, ethnosemantic specifics and connected where's the mentality of the native speakers or with the mentality of the national language personality.

From all mentioned above we could see that the central task of linguaculturology is the consideration of language, culture and personality in their interconnection. Linguaculturology is called to give data and draw conclusions about lingua cultures as of types. The object of linguaculturology - lingua cultures as a special type of interconnection of language and culture manifested themselves equally in both - language and culture. As a separate lingua culture might be considered not only as large formations, but also semantically isolated separate linguacultural areas inside of some linguacultural types. As an object of linguacultural research, it can serve phraseological units, concepts, methods of linguistic thinking typical for various linguacultural types, and the linguaculturemes.

The main characteristics of linguaculturemes consist in a multiplex reflection on the noematic content within the given linguacultural area. Consequently, we believe that hermeneutic-interpretational method suits the best by their description.

Characterological Approach by Creation of the Linguacultural Dictionary

The characterological approach is the reverse side of the typology. First, the typical features within a language, or language phenomena are detected. The goal of the typological analysis is to define some language formations as typical realizations of some abstract theoretic model based on some classifying features. Secondly, the typical part should be removed from the object of interest, and the remained part will be the specific characteristic of the studied phenomena.

In relation to the lingua culturological dictionary, characterological approach will be conducted in the following way: first, the cultural type should be distinguished, then specific, most meaningful areas within the type should be highlighted. The search for the linguaculturemes, the main units of the dictionary, will be conducted taking in the account cultural meanings on the one hand, and on the other hand, it will be conducted based on the own, internal characteristics of linguaculturemes.

The main characteristics of a linguacultureme are valerity, an index of intertextuality, the feature of cultural specificity. The list of linguaculturemes obtained with the approach, even if it is still open, can provide us with the characterology of any culture from the lexical side of view. It is possible that several groups of linguaculturemes different in their nature and main features will be detected. But this fact is also characterological of the national culture. As we can see from mentioned above, characterological approach is useful for the linguaculturological dictionary for the procedure of linguacultureme search, but also for revealing of principles formation and existential features of the dictionary.

Characterological Description of the Linguacultural Dictionary

To describe the characterology of the linguacultural dictionary nature and the principles of the language unit (linguaculturemes) organization should be identified. By the analysis of linguaculturemes as the characterological description of national culture can be received. As the existence of only a national cultural component doesn't make a notion a linguacultureme.

With the flow of time, linguaculturemes can be rethought, and can get new, additional meanings. The main task of the dictionary is to define the main value orientation of the given culture, its main spiritual and cultural areas of significancy. Linguaculturemes of the dictionary are thematized in a lot of texts of culture which have intertextual relationships. The intertextual dialog is mostly conducted by the meanings reflected by the dictionary linguaculturemes. The linguaculturemas of the dictionary have a high level of valerity and intertextuality.

Lexicographic Practice of the Lingua Cultural Dictionary Creation

Linguistic research of the lexical structure of any language should have practical value. We believe that the

amount of linguaculturemes of most cultures will not exceed 100.

Dictionaries are the same product of culture as the level of scientific, political, philosophical, ethical thought development of the ethos- the bearer of culture described in the dictionary. A good dictionary remains in the history of the nation as a creation of a human spirit, like exceptional art creations.

Usually, new dictionaries are created taking in account the new needs of the current linguistic views. Theoretic parameters of the described object and typological features of the dictionary reflect the dictionary concept.

The task of a linguaculturological dictionary creation meets the interests of consideration of the interconnection of language and culture. The task is a great challenge for the authors of such a dictionary, as it cannot be created by analogy or follow any custom. The dictionary can not be limited to the only semantic description of the word meanings, but it also must register noemes. There are no unified methods for the identifying of noemes though. There is a challenge of conducting not a semantic structure of the word in the dictionary article, but the noematic structure of the linguaculturemes.

We believe that the linguacultural dictionary can exist in a form of the of ideographic thesaurus. The thesaurus reflects lexical units of any language in the most systematic and consequential way.

If we classify lexical units by their levels of difficulty from the methodical point of view, linguaculturemes as main units of the dictionary can be defined as words of the special level of difficulty. It is especially important to take into account cultural component of words considering cultural contexts of the word use.

In our opinion, the most contemporary tasks of lexicography nowadays are: description of different lexical layers, fusion of synchronic and diachronic methods in reviewing of the lexical composition, and comparative studies of different languages. We believe that the creation of the linguacultural dictionary agrees with the main contemporary tasks of the lexicography. The dictionaries should be created as an ideographic thesaurus.

The basis of the ideographic thesaurus are semantic relations of the words of the given language situated in the same way as the extralinguistic reality like multi-tiered structure. The unit of such a dictionary is not a word, but a certain semantic field.

Linguacultureme

The study of the content and the meaning of linguaculturemes which directly reflect extralinguistic reality can help by revealing the essence of interconnection of culture and language. Unlike a word link, vocal drama includes in itself segments, not only segments of a language but also of a culture, and it represents dialectic unity of linguistic and extralinguistic content. The inner form of the word does not only represent cognitive extralinguistic content, but also expresses a national specific of the word and reflected realities of the national

culture.

Linguacultureme absorbs and accumulates not only linguistic form of the thought, but it is also tightly and inseparably connected with its extralinguistic cultural environment or reality, stable network of associations which borders are slinky and flexible. That's why a word, like a signal, wakes in an individual special cultural communication, not only the meaning as a hint, but all complex of cultural halo. This type of communication is defined by “conscious intention all of one speaking person to report something to another one, and the conscious readiness of the another to comprehend this message, conducted with the help of signs-signals.” (Foukault, 1982)

The depths of the representation connected with a word or in other words the content of linguacultureme is directly tied with the linguacultural competency of native speakers. Non-acquaintance with the ‘cultural halo’ leaves the language recipient on the language level not allowing him or her to get into that deep network of cultural associations, into the content of the expression, text as a reflection of cultural phenomena.

It will be important to emphasize that linguaculturemes correlate in their similarities and are opposed and there are differences not only on the surface level like lexical units, but they also correlate and the oppose each other on the deep levels of human comprehension. Their specificity is revealed at its greatest on the linguacultural level where the volume of differential features taken in account in meaningfully distinctive oppositions is much higher than definitions of just language units. The perception of the deep linguacultural meaning gives the full awareness of the reality, not just knowledge of the ‘language label’ which needs further cognitive deciphering and knowing of real interaction with the object.

The point of cognition as the transition from the meaning-hint to the conceptual content of the unit and from the content of the unit to the object of culture supposes a constant mutually working connection ‘meaning- cultural meaning’. This connection is a dialectic one assuming contradicting relation between linguistic and extralinguistic components of one linguacultureme, their inequality and difference from one side, and their congruence and sameness from another side. We believe that only this way can take place the process of culturalization of lexical units, leading people studying language from guessing the meaning to the knowledge and inclusion of the sign-object into the network of cultural associations appropriate for a particular nation.

Cultural background surrounding the language sign as a part of linguacultureme is the dialectic unity of linguistic and extralinguistic content. Full penetration into an object, into its essence is impossible without what the holistic awareness of the linguacultural unit, and, consequently the extralinguistic object(phenomena) it represents. This awareness is a complex dialectic process of transition from the language sign to the knowledge of the cultural fact. Linguistic and extralinguistic content of the sign are equal for execution of communicative function of units in the process of discourse, and not equal as the extralinguistic content is incomparably richer. In this case the transition from the first to the second is an endless process of cognition.

The deep meaning potentially presented in the meaning as an element of its content unfolds in the meaning network of cultural-conceptual content of a linguacultureme. Linguaculturemes:

- 1) have connotational meanings and become functional signs.
- 2) can have several connotative significances.
- 3) can be actualized or not in the perception.
- 4) actively exist while actively exist the context which spawned them.

An essential aspect of study and description of linguaculturemes is their typology.

A final result of every communication is not understanding any language as it is, but the assimilation of extralinguistic information. According to A. Potebnya, language just implies the knowledge which should be explicated as mental units, 'further meanings', notions. Every linguaculturema has not only the closest, but also the furthest meaning, the deepest and often the symbolic one and without understanding of it an idea of any work hangs up in the air.

Structural types of linguaculturemes can be very diverse: from one word or lexeme to the whole text of the considerable length.

Semantic Structure of Linguaculturema

Linguacultureme - the main unit of the linguacultural dictionary serving for naming objects and their qualities, phenomena, relationships of reality expressing nationally cultural specifics. Linguaculturema has its form with phonetic and grammatical features and its lexical and grammatical meaning specific for each language.

Lexical meaning - is the content of linguacultureme, reflection in the human consciousness of what it denotes and names, it is the notion of objects, actions, features. Description of the special, cultural component is very important for mastering language. The main danger in studying foreign language is the omitting of the cultural component of the lexica. Meaning of two words in two different languages, not talking about linguaculturemes never fully coincide (excepting terminology). That is why to be used in the right way, every linguacultureme must correlate with the social cultural reality of the country of the studied language.

The term 'lexical background' was introduced by E. Vereshagin and V. Kostomarov. By 'lexical background' they meant the component of word semantic which manifests in the most way the national specific, the main characteristic of the linguacultureme. The lexical background shows its qualities in thematic linkages of language units, and in the syntactic relationships.

Meanings of Linguaculturemas and Methods of their Semantization

When selecting the method of explanation for a linguacultureme we should consider its linguistic nature in the lexical system of the language. From one side, what is the character of its meaning- free or bound, direct or

figurative, what part of speech does it represent, is it abstract or concrete, derivative or non-derivative, single-valued or multivalued, with wide, free, constrained or narrow combinability, is this linguacultureme part of mental grouping- thematic, lexical-semantic, synonymic, antonymic, does it have any peculiarities in formation of grammar forms. On another side, is the correlation of the linguacultureme in the language derived from with its equivalent in the host language taken into account?

The following methods of explanation (semantization) of linguaculturemes can be used:

1) **Visual way** - explanation of meanings in linguacultural way by showing the items or actions they mean, or their pictures, paintings. The advantage of this method is that it creates a bright representation of the linguacultureme in consciousness of a student which helps its memorization. Besides, the method establishes a direct connection between linguacultureme of studied language and its meaning. But this method can be applied to the restricted amount of linguaculturemes which are concrete and available for direct visual perception.

2) **Semantization** without translation- explanation of meanings of linguaculturemes with means of their own, native language. There are three types of untranslated semantization:

Interpreting of linguaculturemes or semantic definition. This is the main way to reveal the meanings linguaculturemes contained in explanatory dictionaries. Several methods of concrete semantic definitions are used:

- a) Definition by indicating the broader generic concept to which the linguacultureme belongs and its distinctive features;
- b) Descriptive method: the description of the linguacultureme is introduced using demonstrative words.
- c) Definition using synonyms. Since synonyms differ from each other in shades of meanings. To define a linguacultureme, several synonyms are often used clarifying and complementing each other they provide a complete, comprehensive definition of the meaning of the word.
- d) Definition using antonyms. In the definition of linguaculturemes, the antonyms with negative particles are used.
- e) Enumerative method: the meaning of linguacultureme is revealed by listing the concepts denoted by this word. In dictionaries, this method is usually combined with descriptive one.

The method of semantic definition gives the most precise representation of meaning of linguacultureme as it is connected with active activity of thought.

Another method of a word meaning explanation- is semantization by word forming connections. This method also helps to explain linguaculturemes with the help of words with the same roots, and to analyze morphemic composition using elements of etymology.

3) **Contextual** method of explaining meanings of linguaculturemes. It is mostly used for explanation of polysemantic language units, as their various meanings are realized only in context. The context might be minimal- just a combination of words. This approach develops language guess skill in learners, and brings

together understanding of a linguacultureme and elaboration of the meaning use skills, but does not guarantee the exact meaning of the linguacultureme.

For the best understanding of linguaculturemes, it is recommended to use the maximal number of approaches mentioned above.

Types of Linguaculturemes

In studied language the following types of linguaculturemes are distinguished:

- 1) Linguaculturemes matching in meaning and similar in their form. They are usually words derived from other languages, and/or internationally used. But the meanings still don't match fully in different languages.
- 2) Linguaculturemes match partially in meaning, but not similar in their form. There is a difficulty in comprehension of this type of linguaculturemes because of their form, and in correlation of sound and graphic image with the meaning of the lexical units. These linguaculturemes can be explained in different ways: concrete units in visual way, abstract ones by the interpretation if no synonyms and antonyms can be detected.
- 3) Linguaculturemes are not congruent in form and volume of meaning. Those units are usually polysemantic.

This type is the most difficult for comprehension, as the phenomenon of interference is expressed the strongest: students transfer volume of meanings from their native language into foreign linguaculturemes. In use of these lexical units are made most distortions because of the mismatch between their meanings in different languages.

Also, two types of correspondence between linguaculturemes in different languages can be distinguished:

- 1) The volume of meanings in foreign language linguaculturema is wider than volume of meanings in lexical unit of native language. In this case the linguaculturema is comprehended in easier way as the influence of the native tongue is absent.
- 2) The volume of meanings in native language linguaculturema is narrower than volume of meanings in lexical unit of foreign language. In this case the linguaculturema is comprehended in a very difficult way as the influence of the native tongue interferes with the process of understanding.

Conclusion

Every language has its own language picture of the world, and it is specifically unique for vision of the world for each nation. Every language has its own way of nomination and partitioning of the objective reality. V Maslova claims: "The objects, phenomena, and processes, which are tightly enshrined and persist for a long

time in language socio-typical meanings, and also connections and relations between objects and phenomena fixed in generalized and abstract way in syntax and widely represented in all kinds of texts". (Maslova, 2001) We fully agree with her opinion and believe that the notion 'language picture of the world' correlates with the notion 'language consciousness' that we understand as peculiarities of culture and social life of a certain nation which defines its mental diversity and reflects in specific features of the language.

Comprehension of language suggests comprehension of the language picture of the world, language consciousness of native speakers. And the implementation of linguacultural approach into the foreign language acquisition using methods described in the article can make a positive impact into intercultural understanding.

References

- Foucault, M. (1982). *The Archeology of Knowledge: And the Discourse on Language*. NY, Vintage.
- Karasik, V. (1996). *Kulturnye dominanty v yazyke// Yazykovaya lichnost: kulturnye konzepty*. [Cultural dominants in language// Language identity: cultural concepts.] Volgograd, Peremena.
- Kostomarov, V. and Vereshagin, Y. (1983). *Yazyk i kultura*. [Language and culture.] Moscow, Nauka.
- Kostomarov, V. and Vereshagin, Y. (1983). *Lingvostranovedcheskaya teoriya slova*. [Theory of lingua regional studies]. Moscow.
- Maslova, V. (2001). *Lingvakulturologia*. [Linguaculturology]. Moscow, Academia.
- Vinogradov, V. (1977). *Izbrannye trudy. Leksikologia i leksikografia*. [Selected works. Lexicology and lexicography.] Moscow, Nauka.
- Vorobyov, V. (1994). *Lingvokulturema kak ediniza polya*. [Linguacultureme as a field unit]. Russian language abroad. #4.
- Vorobyov, V. (1997). *Lingvokulturologia: Teoria i metody*. [Linguaculturology: theory and methods.] Moscow, RUDN.
- Vorobyov, V. (2008). *Lingvokulturologia*. [Linguaculturology.] Moscow, RUDN.
- Potebnya, A. (1989). *Mysl i yazyk*. [Thought and language.] Moscow, Pravda.
- Potebnya, A. (1989). *Slovo i mif*. [Word and myth.] Moscow, Pravda.
- Sherba, L. (1974). *Yazykovaya sistema I rechevaya deyatelnost*. [Language system and speech activity.] Moscow.
- Telia, V. (1995). *O metodologicheskikh osnovaniakh lingvokulturologii// Logika, metodologia, filosofia nauki*. [About methodological foundations of linguaculturology. // Logic, methodology, philosophy of science.] Xth International conference. Moscow-Obninsk, IFRAN, ILKRL.
- Telia, V. (1996). *Russkaya frazeologia. Semanticheskii, pragmaticheskii I lingvokulturologicheskii aspekty*. [Russian phraseology. Semantic, pragmatic and linguacultural aspects.] Moscow, Shkola.

Work-Climate and Its Relationship with Officer Performance

Chris Bitner

The School of Law Enforcement and Justice Administration, Western Illinois University, United States

Niyazi Ekici

The School of Law Enforcement and Justice Administration, Western Illinois University, United States

Glenn Daugherty

The School of Law Enforcement and Justice Administration, Western Illinois University, United States

Patricia Walton

The School of Law Enforcement and Justice Administration, Western Illinois University, United States

Abstract: Organizations, like people, can be healthy or not. Case studies and experiences show healthy organizations resist unreasonable pressure, provide dynamic leadership, supports employees, and provide direction for achievable goals. The concept of work-climate helps us determine the health of an organization. Work-climate is the aggregate of employees' perceptions of the work relationships, leadership practices, motivation, job satisfaction, innovation, morale, and trust. The work-climate construct provides considerable opportunities for understanding the health of an organization and employee performance in the workplace. In this current study, we've taken the concepts of healthy organizations and work-climate and applied them to law enforcement. The purpose is to discover if a relationship exists between the work-climate of law enforcement agencies and officer performance. Law enforcement agencies are similar to most other public organizations, because they include people, workspace, resources, work-structure, systems, procedures, and relationships. We want to examine the work-climate of police departments because we see a quickening to improve police services and officer performance. What we do not know is how work-climate can be leveraged to meet the emerging service demands of the people. To investigate this, we used a rigorous quasi-experimental cross-sectional survey to gather data that allowed for hypothesis testing through aggregation, scaling, counter-balancing and tabulation. Our findings came into view when we examined data through correlations, regression, ANOVA, and coefficient models. We discovered officers become detached from the importance of their work and put in less effort when they feel dissatisfied in their workplace. This examination tells us law enforcement agencies need a focus on work-climate, because it affects how officers carry out their duties and interact with citizens. We reveal a focus on work-climate in law enforcement agencies can enrich relationships between officers and the societies they serve.

Keywords: law enforcement, police, performance, work-climate, healthy organizations

Citation: Bitner, C., Ekici, N., Daugherty, G., & Walton, P. (2023). Work-Climate and Its Relationship with

Officer Performance. In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023--International Conference on Social and Education Sciences* (pp. 496-514), Las Vegas, NV, USA. ISTES Organization.

Introduction

The arrival of the twentieth century created challenges for public administration in the eyes of American government improvers, who sought hope for a stronger nation and pondered the idea of “how to make the public workforce more responsive and productive” (Shafritz, Hyde, & Parkes, 2004, p. 2). One notable campaigner, Mary Parker Follett, questioned the workplace environment, specifically how the typical worker and manager interact, and asked:

What happens to man, *in* a man, when an order is given in a disagreeable manner by foreman, head of department, his immediate superior in store, bank, or factory? The man addressed feels that his self-respect is attacked, that one of his most inner sanctuaries is invaded. He loses his temper or becomes sullen or is on the defensive; he begins thinking of his “rights”—a fatal attitude for any of us. In the language we have been using, the wrong motor-set, that is, he is now ‘set’ to act in a way which is not going to benefit the enterprise in which he is engaged (Follett, 1926, p. 66).

Follett is addressing the importance of retaining valuable employee skills in the workplace, noting that the backbone of this retention comes from the attitude of the manager. Others seek a new wave of leadership methods, as the common hierarchical measures of the past are not reaping the same effectiveness (More and Miller, 2007; Rainey, 2003; Romzek, 1990). Consequently, managerial figures must have the ability to notice what is outside the grasp of their senses, because “today’s workers do not automatically accept authoritarian, dehumanizing styles of management” (Rosenbaum, 1982, p. 33). A supervisor’s “ability to exploit intangible assets has become far more decisive than their ability to invest in and manage physical assets” (Kaplan & Norton, 2007, p. 150). Employees today do not want to adhere to the instructions connected to management techniques of the past. Therefore, supervisors must find the essential motivator to encourage the modern-day worker to reach their full potential (More & Miller, 2007; Pinder, 1984; Romzek, 1990; Rosenbaum, 1982) “not because making workers feel good is nice but because it is necessary” (Rosenbaum, 1982, p.33).

In addition, “Leaders who undermine employee autonomy are corrosive because they undermine the *dignity* of work. This is a serious issue, because dignity is fundamental to well-being and to human and organizational thriving (Valcour, 2014).”

The importance of trust can never be neglected because, “According to scholar Andrew Sayer, dignity is a fundamentally social phenomenon that arises through interaction, and therefore it depends on a mix of both independence and interdependence. It involves recognition and trust, as well as autonomy and self-mastery

(Valcour, 2014).” For success in any organization dignity and trust exist when everyone is listened to, respected, and their opinions considered no matter their position within the organization (Valcour, 2014).

In the preceding paragraph we learned that, “Workplace characteristics associated with negative employee emotions consist of poor communications”. This is a concept that is vital to workplace satisfaction and it is a concept that has existed for decades. Quite simply, people want and need to be heard (Nichols and Stevens, 1957; Johnson, 1953; Kramer and Lewis, 1951). The most important element in communication is listening (Lee, 1983). For optimum communication, both communicating participants must be active listeners to truly understand what the other party is trying to communicate to the other (Lee, 1983). This is a give and take for both participants. Both must actively seek to understand the ideas of the other and try to assimilate the information and attempt to incorporate the views and concerns of the other into a measure of understanding that is beneficial to both parties (Jahromi, Tabatabaee, Abdar, & Rajabi, 2016). There must be feedback and clarification questions to insure the views of the speaker are understood by the listener. These concepts may be common knowledge to good communicators, but putting the concepts into meaningful action is difficult at best because most of us want to be heard (Lucas, 2015). If communication from an employee is ignored, not understood, or is not considered, the speaker feels unimportant and their dignity is damaged (Lucas, 2015). Others have expressed the importance of listening. “Frankly, I had never thought of listening as an important subject by itself. But now that I am aware of it, I think that perhaps 80% of my work depends on my listening to someone, or on someone else listening to me (Nichols and Stevens, 1957; Johnson, 1953; Kramer and Lewis, 1951).” “I’ve been thinking back about things that have gone wrong over the past couple of years, and I suddenly realized that many of the troubles have resulted from someone not hearing something or getting it in a distorted way (Nichols and Stevens, 1957; Johnson, 1953; Kramer and Lewis, 1951).” Thus, listening in communication is not an old concept, but it is one that still negatively manifests itself today.

The magnitude of the idea of work-climate is extremely beneficial. It has been determined that employees’ emotions and work-climate go hand in hand (Coil, Aksoy, Keiningham, & Maryott, 2009), and as a result, the organization is affected (Lowry & Hanges, 2008). Research has shown that the behavior exhibited by employees, along with their performance in the workplace, is consistent with both positive and negative emotions. Inefficient communication skills, high dependence on a chain of command, a small amount of pride, a lack of trust, and unsatisfactory levels of motivation and morale form some of the negative employee emotions in the workplace. On the contrary, some visible positive employee emotions include collaboration, a high sense of creativity, high levels of job satisfaction, a strong connection with management, and a love for workplace tasks (Romzek, 1990). In order to construct a work environment built upon positive employee emotions and values, a modified work-climate is essential and will strengthen the organization as a whole (Lowry & Hanges, 2008).

“Increasingly in the United States and in other nations, business, government, and non-profit organizations have concerned themselves with encouraging their employees’ positive work-related attitudes” (Rainey H. G., 2003, pp. 273-274), and therefore, builds a stronger organization (Rainey & Steinbauer, 1999). In order for a

prosperous organization to exist, there must be an emphasis regarding the development of the employees, workplace relationships, emotions, intellect, and human capacities (Dubois & Rothwell, 2004). Employees are bound to act in a positive manner when their supervisors treat them in a more humane fashion. Depending on the treatment that the manager exhibits, the worker may be “turned on or turned off” and more or less inclined to give effort (Holzer & Gabielian, 1998).

Healthy Organizations

Many individuals realize that most of the decisions they choose to make will influence their health. Those choices that they make will have a bearing on their standard of living, financial situation, and prosperity. The most effective way to make choices that have an impact on your health is to understand the choice’s clinical reality, in addition to thinking about your core values, opinions, issues, and adventures. All these factors aid in protecting our health and wellness. Life choices that promote good health will benefit us in all aspects of our lives, including being able to feel a sense of prosperity and continuing to stay active (Kemper, Magee, & Schneider, 2003).

The short-term problems in police work can stem from stress, fatigue, depression, injury, and others (Riedy et al, 2021). This is not a new concept. These issues have existed as long as we can remember. Regardless of when they occur, the manager/supervisor must deal with them in the short-term as quickly as possible to avoid officer burn-out, excessive sick leave, suicide, or death on the job in the long-term (Riedy et al, 2021). The degraded officer performance, for whatever reason, can be devastation for the officer, the public, and the department (Riedy et al, 2021). Thus, the supervisor must understand the employee officer well enough to know when the officer is not acting “normal” for the officer. This takes time, empathy, and concern on the part of the supervisor. The Laissez-Faire management style of ignoring the problem and hope is goes away is an extremely management technique (Denton, 2020).

While individuals can maintain healthy or unhealthy qualities, organizations also can operate in the same manner. The idea of the “healthy organization” (p. 1) was introduced through research from the University of Maryland Libraries in 1999. Organizations based on research are heavily involved in the exploration of what makes a work environment healthy, with the goal of concluding if these groups are more productive (Lowry & Hanges, 2008). Healthy organizations can be categorized in their care for workers, potency, attaining a goal (Lowry & Hanges, 2008), work-life balance, limiting of risks (Grawitch, Ledford Jr., Ballard, & Barber, 2009), a positive long-term perspective (Hoy, 1990), and a favorable work-climate. An affirmative climate is developed through an emphasis on skills and needs of the worker, personal growth, attempts to boost morale, reliability, guidance, and honoring the workplace relationship (Deal & Peterson, 1991; Peterson, 2002). Humble relationships throughout healthy organizations strive to attain a balance between values and needs of the organization, workers, and the community. Supervisors must realize that relationships need to maintain a sense of fluidity as well. They need to be able to attend to short-term demands that will help all parties affected by the decision (Corbett, 2004).

A lot of energy and effort is accumulated in the work environment from the average individual, more so than any other activity in their life. As a result of this, organizations need to emphasize the importance of developing programs, policies, and practices that allow employees to flourish not only in the work environment, but also outside of the workplace (Grawitch et al., 2009). According to Lowry and Hanges (2008), prosperous organizations acquire new strategies and methods that seek out the best interests of the employee and their well-being. A healthy employee contributes to a strong work environment (Corbett, 2004). A highly functional workplace demonstrates that employees are contributing effectively to improving the organization, and these contributions are deemed vital and are encouraged (Lowry & Hanges, 2008).

An invigorated organization is immune to pressure, boasts confident leaders, shows support for their workers, and has goals set for their future (Hoy, 1990). The achievable but difficult tasks for these organizations are to stray their efforts away from the financial roots and instead towards employee well-being and an environment that obtains success. Organizations must recognize and adhere to difficulties surrounding the well-being of their employees from a psychological and physical perspective for the group's tasks to not be negatively affected (Lowry & Hanges, 2008). A developed work environment will generate "long-term win-win benefits for employees and organizations" (Grawitch et al., 2009, p. 125). Vigorous companies "demonstrate excellence in health practices, social environment and personal resources and the physical environment" (Corbett, 2004, p. 126). Moreover, Corbett (2004) adds, "We can demonstrate through case studies and experiences that a healthy workplace is integral to achieving organizational excellence because the focus is on creating the right work environment for employees" (p. 128). Therefore, work-climate can be an important factor in assessing the prosperity of the organization (Grawitch et al., 2009; Hoy, 1990; Lowry & Hanges, 2008). To simplify, the business environment "is a way of viewing an organization from a range of perspectives that integrates people and processes with events, rather than just viewing an event as an isolated occurrence, distinct from the people and processes" (Crother-Laurin, 2006, p. 7).

Work-Climate

Frederick Taylor's Scientific Management method is the origin to the idea of work-climate, in which Taylor intended to have managers "design work processes so that employees could perform in a climate conducive to greater productivity" (Cooil et al., 2009, p. 277). Lewin, Lippitt, and White popularized the idea of the "social climate" in 1939, which emphasized the importance of science and the rise of the role of organizational leader within a climate (Cooil et al., 2009; Parker et al., 2003). Deviations in school environments prompted researchers in the early 1950s to continue efforts to build upon the organizational climate (Hoy, 1990). In the 1960s (Glisson, 2007), the idea of work-climate erupted in popularity and became a comprehensive branch of management. Hellriegel and Slocum Jr. (1974) found that "intensive and diverse efforts to conceptualize, measure, and utilize" organizational climates thrived in the year 1966. Behavior in the workplace became more understood with the development of a work-climate framework (Hellriegel & Slocum Jr., 1974).

Researchers have concluded that behavior and performance has been influenced by how the employee views their organization (George, 1996) and therefore, the work-climate structure can be shaped by planned organizational change (Glisson, 2007). “Experiential, complex, and enduring” (Hunt & Ivergard, 2007, p. 27) demonstrates the features of work-climate, consisting of relationships, leadership methods, motivation, job appreciation, innovation, attitude, and trust (Cooil et al., 2009; Steers & Porter, 1975).

Work-climate is determined to be the social background of an organization (Glisson, 2007). This context provides the basis for allowing employees to add to the betterment of their organization, as well as the pressures of being an employee within that organization (O’Neill & Arendt, 2008). Furthermore, it is being concluded that a relationship exists between work-climate and the effects of employee performance and attitude, modernization, and results of service (Glisson, 2007; Baltes, Zhdanova, & Parker, 2009). The values, needs, experiences, assumptions, and restraints of the employee, along with the supervisor’s way of encouragement, all influence the creation of work-climate (Steers & Porter, 1975), and is a central idea that emphasizes the beliefs, values, and inferences of worker upon their behaviors and choices (Parker et al., 2003). Specifically, the features of the organization in which the worker senses are an explanation of the idea of work-climate (Hellriegel & Slocum Jr., 1974; Muchinsky, 1977). Employees are able to gauge feelings, read expressions, and seek out excitements and strains in the air (Fink, 1992).

Work-climate provides a “feel” (p. 223) within a group (Dessler, 1980). This is also known as the “feel of the work place” (Fink, 1992, p. 12), and is “the general feel of psychological atmosphere of an organization” (Dubrin, 1981, p. 364). This is summed up in the ways to which an employee sees their place of work (Baltes et al., 2009; Dessler, 1980; Hellriegel & Slocum Jr., 1974; Muchinsky, 1977). It “captures the way people perceive their work environment” (Glisson, 2007, p. 739), and derives from the views of the individual employees’ job position (Hunt & Ivergard, 2007), knowledge of events, formalities, and decisions in an organization. All these differing individual viewpoints are then compiled together to create the overarching work-climate framework (Dessler, 1980; Hellriegel & Slocum Jr., 1974; Lawson & Shen, 1998). This idea of work-climate creates the belief that employees within a constructed organization or system have similar attitudes toward their work environment, ultimately mirroring dominant norms, beliefs, and values (Hellriegel & Slocum Jr., 1974; Hunt & Toni, 2007).

Because “employees’ descriptions of their work environment” (Parker, et al., 2003, p. 390), demonstrate the components of the structure of an organization, development, and operation (Baltes et al., 2009), their confident outlooks contribute to the complementary and trustworthy organizations that have strong leaders (Dessler, 1980). “When one walks out of a very positive atmosphere, one wants to go back. If the atmosphere is stifling, unwelcoming, filled with tension, and not much fun, then one does not want to return” (Fink, 1992, p. 12).

It has been concluded by Glisson (2007) that the work-climate for a certain organization is deemed to be a “stressful climate” (p. 740), then workers are felt to be overwhelmed, combated, and drained emotionally. Task completion starts to lessen as the fatigue continues to persist. On the other hand, workers find an “engaged” (p.

740) work-climate if there is acknowledgment for their hard work and the positive quality of their character is recognized. Work-climates that are fully engaged are practical, employees care about their tasks, are centered around serving others, and perform at a high level. Employees work together, are recognized for their efforts by their supervisors, and find ways to incorporate goals into their organizational framework. Therefore, a work-climate that is committed is a “functional” (p. 743) atmosphere.

Sadly, when the views of the employees regarding how the organization should function do not align with the actual functionality of the organization, role stress and strain become prevalent. Role stress and strain are highlighted within the organization through adverse circumstances. Nonetheless, supervisors can emphasize the work-climate and ultimately relieve some of the stressors that exist within the employees. With the construction of a work-climate, employees are more inclined to perform at a high level within the workplace. Thus, managers should avert their focus from short-term issues within the organization and instead develop an environment that enhances employee performance (Schneider, 1980), due to “a supportive climate in the workplace has a definite impact on employee performance” (Hunt & Ivergard, 2007, p. 30).

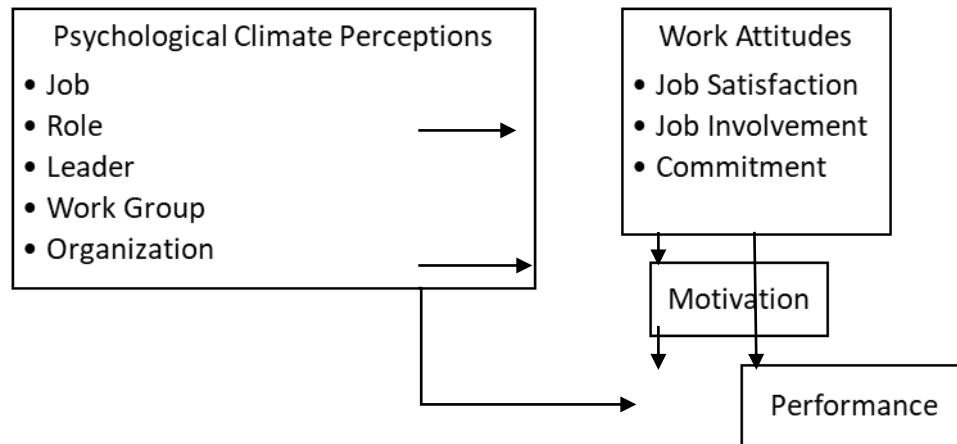
Psychological Climate

The emergence of the idea of psychological climate has amassed a strong and expanding academic focus over the course of the last twenty years (Baltes et al., 2009) and Parker et al. (2003) find that the compilation of research and literature regarding psychological climate has grown exponentially. The view of the psychological climate reflects how an individual employee sees their organizational environment, and the concept of work-climate is the accumulated psychological climate (James, Choi, Ko, McNeil, Minton, Wright, & Kim, 2007; O’Neill & Arendt, 2008; Young & Parker, 1999). Specifically, due to work-climate being prevalent particularly at the group level, researchers consider the viewpoints of the individual in their work environment (psychological climate) and use those stances to combine with the disclosed work-climate (James et al., 2007). Subsequently, it has been concluded that a link between psychological climate and work outcomes exists (Baltes et al., 2009; Hunt & Ivergard, 2007; Parker et al., 2003) including performance (Hunt & Toni, 2007; James, et al., 2007; Parker, et al., 2003; Young & Parker, 1999).

There is, in fact, importance within the psychological judgments and impressions of a work environment. These judgments administer knowledge regarding the upside of organizational characteristics. In terms of the organization itself, psychological climate indicates that employees “impute to their jobs, co-workers, leaders, pay, performance expectations, opportunities for promotion, equity of treatment, and the like” (James, et al., 2007, p. 6). This consists of how the worker feels about their organization as well (James et al., 2007). The positive enforcement regarding the structure, growth, actions of the organization is subsequently covered (O’Neill & Arendt, 2008; Parker et al., 2003).

Effects of Psychological-Climature on Perceptions (From “Relationships Between Psychological Climate Perceptions and Work Outcomes: A Meta-analytic Review”, by Parker, C. P., Baltes, B. B., Young, S. A., Huff,

J. W., Altmann, R. A., Lacost, H. A., Roberts, Joanne E., 2003, *Journal Of Organizational Behavior*, 389-416. Copyright 2003 by John Wiley & Sons, Ltd. Adapted with permission.)



This “enables an individual to interpret events, predict possible outcomes, and gauge the appropriateness of their subsequent actions” (James et al., 2007; Parker et al., 2003, p. 390). To sum it up, psychological climate gives workers the understanding of how events operate within their organization (Parker, 1999). This is crucial for supervisors because employees have been trained to react to the work environment and values to which the supervisors have set for the organization in the past (James et al., 2007; Parker et al., 2003). Managers can challenge the presumptions made through employee attitudes but cannot diminish the perceptions unless they have been fully validated. Abstract assessments of work environments, which are established upon personal values, give positive feedback to an organization about the employee’s experience in the organization. These judgments of the work setting allow for employees to determine if the setting is beneficial and sustainable or not (James et al., 2007). An individual’s beliefs, outlook, and perceptions on the organization demonstrate the degree of effort to which they will perform. Attitudes involving emotions assist the employee with determining the present situation of the workplace (O’Neill & Arendt, 2008), and it is these attitudes that affect the psychological state of the work environment (Glisson, 2007).

The application of psychological climate, advancement of theory, and research aid in describing certain factors that relate to work-climate. James and James assembled the “most popular and accepted conceptualization of psychological climate” (Baltes et al., 2009, p. 671). The stratified model from James and James regarding psychological climate provides the “most readily identifiable set of variables” (p. 9) for evaluating work settings through the processing of personal judgments (James et al., 2007).

Hierarchical Model of Meaning (From “Integrating Work Environment Perceptions: Explorations into the Measurement of Meaning,” by James, L. A., & James, L. R., 1989, *Journal of Applied Psychology*, p. 739-751. Copyright 1989 by American Psychological Association, Inc. Permission not required.)

GENERAL FACTOR OF PYSCHOLICAL CLIMATE			
<p>Leader Support and Facilitation</p> <ul style="list-style-type: none"> • Hierarchical Influence • Psychological Influence • Leader Trust and Support • Leader Interaction Facilitation • Leader Goal Emphasis and Facilitation 	<p>Role Stress and Lack of Harmony</p> <ul style="list-style-type: none"> • Role Ambiguity • Role Conflict • Role Overload • Subunit Conflict • Organization Identification • Management Concern and Awareness 	<p>Job Challenge and Autonomy</p> <ul style="list-style-type: none"> • Job Autonomy • Job Importance • Job Challenge and Variety 	<p>Workgroup Cooperation, Warmth and Friendliness</p> <ul style="list-style-type: none"> • Workgroup Cooperation • Responsibility for Effectiveness • Workgroup Warmth and Friendliness

Research Design

The research design for the study at hand discusses a quasi-experimental, quantitative cross-sectional survey that amasses measurable data and utilizes a quantitative statistical analysis to define information and make conclusions (Meier et al., 2009) regarding work-climates within police departments and the link to officer efforts at work.

Four police departments in Central Illinois were invited to participate in the study. These departments were selected under the criteria of size, similarity, proximity, opportunity, and stratification. Each department employs between 40 and 230 sworn officers, both male and female. Similarities in assignments, shifts, and tasks exist between the departments being studied. Staffing within the departments covers twenty-four-hour service across three shifts, and officers are assigned every day of the year. Each holds the responsibilities of service, including patrol, investigations, and special services. The participating agencies assign officers to a combined multi-county or multi-jurisdictional emergency response team, drug unit, and take part in joint training sessions on a regular basis. The departments are all located close to each other geographically. They all lay in one of two adjacent counties that are split by a river and are separated by about ten miles of one another. Within each county, the biggest city police department, along with the sheriff's department, make up the participating agencies.

The analysis introduces questions involving reinforcement at work, stresses at work, job difficulties, workgroup, and work achievement. Inquiry identifies that support at work, stress, difficulties, and workgroup were highlighted as essential for calculating work-climate when assembled and construct the independent variable for the research. Questions regarding performance build upon the dependent variable.

Positive Evaluation	Areas for Evaluation of Psychological-Climate for Police Departments in Central Illinois	Negative Evaluation
<p>Workers report</p> <ul style="list-style-type: none"> • Leaders respect talents, rights, and agreements • Leaders develops worker talent • Leaders communicate effectively • Leaders are honest • Trust in leaders • Leaders do not employ arbitrary actions • Leaders are open to dissent 	<p>Leader Support and Facilitation</p>	<p>Workers report</p> <ul style="list-style-type: none"> • Leaders are disrespectful or insulting • Leaders do not invest in worker talent • Leaders use rules and hierarchy to control workers • Leaders mistreat employees • Leaders are perceived as dishonest • Lack of trust in leaders
<p>Workers report</p> <ul style="list-style-type: none"> • Knowing what is expected of them at work • A connection to organizational goals • Fair and regular evaluations • Recognition for achievements • Promotion by merit • High job satisfaction 	<p>Role Stress and Lack of Harmony</p>	<p>Workers report</p> <ul style="list-style-type: none"> • Not knowing work expectations • No connection to organizational goals • Irregular or infrequent evaluations • Sense favoritism in the workplace • Low level of job satisfaction • Low connection to work
<p>Workers report</p> <ul style="list-style-type: none"> • Empowerment • Opportunity for improvement • A feeling of accomplishment • Rewards for creativity • Liking their work 	<p>Job Challenge and Autonomy</p>	<p>Workers report</p> <ul style="list-style-type: none"> • Control under hierarchy and rules • Low opportunity for improvement • Bureaucratic red tape guides actions • Dislike of their work

Positive Evaluation	Areas for Evaluation of Psychological-Climate for Police Departments in Central Illinois	Negative Evaluation
		<ul style="list-style-type: none"> • Training needs are not met
<p>Workers report</p> <ul style="list-style-type: none"> • Support of their personal needs • Strong cooperation • Sufficient recognition • Employees work well together 	<p>Workgroup Cooperation, Warmth and Friendliness</p>	<p>Workers report</p> <ul style="list-style-type: none"> • Low cooperation or isolation • Recognition seldom given • Leaders are not receptive to employee's needs
<p>Workers report</p> <ul style="list-style-type: none"> • Performance is important • Their performance is the same as fellow workers • Co-workers volunteer at discretionary work related events as much as possible • Co-workers use all available resources to perform work highly 	<p>Performance</p>	<p>Workers report</p> <ul style="list-style-type: none"> • Performance is not important to them • Their performance is greater than co-workers • Co-workers avoid volunteering for discretionary work related events • Co-workers shirk duties

Hypothesis, Results and Analysis

Work-climate is the accumulation of employee attitudes in their work environment (James et al., 2007; Young & Parker, 1999). This is a development at the group level and is seen as expansion of the compilation of worker attitudes regarding Leader Support and Facilitation, Role Stress and Lack of Harmony, Job Challenge and Autonomy, and Workgroups (James et al., 2007).

The composition of Work-Climate allows for plenty of opportunities to explain the attitudes of employees in the workplace (Hellriegel & Slocum Jr., 1974). The attributes of the climate consist of relationships, leadership methods, motivation, job fulfillment, modernization, morale, and trust (Cooil et al., 2009; Steers & Porter, 1975). The characteristics of the organization that form climate (Hellriegel & Slocum Jr., 1974), have a hypothetical component that has a palpable impact on workers (Fink, 1992). Science shows that the emotions that workers have about environment affects behaviors and output (George, 1996).

As the knowledge surrounding work-climate expands, we can interpret that climate is essential regarding the social background of an organization (Glisson, 2007). The social conditions of an organization act as the basis, which ultimately allows for chances to give to their organization, along with worker constraint (O’Neill & Arendt, 2008). With more research being conducted, it is found more commonly that climate has a link to service results, employee attitudes, innovation, and worker efforts (Young & Parker, 1999).

Work-Climate hypotheses

H₁=Work-Climate (the aggregation of Support at Work, Work Stress, Job Challenge, and Workgroup) has a relationship with police officer performance at work.

H₀= Work-Climate (the aggregation of Support at Work, Work Stress, Job Challenge, and Workgroup) has no relationship with police officer performance at work.

Work-Climate Evaluation

	Frequency	Percent	Valid Percent	Cumulative Percent
positive evaluation	95	80.5	80.5	80.5
Valid negative evaluation	23	19.5	19.5	100.0
Total	118	100.0	100.0	

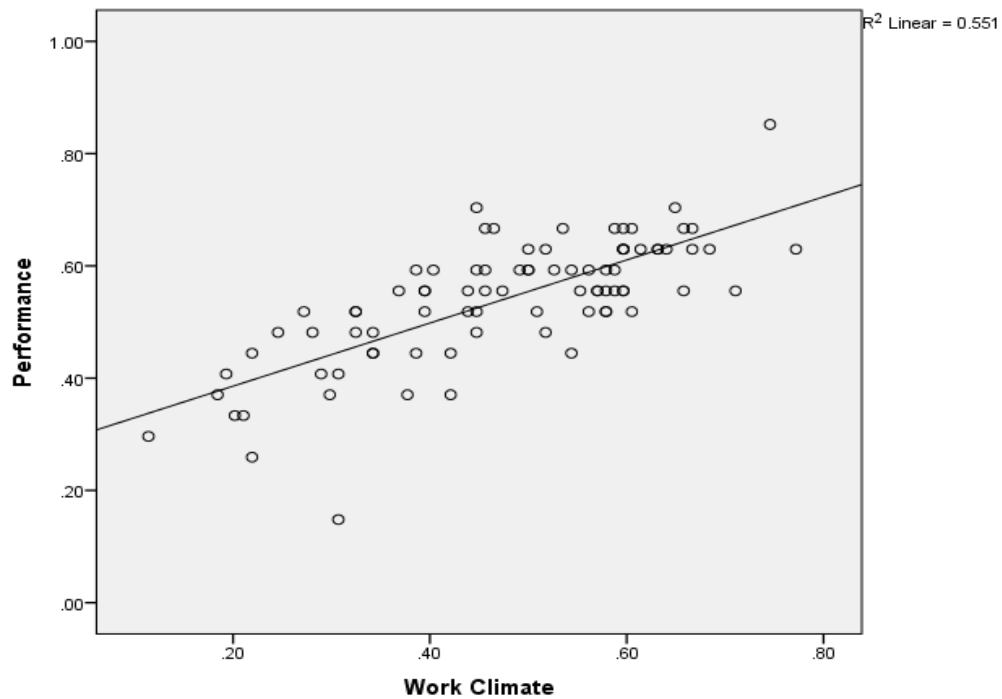
Work-Climate Descriptive Statistics

	Mean	Std. Deviation	N
Performance	.5403	.11115	85
Work Climate	.4748	.14682	85

The Descriptive Statistics mean of .47 describes that the positive assessment for Work-Climate is demonstrating slightly more weakness than strength. It can be inferred that the respondents have a subtle affirmative evaluation of Work-Climate. This means that supervisors must act with caution, because the literature review for the research commends managers to leverage work-climate. Moreover, a parallel analysis between Work-Climate and Performance demonstrates a very strong, positive, and significant relationship.

Work-Climate Correlations

A Linear Regression analysis also indicates a strong positive relationship and that Work-Climate accounts for 55% of the variance in Performance.



In the subsequent tables, Performance rises at a rate of .562 for each unit of increase in Work-Climature, and a strong ANOVA F statistic and t value Coefficients demonstrates a rejection of the Null Hypothesis for Work-Climature. Thus, it can be concluded that this study yields a relationship between Work-Climature and work Performance.

Work-Climature ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.572	1	.572	101.903	.000 ^b
	Residual	.466	83	.006		
	Total	1.038	84			

a. Dependent Variable: Performance

Work-Climature Coefficients

Model		Unstandardized Coefficients		Standardized	t	Sig.
		B	Std. Error	Coefficients Beta		
1	(Constant)	.273	.028		9.887	.000
	Work Climate	.562	.056	.742	10.095	.000

a. Dependent Variable: Performance

Performance Analysis

95.8% of non-administration respondents identified a positive evaluation of Performance for their department.

Performance Evaluation

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid positive evaluation	113	95.8	95.8	95.8
Valid negative evaluation	5	4.2	4.2	100.0
Total	118	100.0	100.0	

When evaluated on a 0 to 1 scale, we notice a mean of .55 in Descriptive Statistics. We can conclude from this data that the positive evaluation for Performance is slightly positive. With, it seems as if the respondents in the study are somewhat hopeful regarding employee efforts in their organization.

Multiple Regression Analysis

This section illustrates which independent variables among Leader Support and Facilitation (Support at Work), Role Stress and Lack of Harmony (Work Stress), Job Challenge and Autonomy (Job Challenge), and Workgroup are better predictors of change in the dependent variable of Performance when adjusted for each other. The statistical software created a statistically significant model ($F=29.18$, $df=4$, $p<.001$) that predicts 59% of variance in the dependent variable.

Multiple Regression Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	
	B	Std. Error				
1	(Constant)	.230	.034		6.827	.000
	Support At Work	-.014	.071	-.026	-.201	.842
	Work Stress	.306	.099	.465	3.092	.003
	Job Challenge	.087	.088	.125	.984	.328
	Work Group	.239	.069	.306	3.474	.001

a. Dependent Variable: Performance

Summary

The goal of the research conducted was to understand whether or not a link was present between the work-

climate within police departments and officer efforts in the workplace. Knowing if a relationship exists between the variables is important because it allows for police managers to look for the performance of the employees as a gauge of how they feel about work (Rosenbaum, 1982).

New findings in science have shown that employee perception has an effect on workplace performance (Parker et al., 2003), but the issue within this research is that the police perceptions of the work-climate and their influences were called into question. The construction of a definitive answer was necessary due to the growing need for information regarding how police performance affects a department (Klinger, 2004). Arguments are beginning to arise that departments are not able to continue the ignorance of officer perceptions in their work-climate due to the risk of poor performance or the emergence of a more hostile work environment. Officer intentions that are forgotten diminish the psychological ties to work, leading to a work force that is not reaping the benefits of the values and performance in which the organization was initially built upon (Romzek, 1990).

To answer the question of whether a connection between work-climate and performance exists, a varied research design was constructed. Within the study, a quasi-experimental quantitative cross-sectional survey was implemented to assemble data, process information, and draw conclusions (Meier, Brudney, & Bohte, Applied Statistics for Public and Nonprofit Administration, 2009). In addition, the composition included a detailed introduction and account of the purpose and problem, a literature review, a comprehensive methodology, and an explanation and display of the data.

In addition to assessing previously written work regarding the relationship between Work-Climat and Performance, the literature review also included Healthy Organizations, Psychological Climate, Leader Support and Facilitation, Role Stress and Lack of Harmony, Job Challenge, Autonomy, and Workgroups.

The methodology analysis includes population, sample, data collection methods, data collection materials, variables, variance in results, analysis procedure, levels of instrument, and the presentation of the data collection materials. Succeeding these steps involves an assessment and presentation of the data, an establishment of the statistical processes used, the statistical application that was emphasized, participant demographics, response rates, hypotheses statements, and the use of tables to cite statistical analysis.

The benefits of this research taking place includes administrative figures in police departments now having access to information available to them that can assist in steps for taking action, allowing their employees to advance their performance skills, and becoming more progressive. Police supervisors that emphasize employee performance should not be consistently claiming their workers as indifferent, unambitious, and uninspiring. These men and women cannot distance themselves from their employees simply because of their higher standing within the organization. More needs to be done for the organization to become reformist and have a better understanding of the work-climate, the environment, that they are spearheading in their department.

In order for the organization to aim towards a progressive environment, the preceding research implores administrative figures to understand the traits for becoming strong leaders, to have awareness regarding practices in the workplace that infuse stress, to stay away from conventional police practices, and to construct efficient, cooperative workers. Progressive supervisors listen to a variety of opinions and see their workers for who they are, along with understanding all sides of an issue, maintaining cooperation, and abstaining from an offensive demeanor (Levine, 2007).

Reformist police managers will analyze and remove distracting work stressors including hierarchy, fixed labor, supervisory control, repetitive responsibilities, redundant paperwork, abstract rules, and the elimination of interpretation (Zhao et al., 2002). They need to cease irregular behaviors in their department that “harass, offend, socially exclude, or adversely affect the work of an employee” (Tuckey et al., 2009, p. 215), because these adverse events, actions, and attitudes affect workplace performance.

Conclusion

To conclude, with the implementation of this structured research method, this study has uncovered that work-climate in police departments does indeed have a statistically and scientifically significant relationship with police work performance. With that being said, we can affirm, with certainty, that police supervisors need to understand the significance of Leader Support and Facilitation, Role Stress and Lack of Harmony, Job Challenge and Autonomy, Workgroups, and their overall impression on their workers to construct high-functioning organizations. We have found in this study that police supervisors need to become aware of the methods and practices for how a positive work-climate leads to better worker performance. Organizational and supervisory attitudes toward workers affects lives and carries an great amount of importance.

Acknowledgment

We thank The School of Law Enforcement and Justice Administration Graduate Assistant William Paveleck for his careful editing, insightful comments, and timely handling of this manuscript.

Note

This manuscript was created in part from sections of a dissertation titled Exploring the Relationship Between Work-Climate of Police Departments and Officer Performance at Work (2013) submitted to University of Illinois at Springfield by Chris Bitner.

References

Baltes, B. B., Zhdanova, L. S., & Parker, C. P. (2009). Psychological Climate: A Comparison of organizational


- and Individual Level Referents. *Human Relations*, 669-700.
- Cooil, B., Aksoy, L., Keiningham, T. L., & Maryott, K. M. (2009). The Relationship of Employee Perceptions of Organizational Climate to Business-Unit Outcomes: An MPLS Approach. *Journal of Service Research*, 277-294.
- Corbett, D. (2004). Excellence in Canada: Healthy Organizations - Achieve Results by Acting Responsibly. *Journal of Business Ethics*, 125-133.
- Crother-Laurin, C. (2006). Effective Teams: A Symptom of healthy Leadership. *Journal for Quality and Participation*, 5-8.
- Deal, T. E., & Peterson, K. D. (1991). *The Principal's Role in Shaping School Culture*. Washington D.C: U.S Government Printing Office.
- Denton, B. (2020). What leadership style works best during a crisis? *Police 1*. Retrieved from <https://www.police1.com/leadership/articles/what-leadership-style-works-best-during-a-crisis>.
- Dessler, G. (1980). *Human Behavior: Improving Performance at Work*. Reston, Virginia: Reston Publishing Company, Inc.
- Dubois, D. D., & Rothwell, W. J. (2004). *Competency-Based Human Resource Management*. Palo Alto, California: Davies-Black Publishing.
- Dubrin, A. J. (1981). *Personnel and Human Resource Management*. New York: D. Van Nostrand Company.
- Fink, S. L. (1992). *High Commitment Workplaces*. New York: Quorum Books.
- Follett, M. P. (2004). The Giving of Orders. In J. M. Shafritz, A. c. Hyde, & S. J. Parkes, *Classics of Public Administration* (pp. 64-71). Belmont: Wadsworth.
- George, J. M. (1996). Trait and State Affect. In K. R. Murphy, *Individual Differences and Behavior in Organizations* (pp. 145-171). San Francisco: Josey-Bass Publishers.
- Glisson, C. (2007). Assessing and Changing Organizational Culture and Climate for Effective Services. *Research on Social Work Practice*, 736-747.
- Grawitch, M. J., Ledford Jr., G. E., Ballard, D. W., & Barber, L. K. (2009). Leading the Healthy Workforce: The Integral Role of Employee Involvement. *Consulting Psychology Journal: Practice and Research*, 122-135.
- Hellriegel, D., & Slocum Jr., J. W. (1974). Organizational Climate: Measures, Research and Contingencies. *The Academy of Management Journal*, 255-280.
- Holzer, M., & Gabrielian, V. (1998). Five Great Ideas in American Public Administration. In J. Rabin, W. B. Hildreth, & G. J. Miller, *Handbook of Public Administration* (pp. 49-101). New York: Marcel Dekker, Inc.
- Hoy, W. K. (1990). Organizational Climate and Culture: A Conceptual Analysis of the School Workplace. *Journal of Educational and Psychological Consultation*, 149-168.
- Hunt, B., & Ivergard, T. (2007). Organizational Climate and Workplace Efficiency. *Public Management Review*, 27-47.
- James, L. R., Choi, C. C., Ko, C.-H. E., McNeil, P. K., Minton, M. K., Wright, M. A., & Kim, K.-i. (2007). Organizational and Psychological Climate: A Review of Theory and Research. *European Journal of Work and Organizational Psychology*, 5-32.
-

- Jahromi, V. K., Tabatabaee, S. S., Abdar, Z. E., & Rajabi, M. (2016). "Active Listening: The key to successful communication in hospital managers." *National Library of Medicine*, 2123-2128.
- Johnson, W. (1953), "The Fateful Process of Mr. A Talking to Mr. B.," HBR January–February 1953, p. 49.
- Kaplan, R. S., & Norton, D. P. (2007). Using the Balanced Scorecard as a Strategic Management System. *Harvard Business Review*, 150-161.
- Klinger, D. A. (2004). Environment and Organization: Reviving a Perspective on the Police. *Annals of the American Academy of Political and Social Science*, 119-136.
- E. J. J. Kramar E. J. J. & Lewis, T. B. (1951). "Comparison of Visual and Nonvisual Listening," *Journal of Communication*, November 1951, p. 16; and Arthur W. Heilman, "An Investigation in Measuring and Improving Listening Ability of College Freshmen," *Speech Monographs*, November 1951, p. 308.
- Lawson, R. B., & Shen, Z. (1998). *Organizational Psychology: Foundations & Applications*. New York: Oxford University Press.
- Lee, D. (1983). "Listening: Our Most Used Communication Skill," MOspace Institutional Repository p. 150. University of Missouri-Columbia Publishing.
- Levine, S. (2007). Getting to Resolution - Turning Conflict into Collaboration. In H. W. More, & L. S. Miller, *Effective Police Supervision* (p. 177). Anderson Publishing.
- Lowry, C. B., & Hanges, P. J. (2008). What is the Healthy Organization? Organizational Climate and Diversity Assessment: A Research Partnership. *portal: Libraries and the Academy*, 1-5.
- Lucas, K. (2015). "Workplace dignity: Communicating inherent, earned, and remediated dignity." R: *ThinkIR: The University of Louisville's Institutional Repository*, 621-646.
- Meier, K. J., Brudney, J. L., & Bohte, J. (2009). *Applied Statistics for Public and NonProfit Administration*. Belmont: Thomas Wadsworth.
- More, H. W., & Miller, L. S. (2007). *Effective Police Supervision*. Anderson Publishing.
- Muchinsky, P. M. (1977). Organizational Communication: Relationships to organizational Climate and Job Satisfaction. *Academy of Management Journal*, 592-607.
- Nichols, R. G. & Stevens, L. A. (1957), Listening to People, *Harvard Business Review*, 1-8.
- O'Neill, B. S., & Arendt, L. A. (2008). Psychological Climate and Work Attitudes: The Importance of Telling the Right Story. *Journal of Leadership & Organizational Studies*, 353-370.
- Peterson, K. D. (2002). Positive or Negative? *Journal of Staff Development*, 10-15.
- Pinder, C. C. (1984). *Work Motivation: Theory, Issues, and Applications*. Glenview, Illinois: Scott, Foresman and Company.
- Rainey, H. G. (2003). *Understanding & Managing Public Organizations*. San Francisco: Jossey-Bass.
- Rainey, H. G., & Steinbauer, P. (1999). Galloping Elephants: Developing Elements of a Theory of Effective Government Organizations. *Journal of Public Administration Research and Theory*, 1-32.
- Riedy, S., Dawson, D., Fekedulegn, D., Andrew, M., Vila, B., & Violanti, J. M. (2021). Fatigue and short-term unplanned absences among police officers. *National Library of Medicine*, 483-494.
- Romzek, B. S. (1990). Employee Investment and Commitment: The Ties That Bind. *Public Administration Review*, 374-382.

- Rosenbaum, B. L. (1982). *How to Motivate Today's Workers: Motivational Models for Managers and Supervisors*. New York: McGraw-Hill Book Company.
- Shafritz, J. M., Hyde, A. C., & Parkes, S. J. (2004). *Classics of Public Administration*. Belmont: Wadsworth/Thomas Learning.
- Steers, R. M., & Porter, L. W. (1975). *Motivation and Work Behavior*. New York: McGraw-Hill Book Company.
- Tuckey, M. R., Dollard, M. F., Hosking, P. J., & Winefield, A. H. (2009). Workplace Bullying: The Role of Psychosocial Work Environment Factors. *International Journal of Stress Management*, 215-232.
- Valcour, M. (2014). The Power of Dignity in the Workplace. *Harvard Business Review*. Retrieved September 09, 2023, from <https://hbr.org/2014/04/the-power-of-dignity-in-the-workplace>.
- Young, S. A., & Parker, C. P. (1999). Predicting Collective Climates: Assessing the Role of Shared Work Values, Needs, Employee Interaction, and Work Group Membership. *Journal of Organizational Behavior*, 1199-1218.
- Zhao, J. ", He, N., & Lovrich, N. (2002). Predicting Five Dimensions of Police Officer Stress: Looking More Deeply Into Organizational Settings for Sources of Police Stress. *Police Quarterly*, 43-62.

Keyword Survey and Thematic Focuses in Educational Research: A Review of 2023


Mesut Bulut

Atatürk University, Turkey,  <https://orcid.org/0000-0002-0733-0964>

Ayhan Bulut

Aydın Adnan Menderes University, Turkey,  <https://orcid.org/0000-0001-6482-8032>

Abdullatif Kaban

Atatürk University, Turkey,  <https://orcid.org/0000-0003-4465-3145>

Abdulkadir Kırbaş

Atatürk University, Turkey,  <https://orcid.org/0000-0001-9846-0256>

Abstract: Education is constantly evolving as a field that shapes the future of societies, so identifying the key topics and prominent studies of educational research in 2023 will help move in the right direction. This study aims to identify the most important and current topics in the field of education through a bibliometric analysis of articles published on education in 2023. In the search in the Web of Science database, 2917 articles on the subject published in 2023 were reached. The articles obtained were evaluated by bibliometric analysis methods. When the frequency distribution of keywords was analyzed, it was seen that keywords such as “higher education”, “education”, and “teacher education” stood out. In addition, with thematic cluster analysis, the keywords were divided into four different regions, which reflect the thematic foci in the field of education. The study also analyzed the top 10 most cited articles among the articles published on education in 2023. These articles had a wide impact on the field of education and focused on various topics. In the analyzed studies, especially topics such as “diversity in education, learning approaches, and artificial intelligence” played an important role. This study provides essential information for researchers and practitioners in the field of education to help them identify thematic foci in education and important cited studies.

Keywords: Education, Trending Topics, Thematic clusters, Bibliometric analysis, Citation analysis

Citation: Bulut, M., Bulut, A., Kaban, A., & Kırbaş, A. (2023). Keyword Survey and Thematic Focuses in Educational Research: A Review of 2023. In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023-- International Conference on Social and Education Sciences* (pp. 515-527), Las Vegas, NV, USA. ISTES Organization.

Introduction

Education is a fundamental factor in shaping the future of societies. New trends in education have become a significant focus for educators and researchers today. These trends aim to respond to the changing needs of education and the evolving needs of students. In this context, it can be said that a wide range of educational issues ranging from parental stress to educational robotics applications, from problem-solving skills to social studies education are among the trending topics (Ünivar, 2022). These themes serve as roadmaps to help broaden the perspectives of educators and researchers by addressing current developments and approaches in education. For example, mobile and analytics technologies have been a consistent trend throughout the period, there was a trend toward maker technologies and gaming in the early part of the last decade, and emerging technologies such as virtual reality and artificial intelligence are predicted to be trending in the future (Dubé & Wen, 2022).

Looking back at developments in education and technology, the 1990s stand out as a remarkable turning point (Reiser, 2001). When we look at those years, the use of Internet technology in education stands out. This situation has allowed the spread of multimedia tools in education. The last two decades have witnessed the adoption of the constructivist approach to education, the use of Learning Management Systems (LMS), Web 2.0 technologies, and the proliferation of MOOC-like courses thanks to Internet-based communication (Martin Weller, 2020). This situation shows that educational research focuses on different topics and is renewed every day.

The introduction of artificial intelligence technology in education has been another milestone for studies in this field. In these studies, intelligent tutoring systems, natural language processing for language education, educational robots for artificial intelligence training, educational data mining for performance prediction, discourse analysis in computer-supported collaborative learning, neural networks for instructional evaluation, affective computing for student emotion detection, and recommender systems for personalized learning stand out (Chen et al., 2022). With the use of the Internet in education and the widespread use of online education, student records in learning management systems have begun to generate a large pile of data. The development of technology research applications based on big data makes it easier for researchers to see the potential and problems of individual students. Based on this data, researchers can monitor and evaluate students, teachers, materials, and learners (Lutfiani & Meria, 2022).

Knowledge and learning have social, economic, and cultural impacts. As such, developments in the field of education are crucial. Today, advancements in technology have greatly accelerated progress in education. Thus, this study seeks to identify the topics that are currently trending in educational articles published in 2023. The objective is to understand and highlight the most urgent issues in the field of education.

Educational research must be responsive to the needs of the knowledge society. In this regard, the significance

of this study is amplified. Abbreviations for technical terms must be explained upon their initial usage. Avoid biased, emotional, figurative, or ornamental language, and stick to standard language with consistent technical terms. Keep the language formal, and avoid contractions, colloquial words, informal expressions, and unnecessary jargon. The positions on subjects should be clear but should also be hedged.

Furthermore, aim for grammatical correctness, and use precise vocabulary to convey meaning whenever possible. Researchers and decision-makers in the education field are focused on complex issues, including digitalization, the transformation of learning methods, student achievement, educational policies, and teaching methods. Clear causal connections between statements should be established to ensure a logical flow of information.

The purpose of this study is to use bibliometric analysis to identify the key and contemporary topics in education. Only articles indexed in the 2023 Web of Science database will be examined. The study aims to help scholars, policymakers in education, and educational practitioners with research in the field. Additionally, it will provide a foundation for future educational research and policymaking processes. To accomplish this, the following research questions were established:

1. What are the most frequently used keywords in articles on education published in 2023 and how is the thematic distribution of keywords shaped?
2. What are the most cited studies in these articles and which topics do they emphasize?

Method

This paper applies bibliometric analysis to identify education-related article trends in 2023. Bibliometric analysis is a scientific study, publication, and citation review method that was employed to examine literature in the education field (Aria & Cuccurullo, 2017). The study features descriptive statistics which encompass the number of articles, author keywords, citations by WOS, and thematic clusters (Hood & Wilson, 2001).

Data Collection

The data collection process was conducted utilizing the Web of Science database. Relevant articles were identified through queries and subsequently filtered as necessary. Figure 1 displays the methods employed during data collection and the steps taken in selecting the data.

An initial query of the Web of Science using the keyword "education" retrieved 1,466,768 studies. The filters of WoS categories: "Education Educational Research", citation topic meso: "6.11 Education & Educational Research", document type: "Article" and language: "English" resulted in 2,917 articles.

Data Analysis

Articles related to the subject and bibliometric data of these articles were obtained through queries on the Web of Science database. The gathered data underwent bibliometric analysis, including frequency of keywords, identification of the most cited studies, and thematic cluster analysis. Technical term abbreviations are explained upon first use. Bibliometric analysis aided in the identification of critical and current issues within the field of education.

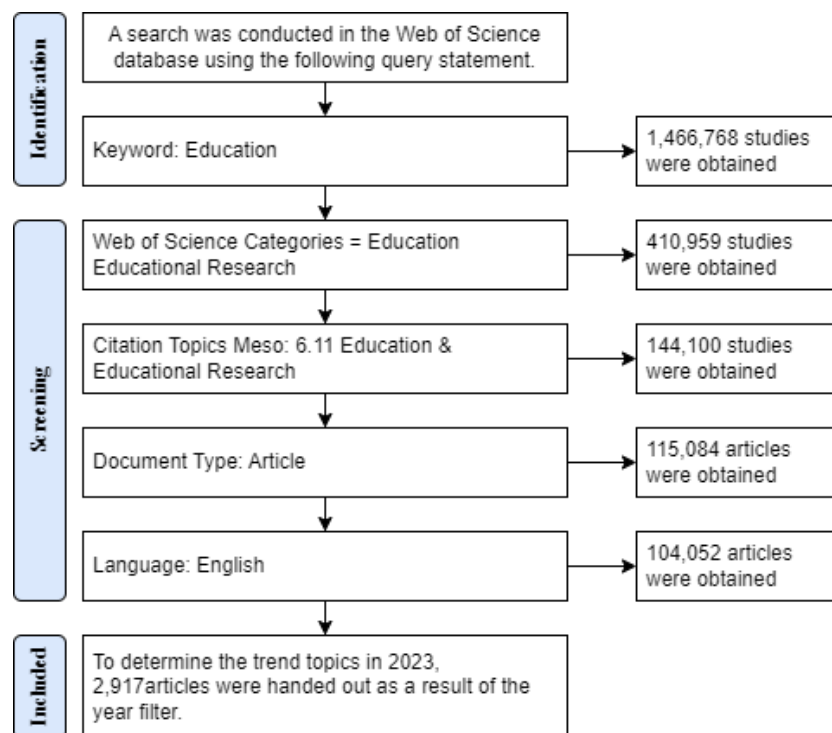


Figure 21. PRISMA Chart of Data Collection Process

Results

In 2023, a bibliometric analysis of education-related articles indexed in the Web of Science database was conducted, yielding crucial data to determine current and prominent topics in education. This data provides insight into trends and priorities within the field. The distribution of keywords in relevant articles, an analysis of the most cited studies, and a detailed examination of notable topics in education are presented below.

Keyword Distribution and Thematic Cluster Analysis

The articles published in 2023 on education were analyzed and important findings were reached by determining the thematic distribution of keywords. A frequency analysis was performed to identify the most commonly used keywords in the articles, and Figure 2 presents a word cloud that indicates the frequency of usage.

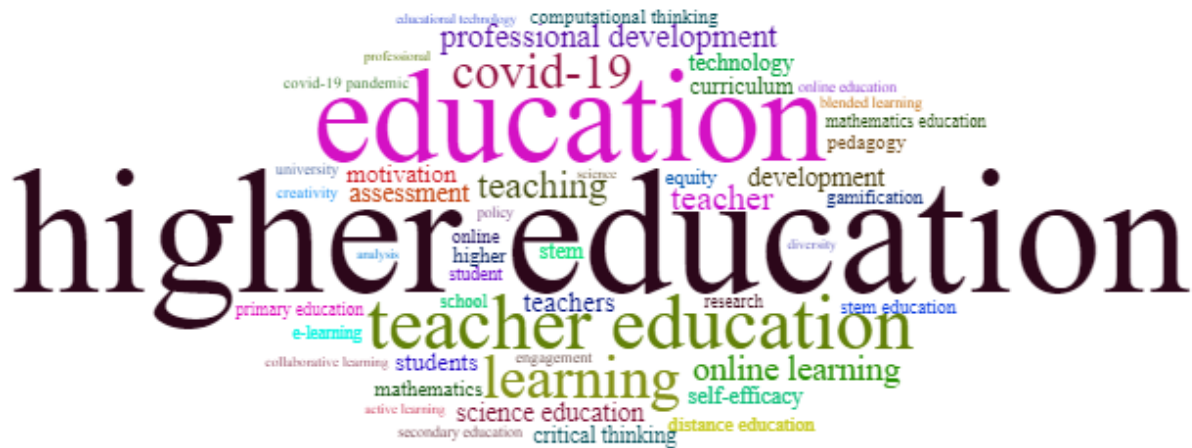


Figure 22. Word Cloud on the Frequency of Keywords in Articles

In 2023, the frequency distribution of keywords of education-related articles is one of the main findings of this study. Analysis of Figure 2 reveals the most frequent keywords used in these articles, which help identify the current focus topics and trends in education. The top three keywords are "higher education," "education," and "teacher education," indicating prominent themes. Other commonly used keywords include "learning," "covid-19," "teaching," and "online learning."

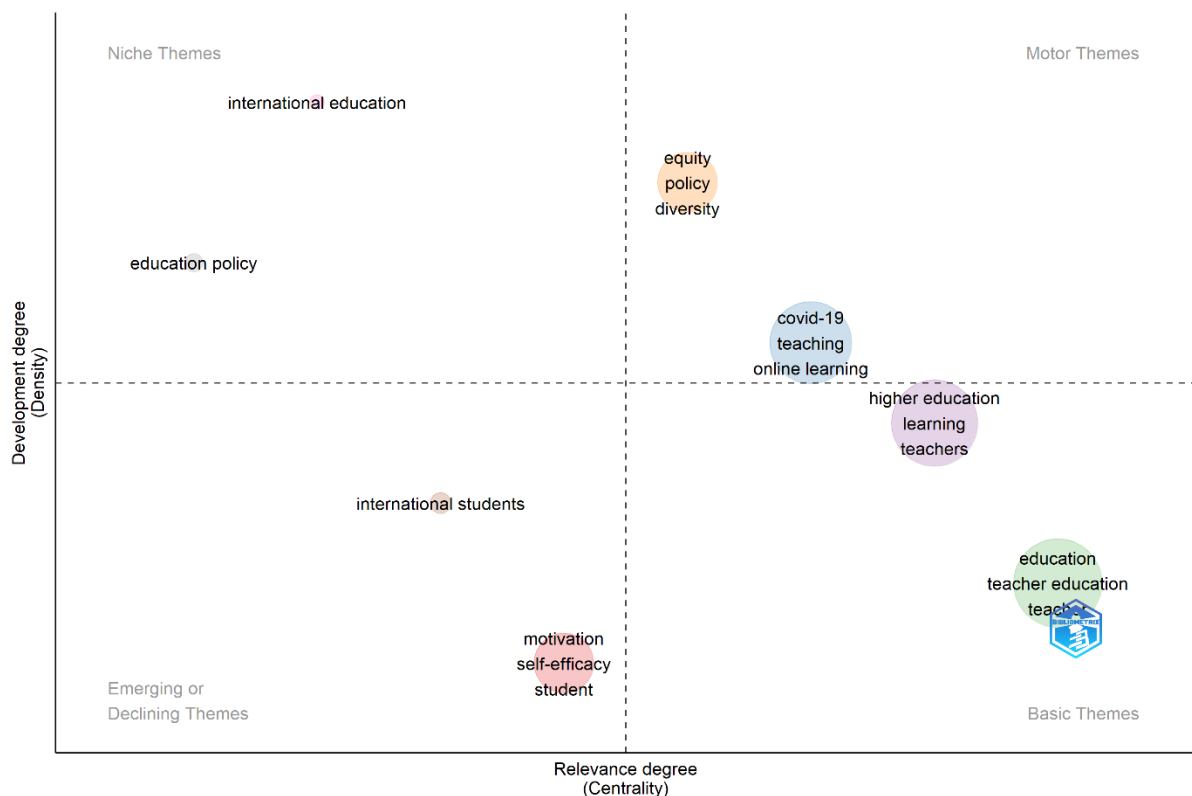


Figure 23. Thematic Cluster Analysis Result

Thematic cluster analysis categorized education-related keywords into four distinct regions. Each region corresponds to particular themes and subtopics. The positioning of the keywords within these regions enables us to comprehend their interrelationships and trends. Additionally, the findings from this analysis can aid in pinpointing high-priority research areas within the education field and offer direction for upcoming studies. Figure 3 displays the various regions and associated keywords resulting from the analysis of four distinct regions.

Region 1: Motor Themes (Top Right)

The keywords in this region appear to address innovative and essential concerns in the field of education. Phrases like "equity," "policy," and "diversity" may pertain to topics concerning fairness, policies, and variety in education. The placement of these phrases towards the center-left area of the region could suggest that these themes indicate a particular field of knowledge and hold significant significance.

Region 2: Basic Themes (Bottom Right)

The keywords in this section appear to be the foundation of the field of education, with terms like "higher education," "learning," and "teachers" suggesting themes of higher education, learning, and teaching. The proximity of these terms to the upper middle edge hints at their association with motor themes (Region 1) and a particular level of expertise. The terms "education," "teacher education," and "teacher" may refer to general education and teacher training. The fact that these terms appear on the middle right side may suggest that core subjects receive less attention compared to other areas.

Region 3: International Students and Motivation (Lower Left)

The keywords in this section suggest that international students and their motivations are significant topics in the field of education. "International students" refers to the experiences of students from different countries. The terms "motivation," "self-efficacy," and "student" reflect student motivation and self-efficacy. The terms in the bottom right corner may indicate a peripheral connection to central subjects and represent a particular area of expertise.

Region 4: International Education and Education Policy (Top Left)

The keywords in this section appear to pertain to international education and education policies. "International education" can refer to programs or experiences aimed at providing a global perspective. "Education policy" refers to policies governing education. The positioning of "education policy" in the bottom left corner suggests that this topic is foundational but may require some level of expertise.

Most Cited Articles

Within the scope of this study, we analyzed the top 10 cited studies among education articles published in 2023. These articles have a great impact on the education field, as the number of citations indicates their effectiveness and value for educational researchers and practitioners. We found each article, which focuses on various education issues and approaches, worthy of detailed review. This review aims to familiarize educational researchers and practitioners with significant works. Table 1 provides the authors, titles, keywords, and total citation counts of these articles.

Table 4. Most Cited Articles

Author	Title	Keywords	Total Citations
Burt, et al.	STEM validation among underrepresented students: Leveraging insights from a STEM diversity program to broaden participation	undergraduate research experiences (UREs), underrepresented students, STEM, broadening participation, validation	12
McLean & Attardi	Sage or guide? Student perceptions of the role of the instructor in a flipped classroom	active learning, flipped classroom, guide, instructor, peer interaction	11
Cooper, G.	Examining Science Education in ChatGPT: An Exploratory Study of Generative Artificial Intelligence	Generative artificial intelligence and science education, Large language models, ChatGPT, Digital technologies	9
Liu, et al.	Toward a model of informal digital learning of English and intercultural competence: a large-scale structural equation modeling approach	Informal Digital Learning of English, Intercultural competence, Language learning beyond the classroom, Ecological CALL	6
Troehler, D.	Comparative education or epistemological power games for world domination	Comparative education, epistemology, globalisation, world power, imperialism	6
Vazquez-Parra, et al.	Social Entrepreneurship and Complex Thinking: Validation of SEL4C Methodology for Scaling the Perception of Achieved Competency	professional education; educational innovation; future of education; complex thinking; social entrepreneurship; higher	5

Author	Title	Keywords	Total Citations
		education	
Cruz-Sandoval, et al.	Student Perception of the Level of Development of Complex Thinking: An Approach Involving University Women in Mexico	Professional education, educational innovation, future of education, complex thinking, educational gender gap, higher education	5
Campol, et al.	Methodologies for Fostering Critical Thinking Skills from University Students' Points of View	methodology; critical thinking; thinking skills; students' conception; higher education	4
Zerai, et al.	The meanings of differentiated instruction in the narratives of Eritrean teachers	Differentiated instruction, individualisation, inclusive education, teacher, narrative analysis, Eritrea	4
Dai & Hardy	Pursuing doctoral research in an emerging knowledge hub: An exploration of international students' experiences in China	International doctoral student, Chinese university, Bourdieu, learning experience, imbrication	4

Table 1 illustrates that the top 10 most cited articles concentrate on diverse educational topics. These articles focus on various topics, including diversity in education, approaches to learning, and artificial intelligence. Nevertheless, a shared characteristic of these studies is their contribution to prioritized issues in education.

The highest cited article is "STEM validation among underrepresented students." One article, which draws on a STEM diversity program, aims to broaden the participation of underrepresented students in STEM fields. The second most cited article, "Sage or guide? Student perceptions of the role of the instructor in a flipped classroom," challenges the conventional role of instructors in flipped classrooms by examining student perspectives. The third article, "Examining Science Education in ChatGPT," analyzes science education in ChatGPT. An Exploratory Study of Generative Artificial Intelligence examines the potential of artificial intelligence models, such as ChatGPT, in science education.

Discussion

The frequency distribution of keywords enables an understanding of priorities and focal points in the education field. The frequently used "higher education," "education," and "teacher education" keywords reflect emphasis on these topics in education. This suggests that the cornerstones of education - higher education, general

education, and teacher education - remain essential. Studies on these topics demonstrate society's ongoing interest in the education system. However, despite the frequent use of keywords such as "COVID-19" and "online learning," it is evident that the COVID-19 pandemic has brought about significant changes to the field of education globally. This exceptional period has required swift adjustments to distance learning, e-learning technologies, and teaching methods, resulting in a surge of interest in these topics. Moreover, the frequent use of terms like "STEM" and "technology" underscores the significance of science, technology, engineering, and mathematics education as well as digital technologies for students' future success. These fields represent sought-after skills in the job market and reflect ongoing research and development in these areas. Similar to our study, Valtonen et al. (2022) found that "online learning," "e-learning," and "higher education" were among the most commonly used keywords. Granić (2022), in his systematic review of technology adoption in education, focused on different technology types and found that e-learning is the most widely accepted delivery method, followed by m-learning, Learning Management Systems (LMSs), and social media platforms.

The results of the thematic analysis demonstrate that research in the realm of education in 2023 encompasses diverse themes. Specifically, keywords in the initial section, labeled as "motor themes", highlight pivotal and foundational concerns in the field of education. Phrases like "fairness," "policies," and "variety" reveal significant topics pertaining to equity, policy, and diversity in education. The positioning of these terms towards the center-left edge of the zone implies a potential focus and depth of expertise. The core themes reside within the second zone, which includes fundamental concepts in education such as "higher education," "learning," and "teachers." Despite this, their proximity to the motor themes in Zone 1 suggests their significance and potential specialization. The third quadrant suggests that the topic of international students and their motivation is significant in the field of education. However, its positioning in the lower right corner suggests that it may have less of a connection to core issues and may instead represent a specific area of specialization. The fourth quadrant appears to pertain to international education and education policy. The appearance of the phrase "education policy" in the lower left corner suggests that this topic may be fundamental but may necessitate a certain level of expertise. A research study that examined publications during the COVID-19 pandemic period determined that the content analyzed could be categorized into three primary areas: teaching and learning, policy and administration matters, and students' mental health (Valtonen et al., 2022). In a comparable investigation, the concepts of educational technology (EdTech), distance learning (DL), and instructional design stood out (Zawacki-Richter & Bozkurt, 2022).

The most cited articles on education published in 2023 were analyzed to determine the topics they focused on. It is possible to list the topics that the top 10 most cited articles focus on as follows:

- Increasing the participation of underrepresented students in STEM education
- Flipped classroom practices and student perceptions
- Artificial intelligence and science education
- English language learning and cultural competence

- Comparative education and globalization
- Complex thinking skills and education
- Develop critical thinking skills
- Differentiated instruction and teacher perceptions
- Experiences of international students
- Important and far-reaching issues in education

These articles addressed a variety of topics in the field of education and each of them ranked among the top cited articles in terms of their focus. Although each article has a different contribution and importance, the information and approaches provided by these studies are considered very valuable for educational researchers and practitioners. One of the reasons for this may be that they addressed essential issues in the field of education. For example, an article that addresses the important issue of increasing the participation of underrepresented students in STEM education may receive wide attention. Another aspect is that they may have used innovative research methods or presented essential findings. Educational researchers and practitioners may want to further understand and adopt such approaches and findings. Furthermore, these articles may have been written to provide guidance to educational practitioners. Teachers, administrators, and policymakers need such guidance. Finally, these articles may be focused on a broad area of research. For example, articles that deal with big topics such as artificial intelligence and education receive a lot of attention. A study that examined studies on education and listed the topics in the most cited articles concluded that topics such as the effects of technology on educational processes, the impact of technology on learning, student motivation, and learning outcomes (Valtonen et al., 2022).

Conclusion and Recommendations

This study reached important findings by examining the frequency distribution and thematic cluster analysis of the keywords of articles published on education in 2023. The most frequently used keywords are "higher education," "education," and "teacher education". These keywords reflect the prominent themes of education-related studies. In addition, thematic cluster analysis was used to categorize the keywords into four different regions. These regions represent different themes by grouping thematic keywords in the field of education. In particular, in the "Engine Themes" region, issues such as justice, policy, and diversity are prominent. The "Core Themes" zone reflects core topics such as higher education, learning, and teaching. The "emerging or Declining Themes" zone includes studies on the experiences of international students and student motivation. Finally, the "Niche Themes" zone focuses on international education and education policy issues.

This study also analyzed the top 10 most cited education-related articles in 2023. These articles have had a wide impact on the field of education and have become important resources for educational researchers and practitioners. Each article focused on different topics and approaches in education. For example, it was concluded that these articles focused on various topics such as diversity in education, approaches to learning,

and artificial intelligence. Each article stood out by contributing to a specific problem in the field of education.

These findings provide guidance to educational researchers, practitioners, and policy makers in identifying and focusing on important issues in the field of education. This study highlights issues such as diversity in education, approaches to learning, artificial intelligence, international students' experiences, and student motivation, which may influence the future research and practice directions of the field of education. Therefore, these findings are of great importance for all those working in the field of education and this study can help to make further progress in education.

Based on the results above, the following recommendations can be made:

- According to the results of the study, keywords such as "equity," "diversity," and "policy" represent important issues in the field of education. It is suggested that educational institutions and researchers should focus more on diversity and equity issues to create a more equitable and inclusive environment in the education system.
- According to the research results, keywords such as "learning" and "online learning" emphasize the importance of learning approaches. Educators are advised to consider various learning methods and technologies to support students to learn more effectively.
- Artificial intelligence models such as ChatGPT demonstrate the potential in education. Educators and researchers should explore ways to use AI and digital technologies as more effective learning tools.
- Keywords such as "international education" and "education policy" emphasize the importance of international education and education policy. Collaboration and knowledge sharing between countries are important to foster developments in the field of education.
- Finally, researchers are advised to carefully examine the most cited articles and see why these studies are so influential and the priority issues in the field of education.

References

- Aria, M., & Cuccurullo, C. (2017). bibliometrix: An R-tool for comprehensive science mapping analysis. *Journal of Informetrics*, 11(4), 959–975. <https://doi.org/10.1016/J.JOI.2017.08.007>
- Chen, X., Zou, D., Xie, H., Cheng, G., & Liu, C. (2022). Two decades of artificial intelligence in education: Contributors, collaborations, research topics, challenges, and future directions. *Technology & Society*, 25(1), 28–47.
- Dubé, A. K., & Wen, R. (2022). Identification and evaluation of technology trends in K-12 education from 2011 to 2021. *Education and Information Technologies*, 27(2), 1929–1958. <https://doi.org/10.1007/S10639-021-10689-8/TABLES/4>

- Granić, A. (2022). Educational Technology Adoption: A systematic review. *Education and Information Technologies*, 27(7), 9725–9744. <https://doi.org/10.1007/S10639-022-10951-7/TABLES/2>
- Hood, W. W., & Wilson, C. S. (2001). The literature of bibliometrics, scientometrics, and informetrics. *Scientometrics*, 52(2), 291–314. <https://doi.org/10.1023/A:1017919924342>
- Martin Weller. (2020). *25 Years of Ed Tech*. Athabasca University Press.
- Ninda Lutfiani, & Lista Meria. (2022). Utilization Of Big Data in Educational Technology Research. *International Transactions on Education Technology (ITEE)*, 1(1), 73–83. <https://doi.org/10.33050/itee.v1i1.198>
- Reiser, R. A. (2001). A history of instructional design and technology: Part I: A history of instructional media. *Educational Technology Research and Development*, 49(1), 53–64. <https://doi.org/10.1007/BF02504506>
- Ünüvar, P. (Ed.). (2022). *Eğitim bilimleri alanında yeni trendler II [New trends in educational sciences]*. Duvar Yayınları.
- Valtonen, T., López-Pernas, S., Saqr, M., Vartiainen, H., Sointu, E. T., & Tedre, M. (2022). The nature and building blocks of educational technology research. *Computers in Human Behavior*, 128, 107123. <https://doi.org/10.1016/J.CHB.2021.107123>
- Zawacki-Richter, O., & Bozkurt, A. (2022). Research Trends in Open, Distance, and Digital Education. *Handbook of Open, Distance and Digital Education*, 1–23. https://doi.org/10.1007/978-981-19-0351-9_12-1
- Burt, B. A., Stone, B. D., Motshubi, R., & Baber, L. D. (2023). STEM validation among underrepresented students: Leveraging insights from a STEM diversity program to broaden participation. *Journal of Diversity in Higher Education*, 16(1), 53–65. <https://doi.org/10.1037/dhe0000300>
- Campo, L., Galindo-Domínguez, H., Bezanilla, M. J., Fernández-Nogueira, D., & Poblete, M. (2023). Methodologies for fostering critical thinking skills from university students' points of view. *Education Sciences*, 13(2), 132.
- Cooper, G. (2023). Examining science education in chatgpt: An exploratory study of generative artificial intelligence. *Journal of Science Education and Technology*, 32(3), 444-452.
- Cruz-Sandoval, M., Vázquez-Parra, J. C., Carlos-Arroyo, M., & Amézquita-Zamora, J. A. (2023). Student Perception of the Level of Development of Complex Thinking: An Approach Involving University Women in Mexico. *Journal of Latinos and Education*, 1-13. <https://doi.org/10.1080/15348431.2023.2180370>
- Dai, K., & Hardy, I. (2023). Pursuing doctoral research in an emerging knowledge hub: an exploration of international students' experiences in China. *Studies in Higher Education*, 48(6), 784-796. <https://doi.org/10.1080/03075079.2023.2166917>
- Liu, G., Ma, C., Bao, J., & Liu, Z. (2023). Toward a model of informal digital learning of English and intercultural competence: a large-scale structural equation modeling approach. *Computer Assisted Language Learning*, 1-25. <https://doi.org/10.1080/09588221.2023.2191652>

- McLean, S., & Attardi, S. M. (2023). Sage or guide? Student perceptions of the role of the instructor in a flipped classroom. *Active learning in higher education*, 24(1), 49-61. <https://doi.org/10.1177/14697874187937>
- Tröhler, D. (2023). Comparative education or epistemological power games for world domination. *Comparative Education*, 1-17. <https://doi.org/10.1080/03050068.2023.2185358>
- Vázquez-Parra, J. C., Carlos-Arroyo, M., & Cruz-Sandoval, M. (2023). Social Entrepreneurship and Complex Thinking: Validation of SEL4C Methodology for Scaling the Perception of Achieved Competency. *Education Sciences*, 13(2), 186, 1-17. <https://doi.org/10.3390/educsci13020186>
- Zerai, D., Eskelä-Haapanen, S., Posti-Ahokas, H., & Vehkakoski, T. (2023). The meanings of differentiated instruction in the narratives of Eritrean teachers. *Pedagogy, Culture & Society*, 31(3), 419-437. <https://doi.org/10.1080/14681366.2021.1914712>

Impact of the KISS Program on Sexually Transmitted Infections (STIs) Awareness: Participants Insight and Implication

Ismatara Reena

University of Louisiana at Lafayette, USA,  <https://orcid.org/0000-0003-1054-8726>

Sumona Hoque Mumu

University of Louisiana at Lafayette, USA,  <https://orcid.org/0000-0003-0386-8991>

Abstract: Background: Sexually transmitted diseases (STDs) remain a significant public health concern as more than 2.5 million infected in 2021, necessitating effective educational interventions to promote knowledge and safe practices. The study analyzes secondary data using SPSS. The dataset includes pre- and post-interventional data of KISS (Knocking out Infections through Safer-sex and Screening) intervention, which includes Sexually transmitted infections (STIs) knowledge assessment scale score among a group of military personnel and their spouses at an army base in Washington. Result: The study found that STIs knowledge increased from 15 to 25 (66.6%) on a scale of 30 after the intervention. Paired sample t test indicates a significant increase in knowledge scores following intervention ($p < 0.01$). After intervention, 92.4% participants were more likely to practice safe sex. In addition, the intervention found to be positively correlated (Pearson correlation, $p < 0.05$) in their responses. Almost all participants were confident talking about STIs (97%), comfortable with their group (97%), comfortable asking questions (95.5%), were willing to get screened regularly for STIs (94%), and to recommend to a friend (88%). Thematic analysis revealed 40% participants decided to practice safe sex whereas about 16% of respondents expressed the intention to ask the doctor to perform regular screening tests. None of the demographic variables showed a significant association with the knowledge assessment scores ($p > 0.05$). Conclusion: The intervention KISS found effective in improving knowledge and behavior of STIs prevention along with high participant acceptance suggests its potential for broader implementation to diverse populations and settings with a control group on a larger scale.

Keywords: STDs, STIs, knowledges, KISS intervention, safe sex.

Citation: Reena, I. & Mumu, S.H. (2023). Impact of the KISS Program on Sexually Transmitted Infections (STIs) Awareness: Participants Insight and Implication. In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023-- International Conference on Social and Education Sciences* (pp. 528-539), Las Vegas, NV, USA. ISTES Organization.

Introduction

Sexually transmitted infections (STIs) are a major public health concern. The prevalence of STIs in United

States in 2018 was amounted to be about 68 million which equates to one in five people (Kreisel et al., 2021). The healthcare costs resulting from 26 million new STI cases that year reached approximately \$16 billion (Chesson et al., 2021). Sexually transmitted diseases (STDs) have disproportionate distribution affecting predominantly marginalized groups vulnerable to social and economic factors. According to the latest report by Centers for Disease Control and Prevention (CDC), almost half of the new STIs in the United States are diagnosed in young individuals aged 15 to 24 years old. STI rates among US military is persistently high, particularly among women (Deiss et al., 2016; Noiman et al., 2020). The high prevalence of these diseases is thought to be associated with a lack of knowledge on the transmission of these infections and on prophylaxis and therapy (Suominen et al., 2017).

The consequences of long term STIs are multifaceted, impacting not only individual health but also societal well-being, particularly in terms of healthcare costs and social attitudes. STIs can cause health problems like infertility, ectopic pregnancy, chronic pain, newborn disease, and increased HIV risk, as well as socio-economic problems like economic burden, shame, and stigma (Kostera & Santiago, 2020). The occurrence of STDs is often related to modifiable sexual behaviors, and many people underestimate their risk (Massuda et al., 2019; Tabler et al., 2018).

There are several forms of intervention for STDs awareness available and offered through both in-person and digital delivery methods. However, it is imperative to assess the intervention's efficacy that can effectively modify high-risk sexual behaviors, prevent transmission, and improve health. Overall, the existing work indicates that a clear understanding of STI awareness program efficacy is yet to meet expectations (Evans et al., 2020). Further investigation is needed to identify the effectiveness, issues and concerns that can, ultimately, be addressed to improve feasibility, acceptance, and behavior adoption outcome in young adults, as they are a high-risk group for STIs. This is desirable because sexual awareness program have immense potential to support healthy sexual practice, lower the STD incidence, and healthcare burden associated with it (Jayes et al., 2022; Zizza et al., 2021).

With this rationale in mind, we aim to enhance the current research prospect by examining the efficacy of the KISS (Knocking out Infections through Safer-sex and Screening) Program which was implemented for promoting awareness about STIs among a group of young military personnel and their spouses. Researchers collected pre- and post-intervention knowledge data, and post intervention feedback were collected for participants as quantitative and qualitative data. In this study, we investigated participant's experiences with the KISS intervention, particularly effectiveness, and utility using both quantitative and qualitative analytic approach. This research contributes in several significant ways: firstly, it provides an in-depth exploration of the intervention's effectiveness and offers insights for potential enhancements to maximize its efficacy. Secondly, the findings can be compared with existing other intervention procedures to assess the best possible model to implement for sexual awareness program. Finally, a thematic qualitative analysis was conducted for deeper understanding of the participant's level of commitments regarding post intervention sexual health behavior.

The rest of the paper is structured as follows. The study's methods and materials, analysis, findings, and discussion are covered. Moving forward in conclusion, we acknowledge the study and framework limitations, as well as future potential research directions based on the implications and findings of the study.

Method

The primary pilot study was conducted at the Madigan Army Medical Center (MAMC) on the Joint Base Lewis-McChord military base in Washington, U.S. over a period from October 2016 to May 2017 (Kunz et al., 2022). Participants inclusion criteria were young individuals aged 18 to 30, who were either active-duty Army personnel or medical beneficiaries of the personnel and were HIV-negative at the time of enrollment. No participants were pregnant or trying to conceive and had no scheduled deployments within the subsequent three months. The focus of this study was to implement the "Knocking-out Infections through Safer-sex and Screening" (KISS) intervention among participants. This educational intervention aimed to enhance knowledge and promote safer sexual practices to reduce sexually transmitted infections (STIs) incidence.

Knocking-out Infections through Safer-sex and Screening (KISS) intervention is acknowledged as an awareness session on STIs by the CDC in the USA. It is a single interactive sexual education group session administered in groups of 5 to 8 participants of the same gender. The session was conducted by a trained study health educator from the research team. The objective of this session is to reduce STIs incidence by promoting increased condom usage. Before the intervention began, knowledge assessments were conducted to establish the participants' baseline understanding of sexual health and STIs. The primary researcher introduced diverse vignettes representing various racial and ethnic backgrounds to enhance inclusivity.

A reassessment was conducted at the end of the intervention. The assessment consisted of thirty questions regarding the knowledge of STIs, STDs, safe sex behavior. Participants received one point for each correct answer. Additionally, a post interventional feedback was collected to understand participant's perception and the level of commitment regarding healthy sexual behavior after the intervention. Participants perception was assessed with a set of Likert questions demonstrated later in the article. The level of commitment towards healthy sexual practice was assessed with an open-ended question "What would you do differently after today?". Some recommendations by the participants were also collected with another open ended question "What did you hope to learn today but did not?".

In this research study, deidentified, publicly accessible secondary data of this pilot study was obtained from Harvard database (Kunz, 2022). Statistical analysis was utilized to investigate the impact of the Knocking-out Infections through Safer-sex and Screening (KISS) intervention among the young adult military personnel. Descriptive analyses were conducted to assess the survey response distribution among the participants. The study compared pre- and post-intervention knowledge assessment score to evaluate the effectiveness of the KISS intervention by paired t test. Qualitative thematic analysis was carried out to analyze the open-ended

questions. All Likert items were assessed with correlation test to determine the interactive strength and direction of questionnaire items. Demographic variables were examined as potential predictors of baseline knowledge assessment scores. All statistical analyses were carried out using SPSS version 26.0. A two-tailed p-value cutoff for statistical significance was set at 0.05 with a 95% confidence level.

Results

Quantitative Analysis

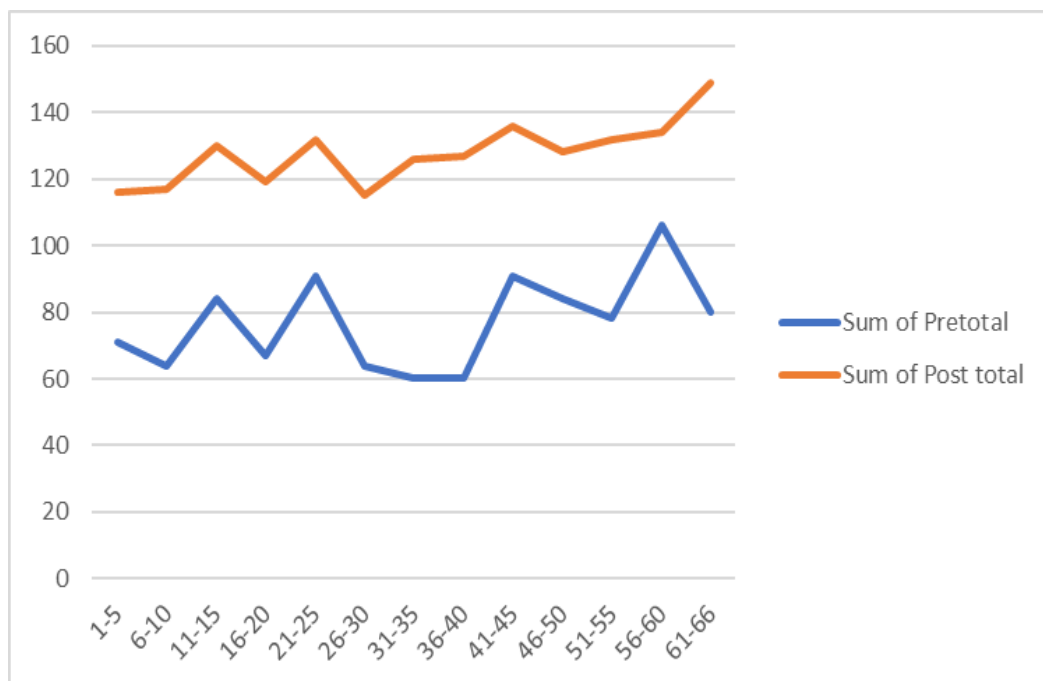


Figure 1. Score before and after the intervention

A paired samples t-test with an α of .05 was used to compare the mean knowledge assessment scores measured by 30 item questionnaires of 66 young adult participants before ($M=15.15$, $SD=5.72$) and after ($M=25.17$, $SD=3.34$) one hour KISS intervention. Mean score for knowledge assessment increased from 15 to 25 (66.6%) on a scale of 30 after the intervention. Visual inspection of the histograms for both pre-and post-test scores and their differences indicated that the assumption of normality was not violated. The paired sample t-test revealed that on average, knowledge assessment scores in the post-test were 10.01 points more, 95% CI [-11.24, -8.78] than the pre-test scores. The difference was statistically significant, $t(65) = -16.29$, $p < .001$, two-tailed. Paired sample t test indicates a significant increase in knowledge scores following intervention ($p < 0.01$). The effect size was estimated utilizing Cohen d criteria and significantly large, $d = 2.14$.

$$\text{Cohen's } d = (M2 - M1) / SD \text{ pooled} = 2.14$$

$$SD \text{ pooled} = \sqrt{((SD1^2 + SD2^2) / 2)}$$

$M1$ = mean of pretest, $M2$ = mean of post test, s pooled = pooled standard deviations for the two groups.

Table 1. Pair sample t test, Mean score difference among participants before and after Intervention

	Mean (Standard Deviation)	t (df)	p value
Pre-score	15.15 (5.72)	-16.253(65)	<0.001
Post-score	25.17 (3.34)		

Note: N=66, p value is significant at <0.05, with 95% Confidence Interval

K-mean cluster analyses of the Likert items feedback was performed, 65 participants out of 66 took one single group of membership, hence was not appropriate to proceed. However, it reveals a consistent pattern of positive agreement among participants regarding the intervention's impact. Almost all participants were confident talking about STDs (97%), comfortable with their group (97%), comfortable asking questions (95.5%), were willing to get screened regularly for STIs (94%), and to recommend to a friend (88%). 92.4% participants were more likely to practice safe sex after the intervention. Figure 2 demonstrates the Likert items and their responses distribution by the participants.

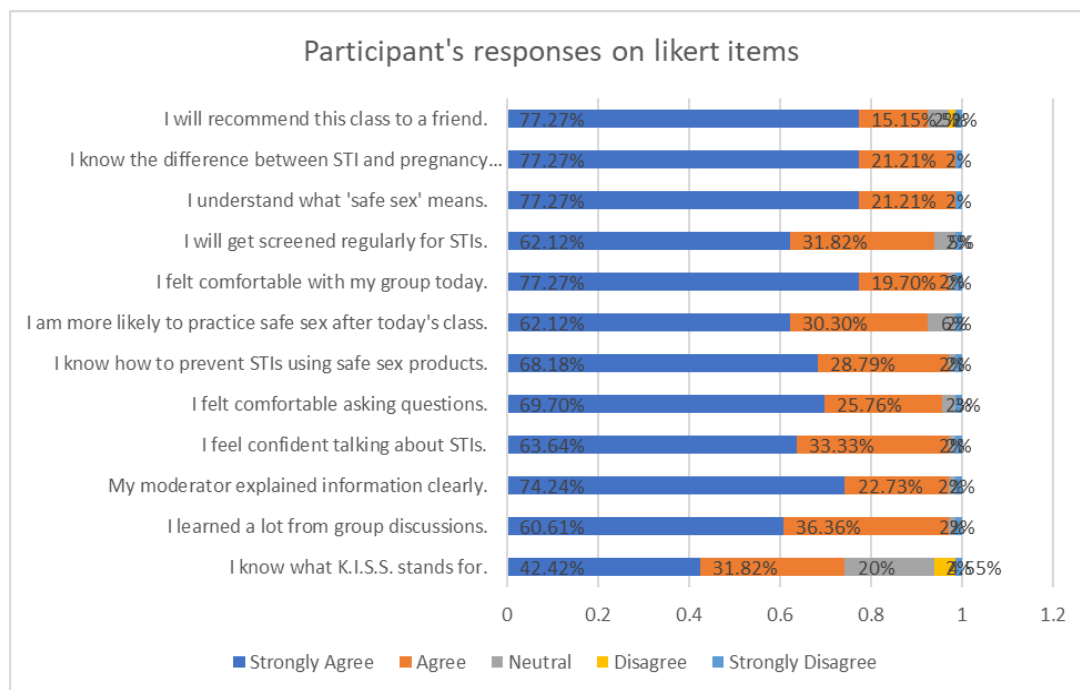


Figure 2. Participant's responses on Likert Items

The summary statistics presented in table 2 demonstrates the distribution and central tendencies of baseline knowledge assessment scores within various subgroups of four independent variables: Gender, Education, Race, and Marital Status. For Gender, males (n=31) have an average score of 16.09 and a variance of 36.75, while females (n=35) average 14.31 with a variance of 28.57. Participants with a bachelor's degree (n=3) show the highest average score of 20 and low variance of 7, while the High school diploma or GED equivalent group

(n=22) has an average score of 14.09 with a variance of 31.41. Among the races, White participants (n=26) exhibit the highest average score of 17.3 and a variance of 26.94, while Other (n=8) has the lowest average of 10.12 and a variance of 34.12. Marital Status shows that individuals in a committed relationship (n=6) have the highest average score of 18.5 and a variance of 29.1, whereas those who are single (n=29) have an average of 13.13 and a variance of 36.9.

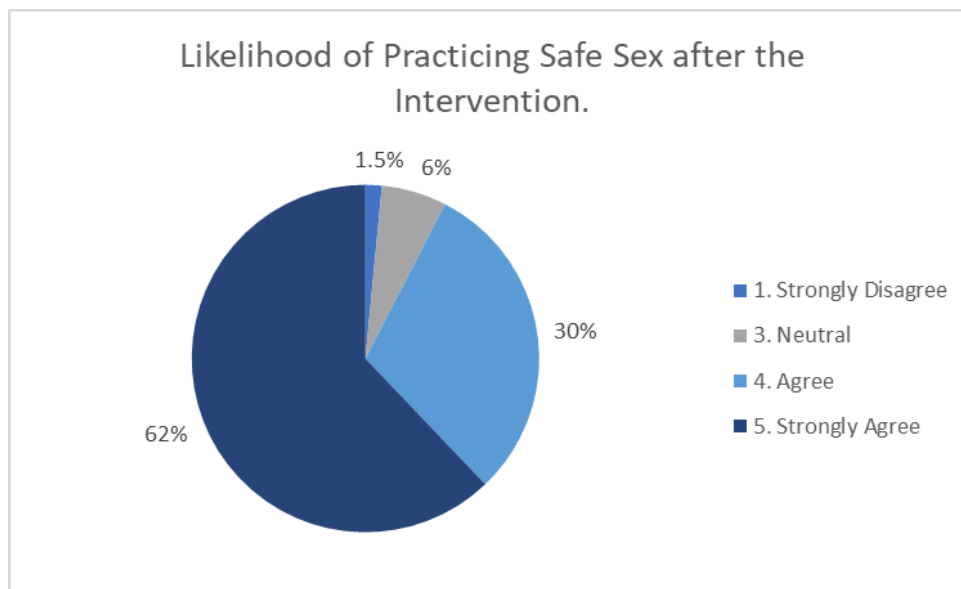


Figure 24. Likelihood of practicing safe sex after the intervention.

Table 2. Summary statistics of baseline knowledge across the demographic variables

Groups	Count	Sum	Average	Variance
Gender				
Male	31	499	16.09	36.75
Female	35	501	14.31	28.57
Education				
High school diploma or GED equivalent	22	310	14.09	31.41
Some College	27	391	14.48	37.79
Associate degree	7	112	16	32.66
Bachelor's degree	3	60	20	7
Vocational/technical school	4	72	18	2
Post graduate (e.g., MS, PhD, MD)	3	55	18.33	46.33
Race				
African American	23	332	14.43	23.71
Hispanic	9	137	15.22	44.69

Groups	Count	Sum	Average	Variance
White	26	450	17.3	26.94
Other	8	81	10.12	34.12
Marital status				
Single	29	381	13.13	36.9
Ina committed relationship	6	111	18.5	29.1
Married	20	329	16.45	24.47
Separated	6	95	15.83	20.96
Divorced	4	58	14.5	12.33

A one-way between-groups analysis of variance (ANOVA) was used to investigate the impact of gender (male, female), race (African American, Hispanic, White, Other), education (high school diploma or GED equivalent, some college, associate degree, bachelor’s degree, vocational/technical school other than military, completed graduate or professional degree e.g., MS, PhD, MD), marital status (single, in a committed relationship, married, separated, divorced) on baseline knowledge assessment score of the participants regarding STIs and healthy sexual practices. Inspection of the skewness, kurtosis indicated that the assumption of normality for the dependent variable (baseline knowledge assessment score) was not violated. There was no statistically significant difference at the $p < .05$ level in STIs knowledge scores any of the groups of the independent variables (Table 3).

Table 3. Impact of demographic independent variables on dependent baseline knowledge

Factor	Source of Variation	SS	df	MS	F	P-value	F crit
Gender	Between Groups	52.23	1	52.23	1.61	0.21	3.99
	Within Groups	2074.25	64	32.41			
	Total	2126.49	65				
Education	Between Groups	175	5	35.05	1.07	0.38	2.3
	Within Groups	1951	60	32.52			
	Total	2126	65				
Race	Between Groups	334.864	3	111.62	3.86	0.05	2.75
	Within Groups	1791.62	62	28.89			
	Total	2126.49	65				
Marital status	Between Groups	221.25	4	55.31	1.85	0.12	2.52
	Within Groups	1785.73	60	29.76			
	Total	2006.98	64				

Qualitative Analysis

The open-ended question prompted participants to reflect on their plans for sexual health and what they hoped to learn. A qualitative thematic analysis of the responses was conducted. The feedback survey questionnaire administered after the intervention had two open ended questions, “What would you do differently after today?” and “What did you hope to learn today but didn’t”. The thematic analysis of responses revealed several key themes.

First, participants expressed intentions to adopt safer sexual practices, with a significant emphasis on using condoms (either male or female) and practicing safe sex. At least 40% percent of respondents specifically mentioned their commitment to this approach. Twenty nine percent of participants referred to 'other' strategies such as using the right lubricant, having fewer sexual partners, and maintaining caution in their sexual activities. Ten percent of respondents expressed a desire to educate others about safe sex practices, and several participants expressed a desire to talk more about safe practices. Screening and vaccination were mentioned by 16% and 4% of participants, respectively. The screening theme reflects a commitment to regular testing for sexually transmitted infections. The HPV vaccination theme suggests an interest in vaccination to prevent HPV-related health issues.

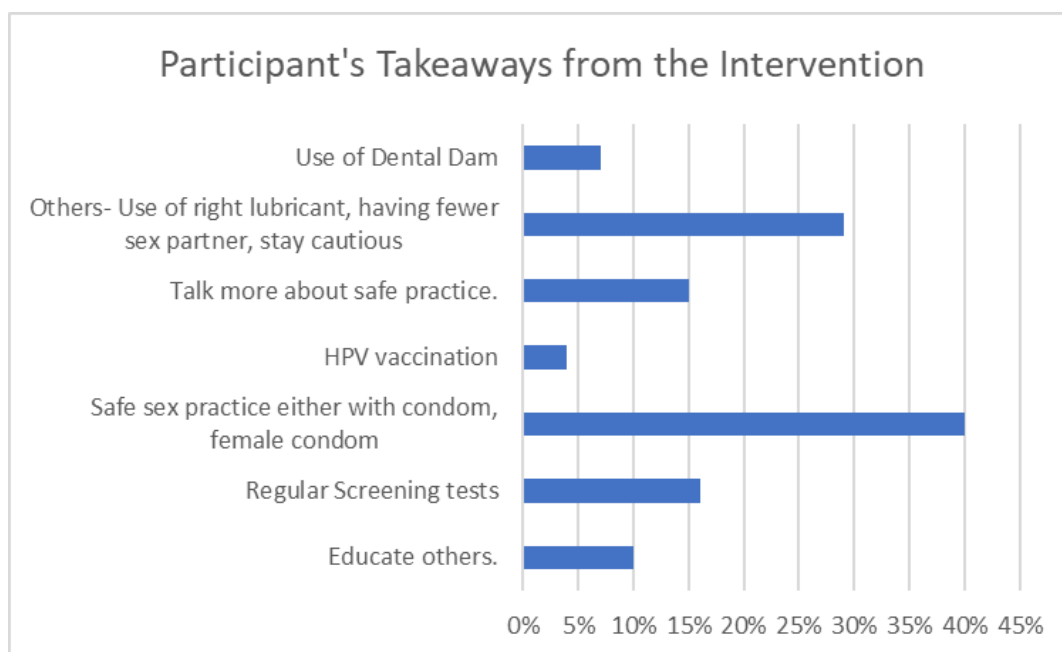


Figure 4. Participants’ response to open ended questions

As for what participants hoped to learn but didn't, the answers reveal quite a few recommendations by the participants. The responses primarily revolved around the timing of testing after unprotected sex, recycling of needles, information about genitalia and personal experiences, new HPV vaccines, coping with post-unprotected sex anxiety, and pregnancy prevention/contraception.

Discussion

The findings of our study indicate a significant knowledge increase among participants regarding STDs and safe sexual behavior following KISS intervention. In line with the study findings, other investigations showed that participant's knowledge regarding STDs improved following STDs awareness program intervention (Widman et al., 2019; Zizza et al., 2021). We identified a study featuring a culturally tailored intervention, and it demonstrated a substantial reduction in the odds of STI incidence by 54% (Gilbert et al., 2021). It may suggest that culturally tailored interventions are particularly effective. The feedback of the KISS intervention was mostly positive. Demographic variables of interest (gender, race, education, marital status) does not seem to significantly affect baseline knowledge level.

Open ended questions reveal a greater level of commitment to healthy sexual practice by the participant including safe sex practice (40%), screening (16%) and HPV vaccination (4%). Similarly, 33% increase in HPV vaccination following the intervention have been reported by (Yoost et al. 2017), in contrast, another Australian study did not report in any change in HPV vaccination uptake due to implementation barrier (Davies et al., 2023). Those diverse findings indicate the importance of structural and methodological factors that can influence the effectiveness of interventions in promoting healthy sexual behavior. Additionally, open-ended questions provided valuable insights into how the contents of the intervention can be improvised such as post-exposure testing, needle recycling, genitalia education, new HPV vaccines, managing post-unprotected sex anxiety, and pregnancy prevention. These insights highlight the need for a more holistic approach to sexual health awareness programs. The KISS intervention's effectiveness in improving knowledge and behavior for the prevention of STIs along with high participant acceptance suggests its potential for broader implementation.

In our comprehensive review of the current state of the art, we have not come across any existing literature that presents a dual approach, encompassing both qualitative and quantitative analyses, to evaluate the effectiveness of the KISS program in promoting sexual health awareness or any other sexual health awareness program. The use of a pre- and post-intervention dataset allows for a robust assessment of the intervention's impact. The study reports a substantial increase in STIs knowledge following the KISS intervention, supported by statistical analysis. It also examines participants' attitudes and behaviors, demonstrating a positive correlation between knowledge and safe practices. The high acceptance and willingness of participants to engage in safe sex practices, along with their confidence in discussing STIs, indicate the intervention's effectiveness and potential for broader implementation. Furthermore, the study's thematic analysis provides valuable insights into the participants' intentions and decisions, enhancing the qualitative understanding of the intervention's effects.

However, it's crucial to acknowledge the limitations of our study. As a pilot study with no control group, we cannot establish a causal relationship between the intervention and increased awareness definitively. The small sample size also limits the generalizability of our findings, and potential confounders may not have been fully accounted for due to the secondary data analysis nature of the study. There are chances for response bias since

the responses are self reported.

Building on the findings of this study, future research should consider longitudinal approach with an inclusion of control group in the research design for an in-depth understanding of how the intervention influences participants' knowledge and behavior. The findings can be compared with existing other intervention procedures to assess the best possible model to implement for sexual awareness program. Large participants pool from different demography can provide a comprehensive understanding of diverse needs and challenges of various populations, ultimately leading to more effective and inclusive strategies for promoting sexual health and STD awareness.

Conclusion

The rise of antibiotic-resistant strains of STDs, the ease of global travel and increasing rates of high-risk behaviors makes it challenging to prevent STD. In the face of these concerns, it is imperative to prioritize comprehensive sexual health education. The success of the KISS intervention showcases its potential to make a meaningful impact in the fight against STDs. It could be adaptable across diverse populations and settings, as indicated by the lack of significant demographic associations. The success of ongoing effort to reduce the prevalence of sexually transmitted diseases is largely influenced by population perception, knowledge and awareness. The KISS program has demonstrated its capacity to enhance knowledge and influence sexual health behavior positively, as reflected in the substantial increase in STIs knowledge scores and the heightened willingness to practice safe sex among participants. The study highlights the need for similar interventions on a larger scale to better understand the mitigation approaches to burden incurred by STIs.

References

- Chesson, H. W., Spicknall, I. H., Bingham, A., Brisson, M., Eppink, S. T., Farnham, P. G., Kreisel, K., Kumar, S., Laprise, J., Peterman, T. A., Roberts, H., & Gift, T. L. (2021). The estimated direct lifetime medical costs of sexually transmitted infections acquired in the United States in 2018. *Sexually Transmitted Diseases*, 48(4), 215–221. <https://doi.org/10.1097/olq.0000000000001380>
- Davies, C., Marshall, H., Brotherton, J., McCaffery, K., McCaffery, K., Macartney, K., Garland, S. M., Kaldor, J., Zimet, G. D., & Kang, M. (2023). Complex intervention to promote human papillomavirus (HPV) vaccine uptake in school settings: A cluster-randomized trial. *Preventive Medicine*, 172, 107542. <https://doi.org/10.1016/j.ypmed.2023.107542>
- Deiss, R., Bower, R. J., Co, E., Mesner, O., Sánchez, J. L., Masel, J., Ganesan, A., Macalino, G., & Agan, B. K. (2016). The Association between Sexually Transmitted Infections, Length of Service and Other Demographic Factors in the U.S. Military. *PLOS ONE*, 11(12), e0167892. <https://doi.org/10.1371/journal.pone.0167892>
- Evans, R., Widman, L., Green, M. N., Javidi, H., Hope, E. C., & Brasileiro, J. (2020). Association of sexual

- health interventions with sexual health outcomes in Black adolescents. *JAMA Pediatrics*, 174(7), 676. <https://doi.org/10.1001/jamapediatrics.2020.0382>
- Gilbert, L., Goddard-Eckrich, D., Chang, M., Hunt, T., Wu, E., Johnson, K. A., Richards, S., Goodwin, S., Tibbetts, R., Metsch, L. R., & El-Bassel, N. (2021). Effectiveness of a culturally tailored HIV and sexually transmitted infection prevention intervention for Black women in community supervision programs. *JAMA Network Open*, 4(4), e215226. <https://doi.org/10.1001/jamanetworkopen.2021.5226>
- Jayes, D., Merrick, R., Pulford, C. V., Buitendam, E., Mohammed, H., & Saunders, J. (2022). What is the role of sexual health services in the delivery of primary prevention of sexually transmitted infections? A narrative review. *Sexual Health*, 19(4), 319. <https://doi.org/10.1071/sh22047>
- Kostera, J., & Santiago, J. (2020). 1532. Demographics and Population Epidemiology of Mycoplasma genitalium infection: Correlation to Co-Infection and prior STI history. *Open Forum Infectious Diseases*, 7(Supplement_1), S766–S767. <https://doi.org/10.1093/ofid/ofaa439.1712>
- Kreisel, K., Spicknall, I. H., Gargano, J. W., Lewis, F. M. T., Lewis, R. M., Markowitz, L. E., Roberts, H., Johnson, A. S., Song, R., St Cyr, S. B., Weston, E., Torrone, E., & Weinstock, H. (2021). Sexually transmitted infections among US women and men: Prevalence and incidence Estimates, 2018. *Sexually Transmitted Diseases*, 48(4), 208–214. <https://doi.org/10.1097/olq.0000000000001355>
- Kunz, A. (2022). Feasibility, Acceptability, and Short-term Impact of a Brief Sexually Transmitted Infection Intervention Targeting U.S. Military Personnel and Family Members [Data set]. Harvard Dataverse. <https://doi.org/10.7910/DVN/WXBHRZ>
- Kunz, A., Moodley, A., Colby, D. J., Soltis, M. A., Robb-McGrath, W., Fairchok, A., Faestel, P. M., Jungels, A. M., Bender, A. A., Kamau, E., Wingood, G. M., DiClemente, R. J., & Scott, P. T. (2022). Feasibility, acceptability, and short-term impact of a brief sexually transmitted infection intervention targeting U.S. Military personnel and family members. *BMC Public Health*, 22(1). <https://doi.org/10.1186/s12889-022-13096-x>
- Massuda, A., Titton, C. M. S., & Moysés, S. T. (2019). Exploring challenges, threats and innovations in global health promotion. *Health Promotion International*, 34(Supplement_1), i37–i45. <https://doi.org/10.1093/heapro/daz008>
- Noiman, A., Macalino, G., Won, S., Byrne, M., Deiss, R., Haw, N. J., Ganesan, A., Okulicz, J. F., Schofield, C., Lalani, T., Maves, R. C., Wang, X., & Agan, B. K. (2020). Sexual Risk Behaviors Associated with Sexually Transmitted Infections in a US Military Population Living with HIV After the Repeal of “Don’t Ask, Don’t Tell.” *Aids Patient Care and Stds*. <https://doi.org/10.1089/apc.2020.0095>
- Suominen, T., Heikkinen, T., Pakarinen, M., Sepponen, A., & Kylmä, J. (2017). Knowledge of HIV infection and other sexually transmitted diseases among men who have sex with men in Finland. *BMC Infectious Diseases*, 17(1). <https://doi.org/10.1186/s12879-017-2203-5>
- Tabler, J., Mykyta, L., Schmitz, R. M., Kamimura, A., Martinez, D. A., MartíNez, R. D., Flores, P., González, K., Marquez, A., Marroquin, G., & Torres, A. (2018). Social Determinants of sexual behavior and awareness of sexually Transmitted Infections (STI) among Low-Income HIV+ or STI At-Risk Hispanic residents receiving care at the U.S.–Mexico border. *Journal of Community Health*. <https://doi.org/10.1007/s10900-018-0562-5>

- Widman, L., Kamke, K., Evans, R., Stewart, J., Choukas-Bradley, S., & Golin, C. E. (2019). Feasibility, acceptability, and preliminary efficacy of a brief online sexual health program for adolescents. *Journal of Sex Research, 57*(2), 145–154. <https://doi.org/10.1080/00224499.2019.1630800>
- Yoost, J., Starcher, R., King-Mallory, R., Hussain, N., Hensley, C., & Gress, T. (2017). The use of telehealth to teach reproductive health to female rural high school students. *Journal of Pediatric and Adolescent Gynecology, 30*(2), 193–198. <https://doi.org/10.1016/j.jpjag.2016.10.002>
- Zizza, A., Guido, M., Recchia, V., Grima, P., Banchelli, F., & Tinelli, A. (2021). Knowledge, Information Needs and Risk Perception about HIV and Sexually Transmitted Diseases after an Education Intervention on Italian High School and University Students. *International Journal of Environmental Research and Public Health, 18*(4), 2069. <https://doi.org/10.3390/ijerph18042069>


The Activity of “Missione Al Cubo”: An Academic Spin-Off of University of Calabria Devoted to Science Education and Public Engagement with Science

Claudio Meringolo

Institut für Theoretische Physik, Goethe Universität, Frankfurt, Germany


 <https://orcid.org/0000-0001-8694-3058>

Federica Chiappetta

Dipartimento di Fisica, Università della Calabria, Rende (CS), Italy,  <https://orcid.org/0000-0001-7221-1382>

Piefrancesco Riccardi

Dipartimento di Fisica, Università della Calabria, Rende (CS), Italy

INFN, Gruppo collegato di Cosenza, Rende (CS), Italy,  <https://orcid.org/0000-0002-9966-7379>


Rosanna Tucci

Liceo Scientifico “E. Fermi”, Cosenza, Italy

Antonio Bruzzese

Liceo Scientifico “G. Berto”, Vibo Valentia, Italy,

Giuseppe Prete

Dipartimento di Fisica, Università della Calabria, Rende (CS), Italy,  <https://orcid.org/0000-0003-3739-3170>

Abstract: Education and Public outreach is an important part of the activities of universities and research institutions. Moreover, public outreach is becoming an interesting career path, suited for young research scientists with strong communication skills and a broad research background. To address these opportunities and challenges, we decided to set up a spin-off company. The cooperative society, which received the status of academic spinoff from the University of Calabria, was named “Missione al Cubo”, a name evocative of both the “third mission” and the “cubes”, the buildings of the University of Calabria. In this work we present the activities set-up by the spin-off during its first year of activity. During this period the spin-off collaborated with schools, private enterprises and public administration developing activities directly derived from the scientific research conducted by the members of the cooperative society who are also young researchers (graduate students and post docs) of the physics department of University of Calabria.

Keywords: Physics Education, Spin-off, Public engagement with Science, Science Education

Citation: Meringolo, C., Chiappetta, F., Riccardi, P., Tucci, R., Bruzzese, A., & Prete, G. (2023). The Activity of “Missione Al Cubo”: An Academic Spin-Off of University of Calabria Devoted to Science Education and Public Engagement with Science. In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023--International Conference on Social and Education Sciences* (pp. 540-547), Las Vegas, NV, USA. ISTES Organization.

Introduction

Scientists are increasingly aware of the importance of communicating with the public and becoming more involved with the local community, especially in schools (Mack et al., 2020; Entradas & Bauer, 2019). They practice outreach with personal enjoyment and satisfaction. In particular, young researchers, like graduate students and post-docs, bring enthusiasm and passion, making outreach programs much more successful (Beck et al., 2006; Riccardi, 2016). Besides this, they have several advantages from this participation, ranging from the opportunity of improving their communication abilities to the enrichment of their curriculum, as education and public outreach is evolving as an interesting career path, suited for physicists with a strong communication skill and a broad research background (Cominsky, 2018). Nevertheless, the involvement of young researchers in education and public outreach activities is still poor (Entradas & Bauer, 2019). Moreover, despite enthusiasm and passion, outreach programs are not going to be enough. A physics department can interact with a limited number of schools and there will be sectors of public that are not going to be reached. Therefore, we asked ourselves if the market could help in increasing and improving our public engagement activities. To this end, we developed a company that received the status of academic spin-off by university of Calabria and is named “Missione al Cubo” (mission cubed), evocative of both the “third mission” and the “cubes”, the buildings of University of Calabria (Riccardi, 2022a).

The spin-off is mainly composed by graduate students and aims at operating in the market sectors that are determined at the interface between research and society. The role of young researchers in our spin-off is that of setting up and conducting educational activities and products derived from research topics actually studied by the research groups of our physics department. In fact, we believe that the real strength of an outreach activity is its direct derivation from an important scientific and research structure which can provide the public with the opportunity to approach scientific research interacting directly with people who know and practice it. The product and services developed by the company are then distributed to a wide market made of schools, museums, the internet etc... This market develops primarily within our surrounding community, to inform the public about the scientific research performed in their local environment.

The discourse is then extended to the connections of this research with the global breath of the international context and with societal implications of scientific issues, that are relevant in people’s everyday life and therefore can be extended to a wider market outside our region. Our choice of the form of a cooperative society for our spin-off company perfectly fits the participation of graduate students. Cooperatives have mutualistic and

democratic purposes (EPRS, 2019) that are best suited to an entrepreneurial activity based on collaboration between doctoral students. Cooperatives are autonomous associations of people aspiring to achieve their objectives through a jointly owned and democratically controlled enterprise. International organizations, such as the United Nations and the European Union (EU), value the role cooperatives play for society, the economy and (international) development (EPRS, 2019). Cooperatives operate in the interests of their members and are not managed in the interests of outside investors. Profits are received by members in proportion to their activity with the cooperative, and reserves and assets are commonly held, non-distributable and dedicated to the common interests of members. Because personal links among members are in principle strong and important, voting rights are not proportional to shareholdings (one man one vote). The capital of a cooperative is variable, which allows an easy entry and exit mechanism for members, with a very limited investment. Moreover, the cooperative form is also compatible with the scientific duties of PhD students, which can be complemented by the activity within the cooperative, according to an operating method long tested in our outreach activities (Chiappetta et al., 2020; Riccardi, 2016; Riccardi & Goletti, 2017; Riccardi et al., 2022b). The activity of the spin-off started in February 2022 and in the following we would like to discuss some of its activities that demonstrate the existence of interesting perspectives for the business idea.



Figure 1. One of the authors (FC) during an activity in a school

The Activities of the Spin-off

The spin-off originates from some specific lines of research on physics education and public engagement conducted by our group in these last years (Chiappetta et al., 2020; Riccardi, 2016; Riccardi & Goletti, 2017;

Riccardi et al., 2022b). These activities have developed mostly within the PNLs (Piano Nazionale Lauree Scientifiche – National Plan for Scientific Degrees) which is the main initiative of the minister of university of research that since 2004 promotes the interaction of universities with schools (Riccardi, 2016; Riccardi & Goletti, 2017). Within the PNLs we have developed educational activities at schools (see Fig. 1) (Riccardi, 2016; Riccardi & Goletti, 2017), in school-work alternation activities (Riccardi et al., 2022b) and, finally, in the management of the program for schools of the Planetarium of Cosenza for the school year 2019/2020 (Chiappetta et al., 2020).

In particular, the project for the schools of the Planetarium “G.B. Amico” of Cosenza (Chiappetta et al., 2020), in which the activities for the schools during the first year of activity have been conducted by PhD students from the Department of Physics (see Fig. 2 and Chiappetta et al., 2020) convinced us that there is a large market for a whole series of products and services designed with the aim of creating a solid and lasting interface between the University and the public, in all its forms. Therefore, to address these opportunities and challenges, we decided to create the spin-off company (Riccardi et al., 2022a).



Figure 2. One of the authors (GP) during a lesson at the Planetarium of Cosenza



Figure 3. Young researchers introducing the projection at the cinema Campus at University of Calabria



Figure 4: A moment of a projection at the cinema "Campus"

The cooperative society “Missione al Cubo” recently collaborated with University of Calabria and the municipality of Rende on the project “Esplorare Rende felici” (“Exploring Makes Happy”). The goal of the project was to launch in the Rende area an offer of scientific tourism, capable of making the space exploration an informal learning experience in which visitors will be inspired to imagine new perspectives for the future. It has been a cultural event in which the dissemination of knowledge of the space will also stimulate reflection on topics of current societal interest, such as the exhaustion of resources and the search for new places capable of welcoming human life. As part of the project, the cooperative produced and carried out an activity reserved for schools at the “Campus” cinema in University of Calabria. The activity was based on an interactive projection entitled “viaggio nel cosmo” (“journey into the cosmos” – see Fig. 3 and Fig. 4). The projection was produced starting from audiovisual material licensed by large research infrastructures (NASA, ESO etc...). Based on this material, a narrative was built on the themes of space exploration and space physics, calibrated to the age of the young spectators, and with young researchers from the physics department as live narrators in the room. The initiative was very successful, as evidenced by the numerous questions that young spectators asked at the end of each projection.



Figure 5: top: Primary school students at the “Città dei Ragazzi” in Cosenza observing an experiments with a Stirling engine; bottom: some of the experimental set-ups installed in the structure

Most of the activities of the society have been developed for pupils of the primary schools, which are typically not involved in the outreach program of a university. In particular, our society, collaborated with the companies that manage the “Città dei Ragazzi”, a structure in the city of Cosenza dedicated to entertainment and educational activities for children. The collaboration consisted in the development of scientific activities as part of a project of which the aforementioned companies were partners. In particular, Missione al Cubo had the task of designing and installing science laboratories dedicated to didactic activities for primary school students (see Fig. 5). The collaboration was also aimed at the training and coordination of the human resources involved in the project and in the organization of activities, users and in-coming. Furthermore, Missione la Cubo also took charge of the repair and reinstallation of some scientific set-ups already present in the structure and not used for several years.

During this year of activity, Missione al cubo collaborated also with several organization participating in science fair and festivals, particularly during this summer (see Fig. 6). These events are generally very participated by the public, thus testifying the existence of a large market that is usually not reached by outreach programs. For the future, Missione al Cubo was selected by University of Calabria, together with nine other business ideas, to be hosted in the Cosenza Open Incubator (COI), an incubator that aims at giving boost to enterprises aiming at operating in the historical downtown area of Cosenza. The incubator will offer to the staff of our society services of formation and mentoring to better qualify the business idea and to identify market strategies. The teams of the ten selected ideas are going to be hosted in the historic Palazzo Spadafora, made available by the Municipality of Cosenza.



Figure 6: Images of events for the public in which Missione al Cubo participated

Conclusion


Though the pandemic crisis is still producing some negative effects, the cooperative society “Missione al Cubo” started successfully its initiatives. During this first year, the spin-off collaborated with schools, public administrations, private enterprises and the University of Calabria, developing activity for schools and the general public. The enthusiasm shown by students, teachers and by the public testifies the validity of the activities produced by the spin-off. Besides these activities, the next few years will see the spin-off engaged in the activities of the Cosenza Open Incubator, an initiative of the University of Calabria and the city of Cosenza aiming at promoting the development and the activity of new enterprises in the historical downtown area. The perspectives for the future are therefore good and we would like to encourage similar initiatives that are likely to expand the outreach activities of universities and research institutions.

References


- Beck, M.R., Morgan, E.A., Strand, S.S., Woolsey, T.A. (2006). Volunteers bring passion to *science* outreach. *Science* 314, 1246–1247.
- Chiappetta, F., Pecora, F., Prete, G. et al. (2020). A bridge between research, education and communication. *Nat. Astron.* 4, 2–3.
- Cominsky, R. (2018). Education and public outreach in astronomy and beyond. *Nat. Astron.* 2, 14-15.
- Entradas, M., & Bauer, M. W. (2019). Bustling public communication by astronomers around the world driven by personal and contextual factors. *Nat. Astron.* 3, 183–187.
- EPRS - European Parliamentary Research Service – Briefing “Cooperatives: Characteristics, activities, status, challenges” PE 635.541–February 2019-
https://www.europarl.europa.eu/thinktank/en/document.html?reference=EPRS_BRI%282019%29635541
- Laursen, S., Liston, C., Thiry, H., Graf, J. (2006). What Good Is a Scientist in the Classroom? Participant Outcomes and Program Design Features for a Short-Duration Science Outreach Intervention in K–12 Classrooms. *CBE-Life Sciences Education* 6, 49 – 64.
- Mack, K., Kruszelnicki, K., Randall, L. et al. (2020). Reaching out. *Nat. Rev. Phys.* 2, 282–284.
- Riccardi, P. (2016). The beauty of outreach. *Science* 354 (6312), 674-674.
- Riccardi, P., & Goletti, C. (2017). How to build an educational bridge. *Nature Nanotech.* 12, 1104.
- Riccardi, P., Valentini, F., Carbone, V. (2022a). How spin-off companies can play a role in science communication. *Nat. Rev. Phys.* 4, 79–80.
- Riccardi, P., Romano, V., Pellegrino F. (2022b). Education and public outreach through vacuum science and technology. *Vacuum*, 196, 110737.

Interactions between Schools and Universities: The Example of Lab2go in Calabria

Giuseppe Prete


Dipartimento di Fisica, Università della Calabria, Rende (CS), Italy,  <https://orcid.org/0000-0003-3739-3170>

Federica Chiappetta

Dipartimento di Fisica, Università della Calabria, Rende (CS), Italy,  <https://orcid.org/0000-0001-7221-1382>

Piefrancesco Riccardi

Dipartimento di Fisica, Università della Calabria, Rende (CS), Italy

INFN, Gruppo collegato di Cosenza, Rende (CS), Italy,  <https://orcid.org/0000-0002-9966-7379>

Rosanna Tucci

Liceo Scientifico “E. Fermi”, Cosenza, Italy

Antonio Bruzzese

Liceo Scientifico “G. Berto”, Vibo Valentia, Italy

Claudio Meringolo

Institut für Theoretische Physik, Goethe Universität, Frankfurt, Germany

 <https://orcid.org/0000-0001-8694-3058>

Abstract: Recent research emphasizes the need for a more sustained interaction of schools with universities and research institutions. For example, informal after-school programs integrated into the school curriculum can provide opportunities for meaningful interaction with researchers in active learning settings. At the physics department of University of Calabria it has been launched in 2016 a program aimed at recovering disused, and in several cases ancient, instrumentation in laboratories of some schools in the region of Calabria. In 2022, our local project merged into Lab2go, a national project of the National Institute of Nuclear Physics (INFN) (Lab2go; <https://web.infn.it/lab2go/>) and of University of Rome “La Sapienza” devoted to the enrichment of the laboratory activities of the schools. Lab2go involves a steadily increasing number of schools and has expanded to include chemistry, robotics and other subjects. This contribution discusses some didactic activities developed within Lab2go. The activities of lab2go are integrated and form part of the (formal) school curriculum as work based experiences, which have become mandatory during the last three years of secondary schools. Thus, this project is an example of how specific policy interventions can lead to the kind of long-term structured collaboration between schools and research institutions needed to favor the shift of focus in science education.

Keywords: Physics Education, History of Physics, Third mission, Public engagement

Citation: Prete, G., Chiappetta, F., Riccardi, P., Tucci, R., Bruzzese, A., & Meringolo, C. (2023). Interactions between Schools and Universities: The Example of Lab2go in Calabria. In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023-- International Conference on Social and Education Sciences* (pp. 548-555), Las Vegas, NV, USA. ISTES Organization.

Introduction

The term “public engagement” indicates the myriad of initiatives that have been developed aiming at creating points of contact between scientific research and the public. Most of these initiatives, like seminars, science festivals etc... are one-day event, which remain isolated and sporadic, and are not able to fill the gap between science and the public. Recent research emphasize the need for a more sustained interaction of the public with universities and research centers, while at the same time requiring a larger participation of research scientists in education and public outreach (Mack et al., 2020; Dudo et al., 2014).

To favor a large participation of researchers, our efforts at the physics department of University of Calabria have gone in these last years in the direction of adopting a participatory approach, which includes forms of two-way communication, that allow outreach to evolve towards forms of public engagement that provide both researchers and the public with opportunities for mutual learning (Chiappetta et al., 2020; Leshner, 2003). Moreover, the interaction with schools have been developed with great attention to provide students and teachers with the opportunity of a longer and more meaningful interaction with a research environment (Riccardi & Goletti, 2017; Riccardi, 2023a), also by taking advantage of recent reforms that have been introduced in these last years in Italian secondary education systems (Riccardi, 2023a).

This contribution discusses recent activities conducted by researcher scientists of the Physics department of the University of Calabria within Lab2go (<https://web.infn.it/lab2go/>), a national project of the INFN (National Institute for Nuclear Physics) aimed at recovering and restoring instruments of school laboratories. Our local project started in 2016, as elsewhere discussed (Riccardi, 2023a; Riccardi, 2023b). The activity is conceived as work-based learning experiences for the school pupils of about 30 hours, i.e. more sustained than the usual one-day laboratory or seminar activity, which can be concentrated in short periods of about a couple of weeks or diluted over longer periods.

This longer interaction is made possible by the recent reform introduced in 2015 in Italian secondary education system. This policy intervention mandates these experiences for all Italian students in the last three years of the secondary education cycle (PCTO – piano per le competenze trasversali e l’orientamento - plan for transversal skills and guidance – formerly known as school work alternation) (Riccardi, 2023a). Work-based learning entails non-formal experiences integrated within the curricular (formal) program and performed in collaboration

with an enterprise or an organization, like for example a physics department in a university, for which it is included within its third mission programs. In this sense, these didactic paths are part of our local outreach project within the PNLS (Piano Nazionale Lauree Scientifiche – National Plan for Scientific Degrees) (Riccardi & Goletti, 2017), which is an initiative of the minister of university and research aiming at creating contact between university and schools operating in the same local context.

Similar local projects were independently launched in other universities. The local initiative of “La Sapienza” University of Rome developed a nation-wide collaboration within the National Institute of Nuclear Physics (INFN) (Lab2go - <https://web.infn.it/lab2go/>). Our project joined Lab2go in 2022. In the following we will discuss some of the activities conducted in these last couple of years in our local project within Lab2go.

Goals of the Initiative

Activities in the laboratory constitute fundamental part of the teaching of physics, not merely to illustrate the concepts studied theoretically, but primarily to educate the ability to the systematic observation of natural phenomena as they occur, which is one of the main skills in the process of scientific research. An effective teaching of physics, as well as all of other scientific disciplines, therefore requires a sustained practice in the laboratory by the students. The laboratory is the place where students could learn to use the scientific method, practicing it in a collaborative environment, capable of stimulating their engagement from both cognitive and emotional point of views; it is the place where teachers can discuss, plan and implement educational paths and strategies, according to an active learning methodology, based on scientific investigation and where the learners are situated at the center of the teaching activity (Mack et al., 2020). Therefore, science laboratories should be one of the most important places in the life of a school community. Actually this is not so, particularly in Italy, where it is common experience that the laboratory is one of the least attended places in the school.

Generally, the physics laboratory in schools appears as a well-equipped space, where students and teachers could find plenty of scientific instruments purchased by the schools over the year. As a result, many schools have rich collections of instruments acquired over decades. Furthermore, in the oldest schools one can find experimental apparatuses of appreciable historical value, and in some of them the instruments are cataloged and showcased in real museums (Leone & Rinaudo, 2020; Gallitto et al., 2021). There is also no shortage of the most recent and technologically advanced equipment, generally purchased according to the input provided by those teachers, that are aware of the help that new technologies can give to teaching.

The problem of the vitality of school laboratories, therefore, does not appear to be related either to the limited instrumental equipment or to the technological updating of the instrumentation. Furthermore, new technologies, especially those related to multimedia, the internet and digital technologies, have been around for several decades now. We argue here, that the main problem, therefore, is not which technology is used, but the defamiliarization with the practice of the laboratory. The ultimate goal of the project is the revitalization of the school laboratories as spaces of both didactic activities and socialization. In fact, the laboratory teaching in

schools is also promoted through the production with the recovered instrumentation of materials and events open to the school community and/or to a wider public. The recovered equipment has been used also for other activities, such as exhibitions and public events (see Fig. 1), which represented an interesting and intense moment of socialization between the participants. Thus, Lab2go aims at restoring the centrality of the laboratory in the every-day life of the school community, working as a mean to recover the ability to experience the laboratory as a place of educational planning and socialization.



Figure 1. The stand of the school Liceo Scientifico “E. Fermi” during the EU researchers’ night at University of Calabria on September 29th 2023

The Activities of Lab2go in Calabria

Some of the activities conducted within lab2go have already been discussed elsewhere (Riccardi et al., 2022; Riccardi, 2023b). Briefly, physicists from the University of Calabria are helping some schools in the region to recover disused instruments in their storerooms and put it back into operation. Currently the project currently involves about a hundred students in four schools of the region: the Licei “E. Fermi” in Cosenza, “G. Berto” in Vibo Valentia, “A. Volta” in Reggio Calabria and “F. Bruno” in Corigliano Calabro.

Generally, the instruments are found in good shape and working, so that they can be used immediately by the students. Those instruments that are not working are brought to the physics department where they can be repaired, if possible. Many old instruments usually do not fulfill the requirements to recent safety regulations. In that case they are used only for exhibits but not operated in the presence of students or the public. The selected instruments are entrusted to the students that learn how to use them and perform experiments, under the guidance of their teachers and the university staff.

An important thing that is required to the study is to take pictures and movies so that the instruments can be catalogued for the benefits of future users. Example of the recovered instruments are reported in Fig. 2 and Fig. 3. Figure 2 shows also the description of the instruments produced by the students participating in for cataloguing and showcasing the instrument.

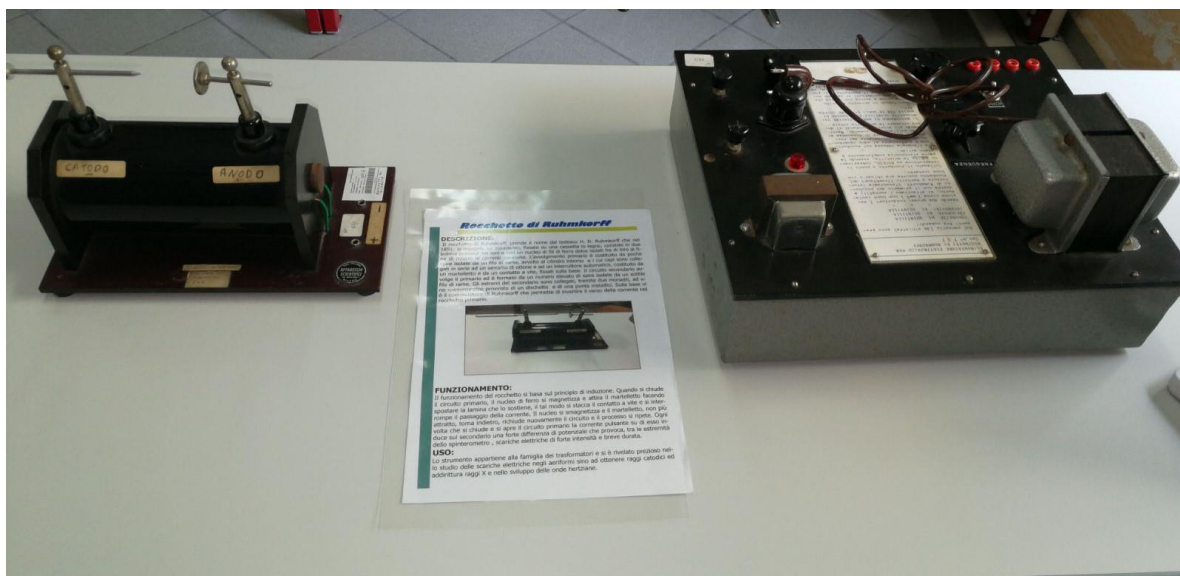


Figure 2. A Ruhmkorff coil and its power supply from Liceo Scientifico “G. Berto” in Vibo Valentia



Figure 3. A Tesla coil lighting a Neon lamp at the Liceo “G. Berto”

The activity proved to be perfectly functional also with respect to the innovations that have occurred in recent years in the teaching of physics in Italian schools. These innovations concern the introduction of elements of quantum mechanics into the curriculum. It has been realized the need to broaden students' knowledge by

including in school curricula those experimental observations and the consequent conceptual developments, which led to the so-called crisis of classical physics.

These innovations immediately pose a problem regarding the training of teachers, the majority of whom do not have degrees in physics and have never studied these topics during their degree courses. In fact, from the requests we often receive from teachers, we can sense their difficulty in adequately carrying out the part of the curriculum concerning the twentieth-century physics. This difficulty is often associated with the difficulties of students in understanding the profound changes that these theories have brought to our vision of the world. On the other side, we found in schools many instruments and set-ups that are suited to study modern physics, like those shown in Fig. 4 and Fig. 5. These are apparatus for the diffraction of electrons, discharge and spectral tubes for the study of atomic and molecular spectra, Thomson experiments and cathode ray tubes of various types and ages, Wood lamps for the study of radiation-matter interaction, superconducting materials. Not to mention all the devices that we are unable to show, from Franck-Hertz to Millikan, Michelson, etc. etc... Therefore, recovering the instruments a project like Lab2go can help schools in overcoming the difficulties generated by the updating of the school curriculum, providing help to both teachers and students.

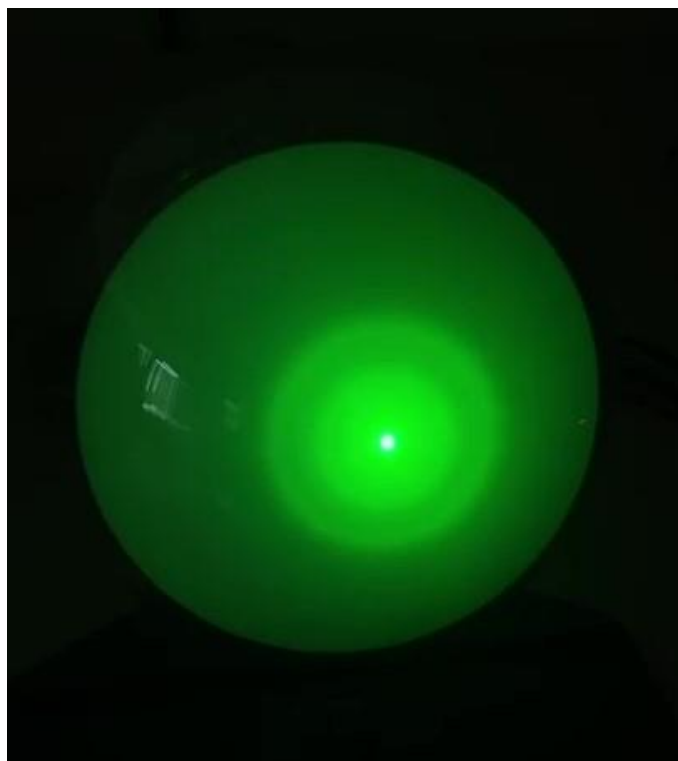


Figure 4. Electron diffraction at the Liceo “E. Fermi”

As mentioned, the issue does not only concern the old instrumentation of the laboratories. Over time, schools have continued to acquire material, and in laboratories today you can find robotics kits, hydrogen engines, kits for the physical-chemical detection of various types of environmental pollution, meteorological stations and various types of photovoltaic cells and panels. This equipment is purchased by schools with the aim of

introducing students to topics of absolute importance and urgency, not only from a scientific point of view but also and above all from a social, economic and human relations point of view, such as energy efficiency, new technologies, climate change, smart and sustainable growth. To this picture, we must add the infinite possibilities that digital technologies and the internet offer today for effective laboratory teaching of physics, ranging from the use of the smartphone to Arduino and computer simulations of phenomena and experiments.

Our action, initially aimed at the oldest instrumentation, often deviates from this path to also use the most recent instrumentation, which is in any case rarely used. Indeed, Lab2go has been recently expanded at the national level to include chemistry, robotics and other subjects.

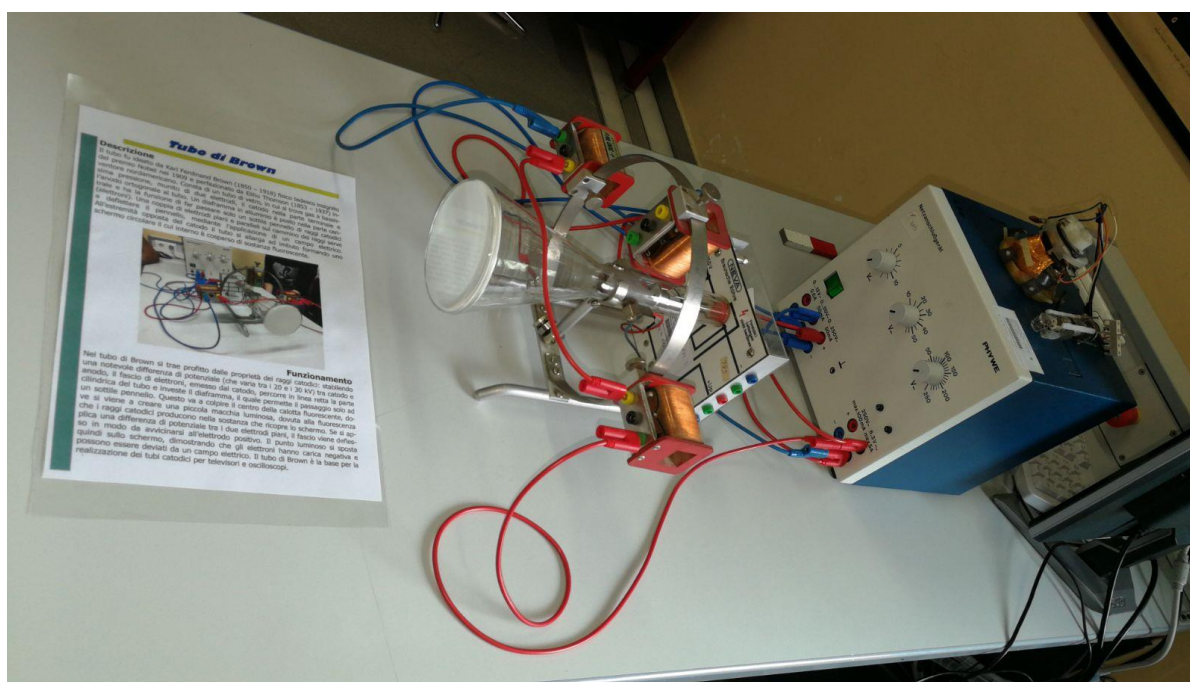


Figure 5: A Braun tube for studying the deflection of electrons into electric and magnetic fields from Liceo “G. Berto”

Conclusion

With the aim of making the laboratory a lived-in place again, teachers need help and not to be left alone. This help can be found in universities, research institutions and centers through projects like Lab2go, that can help schools to recover the equipment and plan teaching and laboratory activities, according to participatory methodologies, with great attention not only to the contents of the activity but also and above all to the interaction between participants. The project represents also a strong moment of socialization through the participation of the students to public events. Projects like Lab2go, that contribute to strengthening the interaction between schools and universities, can be favored by specific policy intervention and we advocate support for efforts in this direction.

References

- Balkwill, F.R. (2021). *Cells are Us* – combining research and public engagement. *Nat. Rev. Cancer* 21, 277-278.
- Chiappetta, F., Pecora, F., Prete, G. et al. (2020). A bridge between research, education and communication. *Nat Astron* 4, 2–3.
- Dudo, A., Kahlor, L., AbiGhannam, N. et al. (2014). An analysis of nanoscientists as public communicators. *Nature Nanotech* 9, 841–844.
- Entradas, M., & Bauer, M. W. (2019). Bustling public communication by astronomers around the world driven by personal and contextual factors. *Nat Astron* 3, 183–187.
- Gallitto, A.A., Zingales, R., Battipaglia, O.R., Fazio, C. (2021). An approach to the Venturi effect by historical instruments. *Phys. Educ.* 56 (2), 025007.
- Key, J., & Hendry, M. (2016). Defining gravity. *Nature Phys* 12, 524–525.
- Leone, M., & Rinaudo, M. (2020). Should the history of physics be rated X? A survey of physics teachers' expectations. *Physics Education*, 55 (3), 035013.
- Leshner, A. I. (2003). Public Engagement with Science. *Science*, 299 (5609), 977.
- Mack, K., Kruszelnicki, K., Randall, L. et al. (2020). Reaching out. *Nat Rev Phys* 2, 282–284.
- Pantano, O., & Talas, S. (2010). Physics thematic paths: laboratorial activities and historical scientific instruments. *Phys. Educ.*, 45 (2), 140.
- Riccardi, P., Romano, V., Pellegrino, F. (2022). Interactions among school teachers, students and university researchers in workplace experiences using disused instruments of school laboratories. *Phys. Educ.* 57 (4), 045006.
- Riccardi, P. (2023a). How to restore trust in science through education. *Nature Physics*, 19 (2), 146-147.
- Riccardi, P. (2023b). Physics education using beams of ions and electrons. *Nucl. Instr. & Meth. B* 536, 7-10.
- Riccardi, P., & Goletti, C. (2017). How to build an educational bridge. *Nature Nanotech* 12, 1104.
- Rinaudo, M., Leone, M., Marocchi, D., Amoroso, A. (2019). The educational role of a scientific museum: a case study. *J. Phys.: Conf. Ser.*, 1287, 012050.

The Basic Course in Communication: A Critical Intercultural and Participatory Approach

Chelsea Slack

Southeastern Louisiana University, USA

Abstract: This paper advocates for using critical intercultural and participatory pedagogy as the basis for an introductory communication course. Communication programs are often concerned with the basics – teaching students to communicate effectively through writing and speaking. Yet the methods for teaching these two classic competencies diverge widely, with some instructors opting for a more traditional approach and others taking a more modern one. A divide also exists in the way today’s students are viewed by educators in secondary and, in particular, post-secondary educational institutions. Where some teachers see lamentable shortcomings of millennials and Gen Z, others see infinite possibilities in these students. Either way, colleges and universities are dealing with a generation of students that is more diverse, connected, tech-savvy, and socially aware than ever before. This paper explores the advantages of using critical intercultural pedagogical practices – practices which are necessarily cooperative, multimodal, and participatory – to reach the students of today.

Keywords: education, critical pedagogy, intercultural, technology, participatory pedagogy

Citation: Slack, C. (2023). The Basic Course in Communication: A Critical Intercultural and Participatory Approach. In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023-- International Conference on Social and Education Sciences* (pp. 556-562), Las Vegas, NV, USA. ISTES Organization.

Introduction

Hundreds of thousands of first-year college students eagerly converge upon campuses every fall across the United States. They head off to class bedecked in school colors and mascot gear, excited hats in class are finally allowed. While working hard to project confidence, they are filled with nerves, questions, and expectations. Parents and teachers galore have filled their heads with the idea that college will be different, and most of all, college will be hard. The vast majority of these first-time freshmen are Gen Zers (Parker & Igielnik, 2020). Their formal education up until this point has been filled with Common Core, Chromebooks, and cooperative learning. But then they walk into class only to see desks in neat rows and something they’ve probably never encountered before – a real chalkboard. The sharp disconnect between teaching and learning at the secondary and post-secondary levels is palpable for students and problematic for faculty. Gone are the days in which the sit and get (Martin, 2015) instructional style, filled with long lectures as students madly scribbled notes, simply worked. K-12 education largely recognized and adjusted to the shifting sands of pedagogy over the past ten

years or so (Heitner, 2018), whereas sit and get is alive and well in many post-secondary institutions. Need proof? Just take a quick walk through a classroom building on any college or university campus. Departments are left to grapple with the death rattle of “traditional” teaching practices, with certain faculty seemingly unwilling to let go of their rinse and repeat methods until they are pried from their cold, dead hands. Some departments, specifically those in the humanities and social sciences, are more of a natural fit for this new frontier of post-secondary pedagogy. What follows is a proposed structure of an introduction to communication course that utilizes critical intercultural and participatory pedagogical practices. This course approach, designed to pique interest while fostering agency, establishes communication theory and skill as a conduit for students to engage with real-world problems that affect their everyday lives or the lives of those in their community.

The Problem

Introduction to communication courses, usually the only general education class within communication departments, are the bread and butter of any university communication program. Traditionally the course has gone by the moniker “speech,” mainly because the curriculum of most (57.8%) basic communication courses revolves almost solely around writing and delivering speeches (Morreale, Hugenberg, and Worley, 2006). Introductory communication courses are in many ways similar to Comp I – we both cover research, organization/structure, rhetorical theory, audience awareness, etc. Where the two diverge is the product. In an English class, the product is a paper or some other type of writing; in a communication course, it’s a speech. And English classes, by and large, have done a good job getting students to understand the “point” of classes like Comp I. Students, especially at the university level, realize they will need to write competently in their future professional lives. The line, “Even scientists have to write reports...engineers still have to write emails!” is something kids often hear throughout their school years. But for students in communication classes, the point of it all seems much more elusive.

When approached with questions from students about when they will ever need to stand up and give a formal speech in front of an audience, instructors often retort with something about job interviews and communication in the workplace. And it is true that outside of the classroom, the average student will constantly communicate with others. There are also things like nonverbal and interpersonal communication that students will use throughout their lives. Yet, on the whole, in traditional introduction to communication courses, the lion’s share of instructional time is devoted to the preparation and delivery of formal speeches (Morreale, Hugenberg, and Worley, 2006). Essentially, we are banking on the skills gleaned from speech giving in the classroom to transfer to other more practical areas, such as the workplace, relationships, and civic life.

This transferability assumption is tied up with our assumptions about communication pedagogy. It is tempting to assume that by standing before our class and lecturing to a seemingly captive audience, our students will, in turn, become competent lecturers themselves. Except our students don’t want to be lectured to – in fact, instructors don’t want to be lectured to either (Dodman, Zuidema, and Kleiman, 2018).

The Goal

Engleberg et al. (2014) identified the following core competencies for introductory communication courses: monitoring and presenting yourself; practicing communication ethics; adapting to others; practicing effective listening; expressing messages; identifying and explaining fundamental communication processes; and creating and analyzing message strategies (2014). Additionally, in their defense of the basic communication course as a requirement for general education, the NCA repeatedly cited the role of communication in civic engagement as well as the calls of employers for students to receive greater oral communication training in college (Simonds et al., 2012).

If the goal is to achieve these core competencies while also preparing students for the workplace and civic participation, then faculty must question how effective the traditional formal public speaking emphasis is in accomplishing these ends. How does a student presenting a five-minute speech on Pokémon Go or an eight-minute speech on “Pit Bulls Aren’t a Dangerous Breed” realistically translate to career professionalization or civil discourse? The answer – it doesn’t. Instead, there is undoubtedly a better approach to helping students become stronger communicators holistically, an approach that will still require students to give speeches but also compel them to engage with relevant issues and problems in their own lives, and society as a whole.

An (Intercultural) Answer

According to Atay and Toyosaki (2018), the goal of critical intercultural communication pedagogy is “To understand, critique, transform, and intervene upon the dynamics of power and domination embedded inside and outside classroom walls through careful, complex, nuanced, and intersectional analyses...” (p. ix). Furthermore, critical intercultural communication pedagogy is meant to work both in and out of the classroom, with an emphasis on understanding social, cultural, and political influences as a way to meaningfully affect the world outside of academia. Meanwhile, participatory pedagogy is defined as, “One that does not fully define all curricular needs in advance of interacting with learners...multiple perspectives, opinions, and active creation on the part of learners all contribute to the final context of the learner experience,” (Siemens, 2008, p. 8). These two complementary pedagogical approaches are at the crux of my course approach for an introductory communication class.

The Outset

Following a critical intercultural and participatory approach must begin very early in the semester. Generally in the second week of class, students should be presented with a challenge – identify a significant issue that affects them and/or their community. The topic they select will be heavily researched, discussed, and debated throughout the term. This is usually a daunting proposition for first and second-year college students because it requires them to critically consider the system in which they exist as well as the social, cultural, and political forces at work within that system. Another problem is student misconception about “controversy” – most

communication instructors have had the experience of millennial and Gen Z students entering colleges and universities having been explicitly taught to not question authority or even broach contentious subjects. But, once they realize dissent is not only permissible but desirable, they are on their way for the rest of the semester.

By allowing students to determine the content around which their experience in the communication course will be centered, their buy-in is significant. The course essentially becomes a survey on their chosen topic, through which they sharpen their communication skills. Simmons, Barnard and Fennema (2011) note the excitement and increase in engagement that comes with inviting students on a “Personal and intellectual path of inquiry.” (p. 89). What’s more, the participatory aspect precipitates the interculturalism of the course. According to Halualani (2018), critical intercultural pedagogy should seek to establish students’ “critical sensibility” and “remake not just their conceptualizations of the world but the way in which we work to transform the world and the larger systems of power” (p. 8). Even in a class that seems mostly homogenous, student dialogue on problems affecting their community forces their peers to reconsider their own lives, positions, beliefs, and misconceptions, giving them a wider worldview and greater understanding of the plights of others. Students are not sitting and getting; they are in the driver’s seat of their own learning while also learning from the other drivers on the road – their peers.

They’ve Identified Issues...Now What?

Throughout the semester, the major assignments within a critical intercultural communication course are all structured to require student engagement with their selected issues. Rather than merely assign an informative speech over a random topic, students research and inform the class on some aspect of their chosen cultural, social, or political problem. They “live” within their issues throughout the term. Furthermore, original research requirements may be added so a student will not be tempted to AI their way through the term via ChatGPT. For example, a student in a course following this pedagogical approach recently chose homelessness in New Orleans for his semester-long study. His informative speech dealt with the causes of homelessness in the city, his persuasive speech advocated for policy change to help the homeless, and his final project was an action plan on how he personally could effect change to help the thousands of people without a home in New Orleans. To meet the original research requirements for the term-long project, he had to meet with groups that focus on helping the homeless, engage with leaders in the city, and even interviewed students who were formerly homeless. This gave him an “on the ground” view of his issue. And, even if he had, say, used AI to transcribe his interviews (if they were not already transcribed via Zoom) and entered the transcripts into ChatGPT, Bard, or Bing, telling the AI to synthesize the interviews into a speech on homelessness, he was still truly engaging with his issue, albeit using an “assisted driver” approach, steering the car while AI works the cruise control. Leveraging AI with this approach is actually currently being used in academic research (Grimaldi & Ehrler, 2023). Some educators are starting to advocate for teaching students how to use AI rather than ban it entirely, which is likely the most realistic view. Ultimately, the intercultural atmosphere of the course is further fostered with a group presentation requiring students to work with peers to examine the intersection of their selected issues or problems, such as socioeconomics and technology, race and gender, religion and inequality, etc.

Maintaining the Intercultural Climate

The goal in using critical intercultural, participatory pedagogy in the basic communication course is for students to appreciate the value and power of their voices in a democratic society, especially regarding issues relevant to students' everyday lives. A frequent question other instructors ask is: "How do you keep the class from falling into chaos?" Admittedly, there is usually dissent among students regarding their selected issues, but where better than the classroom for students to come to understand and value the plurality of voices in society? The mantle of maintaining the classroom's interculturalism falls not solely to the instructor, but is instead a collaborative effort between instructor and students. The challenge for teachers is establishing critical intercultural communication classrooms as, "A safe environment that promotes discomfort. Discomfort with the status quo, with limited understandings of self, and with ignorance of the marginalization of others," (Sandoval & Nainby, 2018, p. 24). Again, the participatory aspect is helpful in this regard – students are asking tough questions about the system(s) in which they exist and largely recognize their peers are simply doing the same.

The Result

Earlier, the assertion was made that traditional pedagogy in an introductory communication course falls short in realistically preparing students for the workplace or civic life because it presupposes the transferability of skills garnered from giving formal speeches, especially speeches on random and inconsequential topics. The critical intercultural approach for which this paper advocates has clear benefits in preparing students to participate in civil discourse, since students are challenged to wrangle with cultural, social, and political issues. In terms of career preparation and professionalization, a critical intercultural communication pedagogy is just as beneficial.

Lee et al. (2018) note the importance of intercultural educational practices due to increasing globalization, emphasizing the need for undergraduate institutions to "Explicitly and systematically develop the skills and knowledge graduates need to successfully navigate a complex, diverse, and increasingly interconnected world," (p. 2). Essentially, critical intercultural communication pedagogy provides students with a set of basic skills they will need as soon as they enter the ever-diversifying workforce. Halualani (2018) specifically cites business, international relations, healthcare, and education as fields in which intercultural training is becoming increasingly imperative.

One Last Thing

The approach to a basic communication course described herein has one more necessary ingredient to make it a success: technology. In 2023 and post-Covid, it seems senseless for any course, especially communication courses, to be taught without tech. As previously stated, millennial and Gen Z students have grown up as digital natives; the Common Core era dominated their K-12 education. And there are literally thousands upon thousands of academic articles, research studies, personal testimonies, etc., that demonstrate the need for digital

education. According to Gee (2013), colleges must shift away from focusing solely on content and toward digital thinking and problem solving. Otherwise, a crisis of “stupidity” will continue to ensue – one in which college graduates go into the world with meaningless degrees that have not prepared them for life in the digital age and digital workforce.

For critical intercultural and participatory pedagogy to work, for students to truly engage with their selected problems or issues, they have to use technology. And, really use it – not just make a presentation with an accompanying PowerPoint. Technology in the classroom contributes to intercultural and participatory learning, becoming even more of an interactive experience. Instructors who have embraced technology to the hilt know doing so helps them play more of a facilitator role than someone who gives students knowledge. This allows students to make meaning and think critically by using devices to research, participate in classroom activities, collaborate with other students, and design compelling modern presentations.

Conclusion

In the end, when students leave a communication course centered on critical intercultural and participatory pedagogy, they leave with a sense of empowerment on multiple fronts. All instructors want the students leaving their COMM101 courses to feel confident as communicators. But, what a student learns in a critical intercultural classroom is so much more than just how to give a speech. They leave with experience debating real issues that affect them personally, addressing people in positions of power, and confronting those steadfastly opposed to their positions. Students with a critical intercultural awareness also generally have a much broader and more empathetic worldview, as well as historical and rhetorical perspectives on the underpinnings of social systems on local, regional, and national levels. The most basic skills students glean from a course such as that described herein is problem solving, which is arguably one of the most important skills for students of today to possess. When confronted with anything from a complex civil or governmental issue to a confusing new app or software, I want them to have the self-assurance and determination to figure it out.

References

- Atay, Ahmet, and Satoshi Toyosaki. 2018. *Critical Intercultural Communication Pedagogy*. London: Lexington Books.
- Parker, Kim, and Ruth Igielnik (2020). *On the Cusp of Adulthood and Facing an Uncertain Future: What We Know About Gen Z So Far*. Pew Research Center. <https://www.pewresearch.org/social-trends/2020/05/14/on-the-cusp-of-adulthood-and-facing-an-uncertain-future-what-we-know-about-gen-z-so-far-2/>
- Dodman, S., Zuidema, E., & Kleiman, A. (2018). Choose your own adventure: Action research for PD. *Educational Leadership*, 76(3).
- Engleberg, I., Disbrow, L., Katt, J., Myers, S., O’Keefe, P., & Ward, S. (2014). *The case for core competencies*

- in introductory communication courses*. National Communication Association.
- Gee, James Paul. 2013. *The Anti-Education Era: Creating Smarter Students through Digital Learning*. New York: St. Martin's.
- Grimaldi, G., & Ehrler, B. (2023). AI et al.: Machines Are About to Change Scientific Publishing Forever. *ACS Energy Letters*, 8(1), 878–880. doi:10.1021/acseenergylett.2c02828
- Halualani, R. (2018). Demarcating the “critical” in critical intercultural communication studies. In A. Atay & S. Toyosaki, *Critical Intercultural Communication Pedagogy* (pp. 3-8). London: Lexington Books.
- Heitner, Devorah. 2018. *Screenwise: Helping Kids Thrive (and Survive) in Their Digital World*. New York: Bibliomotion.
- Lee, A., Poch, R., Smith, A., Delehanty Kelly, M., & Leopold, H. (2018). Intercultural pedagogy: A faculty learning cohort. *Education Sciences*, 8(4), 177. doi: 10.3390/educsci8040177
- Martin, T. (2015). Ludic learning. *Language Magazine*.
- Morreale, S., Hugenberg, L., & Worley, D. (2006). The basic communication course at U.S. colleges and universities in the 21st century: Study VII. *Communication Education*, 55(4), 415-437. doi: 10.1080/03634520600879162
- Sandoval, J., & Nainby, K. (2018). Making a place: A framework for educators working with critical intercultural communication and critical communication pedagogy. In A. Atay & S. Toyosaki, *Critical Intercultural Communication Pedagogy* (pp. 11-26). London: Lexington Books.
- Seimens, G. (2008). New structures and spaces of learning: The systemic impact of connective knowledge, connectivism, and networked learning. [Conference paper]. Universidade do Minho, Encontro sobre Web 2.0. Braga, Portugal. http://elearnspace.org/Articles/systemic_impact.htm
- Simmons, N., Barnard, M., & Fennema, W. (2011). Participatory pedagogy: A compass for transformative learning?. *Collected Essays On Learning And Teaching*, 4. doi: 10.22329/celt.v4i0.3278
- Simonds, C., Buckrop, J., Redmond, M., & Quianthy, D. (2012). *Revised resolution on the role of communication in general education, adopted by the NCA Legislative Assembly*. National Communication Association.

STEM Family Engagement Program for Families with Young Children

YaeBin Kim

University of Nevada, Las Vegas

Abstract: Let's Discover STEM is designed to provide enriching foundational Science, Technology, Engineering, and Mathematics experiences for Latino children who likely would not have such experiences; teach parents how to nurture children's curiosity by encouraging and supporting their children's STEM learning at home, in school and throughout the community; and build a connection between homes and schools to support children's STEM success as they enter and progress through school. Since 2017, Let's Discover STEM program in Nevada (Clark and Washoe) have been provided in-person 7-week classes (32 hands-on STEM activities, 7 mini-lessons, and 7 STEM children's books) to Spanish-speaking families with young children to support their early STEM learning. After the program, parents were significantly more confident about using STEM skills to teach their children; believed their children could learn from them; were significantly more confident about helping their children succeed in school; and felt that they were significantly better prepared to help their children learn. Parents also reported that their children's STEM readiness skills were significantly improved (e.g., recognizing shapes and numbers, building with blocks, recognizing patterns, etc.)

Keywords: Early STEM, family engagement, parenting, school readiness, and parent-child interaction

Citation: Kim, Y. (2023). STEM Family Engagement Program for Families with Young Children. In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023-- International Conference on Social and Education Sciences* (pp. 563-568), Las Vegas, NV, USA. ISTES Organization.

Introduction

Young children are born scientists. They are naturally curious about the world around them—eager to explore, invent and solve problems. They are enthusiastic investigators, and as they explore their world, they are beginning to develop STEM (Science, Technology, Engineering and Math) knowledge and skills. Unfortunately, by the time they reach fourth grade, many children are lacking key STEM knowledge and skills (Hammer, Jia, & Uchikoshi, 2011). Hispanic children are particularly at risk for not developing strong STEM skills and aspirations. In 2015, only 12% of Nevada Hispanic fourth-graders rated at or above proficiency in both math and science, which may help explain why Hispanics are underrepresented in STEM professions (National Assessment of Educational Progress, 2015). Fortunately, early exposure to STEM, whether at home or in school, supports children's overall academic growth, develops early critical thinking and reasoning skills, and enhances later interest in STEM studies and careers (McClure et al., 2017). Providing opportunities for young children can help them gain basic STEM skills in: Observing what is happening, what they see, hear and feel; Predicting what will happen if they try something or what will happen next; Experimenting and investigating

their predictions to see what really happens and why; Interpreting and drawing conclusions, such as whether the results would be the same in another setting.

Equally important, involving parents encourages them to take an active role in creating a positive and safe environment at home for exploration and discovery (Dearing & Tang, 2010; Fan & Chen, 2001). By creating a stimulating STEM-rich environment at home, young children will be better prepared as they enter and progress through school.

Let's Discover STEM

Funded by a NIFA Children, Youth and Families at Risk grant, Let's Discover STEM/Descubramos STEM was designed to provide enriching STEM experiences for young Hispanic children (3-6 years old) who likely would not have such experience, and to teach parents how to nurture children's curiosity by encouraging and supporting their children's early STEM learning. Young children learn best when doing—touching, moving, testing, playing. Therefore, central to Let's Discover STEM/Descubramos STEM were workshops where children and parents were actively engaged in hands-on, developmentally appropriate activities designed to enhance STEM-related interest, knowledge and skills. Targeting families in at-risk neighborhoods in Las Vegas and Reno/Sparks, the seven-week workshop series focused on beginning STEM, as well as parents' skills and confidence in boosting children's early STEM learning. The majority of these children were not in formal early childhood programs. During the weekly lessons, families: discussed key foundational STEM skills; engaged in a variety of hands-on, experiential STEM activities; read a carefully selected STEM book; learned about do-at-home enrichment activities that enhance the value of STEM; and received a free book and materials to complete additional enrichment activities at home.

Methods

The Let's Discover STEM program was first developed for in-person delivery modes and was delivered in-person between Fall 2017 and Spring 2022. During the pandemic, between Fall 2020 and Spring 2022, virtual classes and in-person classes were interchangeably provided. More specifically, only virtual classes were provided during Fall 2020, then some sites started requesting in-person classes starting in 2021. We continued providing virtual options to partner sites in 2022, although more requested in-person workshops. Overall, our team provided 18 virtual classes to 236 families and 72 in-person classes to 779 families during this period. Out of the 1,015 program participants, evaluation data was collected from 826 families. The reduced sample size for participants with evaluation data is mostly due to participants who did not attend all of the sessions when in-person and due to difficulties collecting evaluation forms from families during virtual programming. Sample sizes are smaller for some variables reported due to missing data and attrition of participants during the program. Additionally, some scales (i.e., the STEM School Readiness scale) were not implemented until later in the program life cycle.

Participants

Participants were families from 43 community sites in Clark and Washoe County in Nevada. The study sample reported in this paper consisted of 826 parents/caregivers who returned evaluation forms for data collection. Most of the participating parents/caregivers were females and more of them took the class in Spanish and were Hispanic. More than half of them were stay-at-home (see Table 1).

Table 1. Parents/Caregivers Demographics (N = 826)

Parent Gender	
Male	61 (9%)
Female	654 (91%)
Language	
English	339 (45%)
Spanish	419 (55%)
Parent Ethnicity/Race	
Hispanic or Latino	508 (71%)
White/Caucasian	83 (12%)
Asian	62 (9%)
Black	43 (6%)
Other	13 (2%)
Parent Employment	
Employed full-time	127 (18%)
Employed part-time	95 (14%)
Unemployed/Not Working	470 (68%)
Parent Education	
Less than high school	134 (19%)
High school	215 (31%)
Some college	210 (30%)
College and over	133 (29%)
Parent Age	
20-30	152 (22%)
30-40	365 (54%)
40-50	131 (19%)
Over 50	33 (5%)

Measures

The following measures were used to collect data from program participants from 2017 through 2022.

Number of Sessions Attended

The number of sessions attended by each parent-child pairing was recorded using an attendance sheet filled out each week by the program instructor and could range from one to seven sessions. They were categorized into two groups: families attend 1-4 sessions and families attended 5-7 sessions.

Parent Perceived Impact of Program

The parent perceived impact of the program was the mean of five items collected at the end of the program, each answered on a 5-point Likert-type scale from “very little” to “very much.” Example items include, “how much has the program increased your knowledge about STEM?” and “how much has the program increased your child’s interest in doing STEM-related activities?” The scale had good reliability ($\alpha = 0.88$).

Parent Support of STEM

The parent support of STEM scale was the mean of four items answered on a 5-point Likert-type scale from “very little” to “very much.” This scale was collected at the end of the program as a post-reflective measure, meaning there were four items asking how the parent felt before the program as well as four items asking how the parents felt after completing the program.

Example items include, “how confident were you that you could use STEM skills to teach your child?” and “how much did you believe your child could learn from you?” The scale had good reliability (pre-support of STEM $\alpha=0.88$; post-support of STEM $\alpha = 0.86$).

STEM School Readiness (SRS)

The STEM School Readiness (SRS) scale was the mean of 16 items answered in a 3-point Likert-type scale including “not yet,” “somewhat,” and “yes.” This scale was collected at the end of the program as a post-reflective measure, meaning there were 16 items asking what “My child could do BEFORE the program” and 16 items asking what “My child can do AFTER the program.” Example items include, “count 1-20,” “build with blocks,” and “compare objects to determine more or less.” The scale had excellent reliability (pre-SRS $\alpha=0.94$; post-SRS $\alpha=0.90$).

Total Number of Weekly Take Home Activities Completed

For each weekly take-home activity sheet, parents indicate which of the four activities they completed with their child. This variable is a sum score of the total activities, out of 24, that a parent indicated they completed with their child during the program.

Total Time Spent in Weekly Take Home Activities

For each weekly take-home activity sheet, parents indicate how much time they dedicated to weekly take-home activities. This was the mean of six weekly take-home activities answered on a 5-point Likert-type scale from 1 to 5 (1: No time dedicated, 2: Less than 30 minutes, 3: 30 minutes to 1 hour, 4: 1 hour to 2 hours, and 5: More than 2 hours).

Results

Increased Time Engaged in STEM Activities

During the workshops, children participated in as many as 28 STEM enriching activities. Also, each week we sent home ideas and activities for doing additional STEM activities. Over the course of the program, families did an average of 19 of the 24 suggested take-home activities. Nearly 87% of parents reported spending at least 30 minutes or more per week doing those activities at home, with 45% reporting spending one or more hours a week doing the activities. Through both in-class and at-home activities, children engaged in up to 52 STEM activities that otherwise would not have been done with these targeted children. In essence, through participating in the program, children and parents were engaged in enriching fundamental STEM activities that build STEM readiness and success.

Increased Knowledge and Interest in STEM activities

Parents reported that their children increased their knowledge about STEM and their interest in doing STEM-related activities. Parents also reported that the program increased their own knowledge of STEM and their interest in doing STEM related activities with their children. In other words, both children and parents increased their knowledge and interest in STEM because of the program.

Increased STEM Skills

Foundational STEM skills for young children include abilities such as counting 1-20; recognizing shapes; comparing objects to determine more or less; measuring length, size and weight; and building towers and bridges. Learning these skills early can set children up for success in STEM-related subjects in school. At the end of the series, parents rated their child's ability on 16 fundamental STEM skills. According to parents, children made significant gains on all of the emerging STEM skills focused on in the classes. In other words, parents saw an increase in their children's emerging STEM skills across the program ($t = 21.57, p < .001$).

Increased Parental Confidence

By the end of the program, parents reported being significantly more confident they could help their children

gain STEM skills that their children could learn from them that they could help their children succeed in school, and that they were prepared to help their children learn ($t = 31.61, p < .001$; $t = 26.25, p < .001$; $t = 25.94, p < .001$; $t = 29.09, p < .001$). Parents also felt that the program helped strengthen their relationships with their children.

Conclusion


This program implementation research proved that the family engagement program focusing on children's early STEM skills increased children's time engaged in STEM activities, parents' knowledge and interest in STEM activities, children's early STEM skills, and parental confidence in helping children develop STEM skills and be ready for school. Exposing children to STEM at a young age supports their overall academic growth and develops early thinking and reasoning skills, so it is important to start early from home. Hispanic, Spanish-speaking families were the vast majority of this program participants and the program showed that this program benefited their children and themselves. Especially, the program enhanced parents' attitudes and confidence in their ability to help their children develop fundamental STEM skills. This implies that family engagement focused program can help families improve young children's school readiness and create lasting change for families.

References

- Hammer, C. S., Jia, G., & Uchikoshi, Y. (2011). Language and literacy development of dual language learners growing up in the United States: A call for research. *Child Development Perspectives, 5*, 4-9.
- National Assessment of Educational Progress. (2015). National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. <http://nces.ed.gov/nationsreportcard/>.
- McClure, E. R., Guernsey, L., Clements, D. H., Bales, S. N., Nichols, J., Kendall-Taylor, N., & Levine, M. H. (2017). *STEM starts early: Grounding science, technology, engineering, and math education in early childhood*. New York: The Joan Ganz Cooney Center at Sesame Workshop.
- Dearing, E., & Tang, S. (2010). The home learning environment and achievement during childhood. In A. L. Reschly & S. Christenson (Eds.), *Handbook on school-family partnerships for promoting student competence* (pp. 131-157). New York: Routledge.
- Fan, X., & Chen, M. (2001). Parental involvement and students' academic achievement: A meta-analysis. *Educational Psychology Review, 13*, 1-22.

Promoting Geometry Learning in Middle School through Ethno-Mathematics

Khayriah Massarwe

The Academic Arab College for Education in Israel – Haifa, Israel,  <https://orcid.org/0000-0003-1447-0321>

Abstract: In response to the challenge of geometry's abstract and less engaging nature for students, this study explored the potential of connecting geometry to cultural elements, specifically geometric ornaments found in various cultures worldwide. Geometric ornaments, laden with cultural and spiritual significance, serve as a bridge between mathematics education and cultural contexts. The current research focused on in-depth interviews with 10 school students chosen randomly from two ninth-grade classes from an Arab middle school who were engaged in activities involving analyzing of geometric properties of ornaments, constructing ornaments using a compass and straightedge, and problem-solving exercises related to these ornaments. The qualitative data were analyzed to answer how the students perceived the learning of geometry in the context of geometric ornaments. The findings revealed a significant positive view of the students towards geometry after engaging in these activities.

Keywords: Geometry, Ethno-mathematics, geometric Ornaments, Culture, Middle School.

Citation: Massarwe, K. (2023). Promoting Geometry Learning in Middle School through Ethno-Mathematics. In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023-- International Conference on Social and Education Sciences* (pp. 569-581), Las Vegas, NV, USA. ISTES Organization.

Introduction

Geometry learning allows students to solve problems in everyday life (Abdullah & Leow, 2017). It contributes to students in developing skills in visualization, critical thinking, intuition, perspective, problem-solving, estimation, deductive thinking, logical reasoning, and proof (Jones, 2002). However, it's one of the subjects in mathematics that school students consider as a challenging. The difficulties among school students are expressed mainly in solving geometric problems and developing formal proofs (Juman et al., 2022), and the fact that geometry requires students to understand abstract concepts (Andika et al., 2020). Difficulties in geometry are not limited only to the students, but also to mathematics teachers. They tend to have a very low understanding of geometry (Mashingaidze, 2012), when difficulties begin with the in-service preschool teachers. Markovits and Patkin (2021) found that among in-service preschool teachers almost lack of knowledge to name shapes and solids and have challenges in defining them by properties but more by the visual characteristics of these geometric shapes. It was found that pre-service mathematics teachers have difficulties with geometric concepts (Sunzuma & Mahara, 2019). Studies (Arabacı, & Kanbolat, 2023) pointed out to a lack of awareness

among teachers of their students' difficulties and in realizing in what level they are of understanding geometry, as Van Hiele's geometric thinking levels. The research literature offers different ideas to overcome difficulties in learning geometry. Geometry should be considered a practical subject that requires learners to use a variety of resources to investigate and explore the properties of shapes and geometry facts (Jones, 2002). Researchers in mathematics education call for connecting mathematics teaching to the culture of the learner (Gerdes, 1988; Bishop, 1988; Rosa & Orey, 2011; D'Ambrosio, 1985), and see culture as a rich resource for teaching mathematics (Presmeg, 1998). The cultural context allows students to explore mathematics more realistically (Nur et al., 2020a). Ornaments are part of the heritage of different cultures in the world that have a spiritual and cultural meaning. Researchers (Massarwe et al., 2010) pointed out that practice geometric constructions of ornaments, by compass and straightedge in geometry class through analyzing the properties of the shapes and solving geometric problems related to them, was found as a highly enjoyable experience, and fostering an understanding of the importance of ethno-mathematical learning activities related to the students' own cultures and those of others (Massarwe et al., 2012). It helps in understanding geometric concepts and contributing raise motivation among students and developing positive attitudes towards geometry. Geometric ornaments have a direct connection to art and culture ever since throughout the history (Cenani & Cagdas, 2006). Their cultural context can influence the students' thinking as well as the construction of mathematical knowledge among them (Nassar & al-Muheisen, 2013) which affect their achievement (Masgoret & Gardner, 2003). The current study is part of an ongoing research on Ethnomathematics which started together with the author and colleagues in the academy at the Technion. Following the research, a course in ethnomathematics was developed for graduate students in the Education in Science faculty at the Technion in 2008, which was taught by the author and the colleagues. Then, the course was invited and adapted to be taught by the author at the Academic Arab college for Education in Israel, where the author teaches and which is intended for master's degree students who are actually in-service mathematics teachers. Some teachers applied the content they learned in the course to their students at schools. The current study aimed to examine how the 9th grade students perceive learning of geometry in the context of geometric ornaments.

Theoretical Framework

Difficulties in Learning Geometry

In the perception of students, geometry is often regarded as a difficult and abstract discipline. The study of geometry necessitates the acquisition of new concepts and their application in various proofs, involving the manipulation of properties of different geometric shapes (Karimah et al., 2018; Nagubandi, 2018). These abstract concepts pose challenges to understanding geometry at the middle school level, primarily in the form of fundamental cognitive difficulties in grasping geometric concepts, or difficulties related to visual perception. Mathematics teachers, sometimes are unaware of these challenges or lack the tools to effectively address them (Adhikari, 2019; Karimah et al., 2018). In the middle school, the formal study of geometry commences, demanding the mastery of cognitive skills that go beyond the visual (Nagubandi, 2018; Regmi, 2019). At this stage, students are required to engage in logical and deductive thinking, which poses challenges for them

(Adhikari, 2019; Karimah et al., 2018). They meeting new concepts, like definitions and theorems, and learn to substantiate claims while also refuting incorrect claims through the use of counter examples (Adhikari, 2019; Regmi, 2019). The acquisition of geometric concepts, a fundamental component of learning, involves various aspects, including knowledge of the concept's perimeter, comprehension of its defining characteristics, an understanding of the concept's terminology, and similar elements (Karimah et al., 2018; Nagubandi, 2018). Geometric concepts can be acquired at four distinct levels: the concrete level, the level of identity, the classification level, and the formal level. In mathematics education, the emphasis primarily lies in the higher classification and formal levels (Adhikari, 2019; Karimah et al., 2018). At this stage, students encounter challenges in articulating concepts, differentiating between them, and providing accurate definitions (Adhikari, 2019; Karimah et al., 2018). The challenges associated with learning geometric concepts can be attributed to several factors, including instructional methodologies, limited access to educational materials, and the inherent complexity of these concepts (Ubi & Igiri, 2018). Another studies (Juman et al., 2022) pointed out to the fact that students encountered more significant difficulties in learning geometry, such as drawing diagrams for a given geometric problem and applying more than one theorem to solve a problem.

Learning Geometry through Cultural Context

The main idea of the current research is about the notion that the learning geometry through analyzing and constructing ornaments rooted in the learner's culture and other cultures, can potentially enhance the student's ability to engage with mathematical content. Utilization of tangible objects, like ornaments, in mathematics instruction contributes to enhance learning outcomes (Ahmad & Chang, 2017; Holtzman & Susholtz, 2011; Kohlhase, 2017; Lavinia, 2011). By employing physical objects, students engage their senses and thus acquire knowledge in an optimal manner (Murray, 2001). Employment of tangible means, such as ornaments, as part of mathematical instructional methods is commonly perceived as the application of manipulations in purpose to render abstract mathematical concepts meaningful to the student (McNeil & Jarvin, 2007). This requires the teachers to guide their students towards practical implementation, translating the tangible object into a tool for achieving the pedagogical objective (Lehtinen & Hannula, 2006). Learning with ornaments by engaging the students in the learning process can facilitate them connecting abstract concepts in geometry and the practical knowledge in the real life, and thus enhancing their comprehension in the subject (McNeil & Jarvin, 2007).

The Ethnomathematics Approach

Ethnomathematics describes the mathematical practices inherent within cultural groups, and inquiring of mathematical ideas rooted in each culture (D'Ambrosio, 1985). It can be described as the manner in which individuals from a specific cultural use to solve problems in everyday life (Rosa & Orey, 2011). This approach in learning mathematics validates the mathematical experiences of peoples, as it enlightens the contribution of every culture to mathematics. Over the past four decades, ethnomathematics become a pedagogical approach in various topics. It is based on the constructivist methodology, which consider the student as an active learner constructing knowledge through experiential and social interaction facilitated by the teacher. Guiding such

activities necessitates the teacher's specialized content and pedagogical knowledge expertise, and ability to engage with students, recognize their cultural backgrounds. Through engagement in mathematical activities rooted in diverse cultures, students can learn to appreciate mathematics and develop greater respect for those who differ from them (D'Ambrosio, 2007). success in mathematical learning can be better realized when considering the cultural background of the student. The cultural context allows deepen engagement of the students in mathematics and make the study of the subject more realistic (Nur et al., 2020a). Researchers in ethnomathematics pointed out to various benefits of learning mathematics based on the ethnomathematical approach as the students can grab the lesson easily and acknowledge their own cultures (Mania & Alam, 2021), and that it has a positive impact on increasing students' geometry spatial abilities (Sukestiyarno, 2023), and the realistic mathematics learning with ethnomathematics orientation can improve mathematical problem-solving skills and fosters the learner abilities (Nur et al., 2020b).

The Study

The current study accompanied the process of learning geometry in a cultural context based on the ethnomathematical approach, through engaging 9th grade school students in activities of analyzing geometric ornaments and constructing them by compass and straightedge, and solve geometric problems related to these ornaments. The study aimed to examined how school students perceive learning geometry in the context of ornaments. This paper focus on the qualitative part that included in-depth interviews with 10 school students to present their perceptions towards learning geometry through experience in analyzing and constructing of geometric ornaments.

Participants

Two 9th classes that included 70 school students were engaged in activities of learning geometry in the context of analyzing and constructing ornaments from different cultures. The students learn in a private school in the Arab sector of Israel in one of the Arab cities in the north of the country. This paper focus on in-depth interviews with 10 students chosen randomly from the two classes. They learned the subject with a mathematics teacher that studied at The Academic Arab College for Education for her master degree in where the author teaches. The teacher herself studied with the author a professional development course based on the ethnomathematics approach and applied the subject to the 9th graders. In the course she learned to adapt the material to school students, so adjustment was made to the contents learned that would be suitable for 9th grade students. For this purpose, an instructional unit was developed on the subject.

The Study Tool

The research tool included semi-structured interviews with the school students after learning geometry with ornaments to present their perceptions towards learning geometry through experience in analyzing and

constructing by compass and straightedge of geometric ornaments. The semi-structured interview was chosen because it allows enough flexibility for the interviewees to raise additional issues that are important to them besides the purpose to investigate the issue. The interviews were conducted in Arabic as the native language of the participants. After every closed question the students were asked to explain and give examples. The students' answers were written down in full. The closed questions of the interviews were: 1) What is your opinion about the activity of analyzing and constructing geometric ornaments in class?; 2) What did you like about the lesson?; 3) Do you prefer to learn more topics in geometry with the same method?; 4) How did the geometry activity contribute to you?; 5) What is your opinion on learning geometry in the context of geometric ornaments?; 6) Did the activity of analyzing and constructing ornaments contribute to understand geometric concepts or to solve geometric problems?.

The Study Process

The 9th grade students studied geometry combining analysis and construction of geometric ornaments. They learned for seven lessons of forty-five minutes each. At the beginning the students learned basic construction principles using a compass and straightedge to provide a basis for constructing the ornaments. The topics they studied were those necessary for constructing the specific ornaments they learned like: bisecting a segment, bisecting an angle, constructing an isosceles triangle, constructing an equilateral triangle, constructing a perpendicular to a straight line. Then the teacher presented the students with ornaments from different cultures and an introduction was made regarding the topic. The students were introduced to ornaments from the Islamic culture which is the culture of the students and other cultures. The teacher chose two geometric ornaments suitable to be constructed with the students: A typical Islamic ornament as symbolizes the cultural context and the Seed of Life ornament which relates to the Ancient Egypt culture and other cultures in the world. The last ornament was chosen so that it would be suitable for teaching the subject of the circle through the curriculum and to practice the theme through analyzing geometric ornament. Guided by the teacher, the students analyzed the properties of the ornaments and solved geometric problems related to them. The geometric problems were developed by the teacher to be suitable for 9th grade and appropriate for the material they learn in the school curriculum. The instructional unit is described in Table 1 below.

Table 1: The Instructional Unit

	The learning stages	Explanation
1	Acquisition of basic knowledge of geometric construction.	Acquiring a basic knowledge about constructing principles with the help of a compass and straightedge, which is necessary for constructing a specific ornament. The students analyzed every step in the construction and analyzed the properties of the geometric shapes created at each stage of the construction.
2	Presenting a background and a gallery of ornaments from the	Preparing a short introduction of a specific culture and a presentation of ornaments from the culture and different cultures

	The learning stages	Explanation
	culture.	through taking into account examples of ornaments from the students' cultures.
3	Geometric inquiry of an ornament.	Analyzing of the geometric properties of an ornament and building series of the construction of the ornament by compass and straightedge. The students discussed every step in the construction and analyzed the geometric shapes created at each stage of the construction.
4	Problem solving related to the ornament.	Engaging the students in solving different geometric problems related to the ornament.

At the end of the study unit, the students were randomly selected and after their consent to participate in an interview at the end of the process with the aim of having them interpret their interpretations, perceptions, opinions and attitudes towards the activity of analyzing and constructing geometric ornaments in class. Also, the participants were asked to explain what they like in a class that combines geometric ornaments. The categories were produced from the answers of the participants. The students' results were interpreted and were drawn conclusions from the contents emerging from the products. Examples of the activities the students were involved in are presented below.

Constructing an Ornament by Compass and Straightedge

Fig. 1 describes the construction of the Seed of Life ornament from the Ancient Egypt culture by students. All the circles have the same radius.

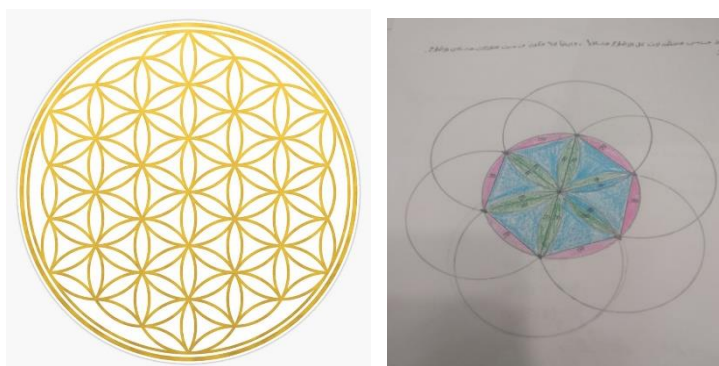


Figure 1. Constructing the Seed of Life ornament.

Solving Geometric Problems Related to the Ornament

Problem 1

For the constructed ornament assume that the radius of every circle is R as seen in Fig. 2. Prove that the hexagon AEFDBC is a regular hexagon.

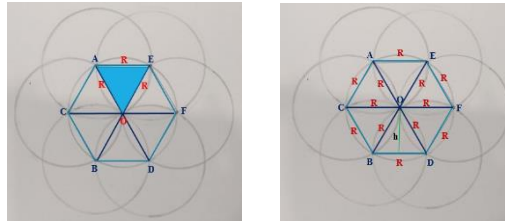


Figure 2. Problem Solving Related to the Ornament.

Solution:

A regular hexagon is built from 6 equilateral triangles whose side length is R (The left of Figure 2). There are 6 triangles like the OAE Triangle. A regular hexagon is a hexagon whose sides are all equal to each other; $AE=EF=FD=DB=BC=CA=R$

Problem 2

Find the area of hexagon AEFDBC using R . See Figure 2. (The right ornament).

Solution:

Each side is of length R . To find the area of the hexagon, find the area of each equilateral triangle $\frac{\sqrt{3}}{4}R^2$.

And the area of the hexagon is $6 \cdot \frac{\sqrt{3}}{4}R^2$.

Problem 3

In the ornament in Figure 3 find the area of the flower using R .

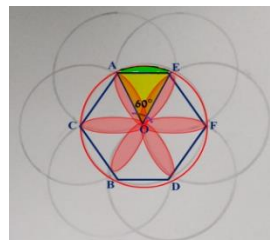


Figure 3. Find the area of the flower in the ornament.

Solution:

Each branch of the six branches of the flower is divided into two identical parts by the sides of the triangle OE and OA. i.e., the area of the flower consists of 6 whole branches or 12 half branches.

The area of one-half branch is equal to the area of the segment AE. multiply it by 12, and get the area of the flower. The area of the circle is πR^2 . The area of the section AEO is the area of the circle divided by 6. So, the

area of the flower is: $12 \cdot \left(\frac{\pi R^2}{6} - \frac{\sqrt{3}R^2}{4}\right)$.

Findings

The findings from analyzing the responses of the school students in the interviews revealed five categories that characterizes their experience in learning geometry through engagement in activities of analyzing and constructing geometric ornaments and problem solving. The categories related to different directions as presented below: High level of interest in the geometric lesson; Implications for learning other subjects in geometry; the contribution of learning geometry with ornaments; positive attitudes of the students regarding learning geometry in the context of geometric ornaments; and the contribution of the activities with ornaments for understanding geometric concepts and enhancing geometric problems skills.

High Level of Interest in the Geometric Lesson

All the students pointed out that they liked the activities emphasizing the experience of constructing geometry shapes with compass and straightedge that based on circles, as the students clarified that "it was a nice activity, I especially liked the activity of using a compass and straightedge, I liked drawing the circle"; as other student similarly explained "I really liked how I can draw a circle with a compass and straightedge ". even if some found the experience as challenging but indeed liked it as student claimed that "at first it was difficult but I loved it". Students found the lesson of geometry with ornaments as interesting and that it facilized their learning: "The class was very interesting, I liked it, not boring"; "the activity is beautiful, I liked the activity of drawing the circle and the Dalton"; other student believed that it was "a good activity for understanding geometry, I understood better with the constructing"; others pointed out that "the activity helped me understand geometry in a different and interesting way".

Based on the above findings, it can be stated that the students did enjoy and that the activity of analyzing and constructing geometric ornaments in class is a joyful activity, clearly unusual, not boring like the regular class, satisfying, and increases the motivation to learn geometry in an interesting and out-of-the-box method.

Implications for Other Geometric Subjects

The study participants were asked if they prefer to learn more subjects in geometry through analyzing and constructing geometric ornaments. Based on the students' responses, it can be discerned that indeed these responses are aspects of the subjects under consideration and that they indeed prefer to study other geometric fields with the same method. The students indicated their preference for studying topics in geometry that seemingly pose challenges for them or that the activities contributed to their comprehension, as they mentioned: "It helps in understanding geometry, and concepts like triangle, Dalton, circle"; "It was easier for me to understand mostly the features of the Dalton". Two students indicated student expressed reservation and noted that it would be difficult and challenging for him "No, it will be difficult for me, but we can try"; and the other

said "doesn't know if it is possible. It depends on the subject". Other students expressed enthusiasm for the idea as they explained: "Yes, it seems interesting to me".

The responses of the students indicated that they were interested in the teaching method combining geometric ornaments, and therefore they think that the integration of this teaching method in other geometric fields can lead to optimal results, and in particular that it is a method that increases the dimensions of interest and motivation in learning.

Contribution of Learning Geometry with Ornaments

The participants were asked to elucidate the contribution of geometric ornaments to their learning outcomes. Based on their statements, it becomes evident that geometric ornaments serve as a highly pragmatic and tangible catalyst for enhancing their geometric products. Students claimed that the method "contributed to my knowledge of geometry, I could remember properties"; other clarified that the this experience has contributed to realize that they capable of adopting an alternative perspective when it comes to comprehending geometric forms: "contributed to my understanding that I could understand a different way of seeing geometric shapes"; and that it "helped me see how it is possible to understand geometric concepts through drawing"; and "helped me see a different method for understanding features in geometry". Other students pointed that learning geometry with ornaments enriched the comprehension and fostered their creativity within the classroom: "contributed to my understanding and being creative in class". Students provided an explanation that the contribution of the approach lay in the enhancement of one's orientation towards geometry and the cultivation of a deeper affection for the subject as they clarified: "It helped me love geometry".

Based on the aforementioned findings, it can be deduced that the incorporation of ornaments in the geometry class significantly enhanced their learning outcomes and fostered a heightened sense of enthusiasm and motivation. This effect can not only encourage active engagement with the subject matter but also can promote the attainment of satisfactory achievements within geometry.

Positive Attitudes regarding Learning Geometry in the Context of Ornaments

The participants construed their attitudes towards learning geometry within the context of geometric ornaments. Their statements indicated that their attitudes are unequivocally positive. As they claimed that it was an "interesting subject, you can learn a lot and remember geometric properties"; and "interesting, easy to understand". The students emphasized that the subject matter was intriguing despite its difficulty, and they derived enjoyment from it and that the topic was "interesting, despite the difficulty, but I enjoyed it"; and "Interesting, I really enjoyed learning geometry". They highlighted the method as one that facilitated their geometric learning as they claimed: "interesting, it was easier"; and that the subject was "interesting, it helped me a lot to see geometric properties in depth".

The participants' statements convey highly favorable attitudes toward learning geometry within ornaments. They particularly tense that this method substantially and distinctly eases the learning process.

Enhancing Problem Solving Skills

The research participants were required to clarify whether and how the activity of analyzing and constructing ornaments contributed to their ability to understand geometric concepts and solve geometric problems. They explained that learning in this way significantly facilitated their ability to solve geometric problems as they pointed that it's "helped me a lot, it was easier to solve geometric problems". Some of them explicitly mentioned the contribution in specific topics within geometry as "helped me understand mainly the features of the Dalton", and assisted in perceiving an alternative approach to comprehending geometric properties as "helped me see a different method for understanding geometric properties". Some of them went further and linked their professional affection with a deeper understanding of the subject matter when the activity contributed as it "helped me love geometry and understand more". This learning method opened up a new approach for them to study geometry and helped in " realizing that I could understand another way of seeing geometric shapes". Furthermore, the students reflected on their performance during the activity, emphasizing its creativity as "contributed to my understanding and being creative in class".

Based on the interviewees' statements, a distinct and unequivocal conclusion emerges: the impact of learning geometry with ornaments on enhancing the comprehension and resolution of geometric problems is highly substantial, as perceived by the participants. Consequently, they consider it as a beneficial method for application in the context of teaching geometry.

Discussion

The aim of the present study was to examine how the 9th grade students perceive learning of geometry in the context of geometric ornaments. The approach relies on the analysis of geometric ornament properties and their integration with the subject matter. Moreover, the act of physically constructing the ornament using a compass and straightedge facilitates the observation of the construction process and the geometric shapes comprising the ornament. This, in turn, affords the learner the opportunity to examine the features of the geometric shapes within the complex pattern and offers a pathway to resolving geometric problems associated with a tangible object. The students were involved in activities of analyzing and constructing geometric ornaments and problem solving. The findings from analyzing the responses of the school students in the interviews at the end of the learning process pointed out to the promoting of the method to their learning of geometry in different directions. The students' interest in geometry lesson increased following the activities. The contribution extends beyond the subject being studied, as they view it as an efficient method for learning other topics in geometry. Students developed a more positive attitude towards geometry as a result of studying the geometry in the context of geometric ornaments. Learning with tangible objects like ornaments contributed to the understanding of

geometric concepts as in line with previous researches (Murray, 2001; McNeil & Jarvin, 2007) and enhancing the geometric problems skills of the students (Nur et al., 2020b). This finding is in line with other researches (Ahmad & Chang, 2017; Holtzman & Susholtz, 2011; Kohlhase, 2017; Lavinia, 2011) who pointed out to the contribution to enhance learning outcomes.

Conclusion

In conclusion the findings indicate that school students enjoy learning geometry through analyzing and constructing with compass and straightedge geometric ornaments from their own culture and other cultures. They found it as a joyful learning and a beneficial method that help them acquire knowledge and understand geometric concept. This way they help students develop a positive attitude towards geometry. Geometric ornaments are rich patterns that can provide an opportunity for posing and solving geometric problems and such enhancing their problem-solving skills.

Recommendations

For further research it is recommended to examine the relationship between the use of ornaments and students' achievements in geometry in the ninth grade. And there is a need of additional research examining the potential impact of the cultural context represented by ornaments on the students' motivation and attitudes towards mathematics in general, and geometry in particular.

References

- Abdullah, M. F. N. L., & Leow, W. (2017). Learning Form One Geometry: Validity and Reliability of a Self-Evaluation. *Malaysian Journal of Learning and Instruction*, 14(1), 211–265.
- Adhikari, P. (2019). *Difficulties in learning vector geometry at secondary level*. (Master's thesis, Tribhuvan University Kathmandu, Nepal). Tribhuvan University Central Library. <https://elibrary.tucl.edu.np/handle/123456789/1710>
- Ahmad, T., & Chang, L. H. (2017). Presentation of Mathematics Object in Verbal and Symbolic Forms to Increase Conceptual Understanding in Category Statistics Math. *Journal of Education, Teaching and Learning*, 2(2), 253-258.
- Andika, F., Pramudya, I., & Subanti, S. (2020). Problem posing and problem solving with scientific approach in geometry learning. *International Online Journal of Education and Teaching (IOJET)*, 7(4). 1635–1642.
- Arabacı, D., & Kanbolat, O. (2023). Pre-service elementary mathematics teachers' evaluations of meetings with expert and peer participation based on van Hiele geometric thinking levels. *International e-Journal of Educational Studies*, 7 (15), 752-768. <https://doi.org/10.31458/iejes.1345567>.
- Bishop, A. J. (1988). Mathematics education in its cultural context. *Educational Studies in Mathematics*, 19(2), 179-191.

- Cenani, S., & Cagdas, G. (2006). Shape grammar of geometric Islamic ornaments. *Proceedings of the 24th eCAADe*, 292-309.
- D'Ambrosio, U. (1985). Ethnomathematics and its place in the history and pedagogy of mathematics. *For the Learning of Mathematics*, 5(1), 44-48.
- D'Ambrosio, U. (2007). Peace, social justice and ethnomathematics. *The Montana Mathematics Enthusiast, Monograph 1*, pp.25-34.
- Gerdes, P. (1998). Culture and mathematics teacher education. *Journal of Mathematics Teacher Education*, 1(1), 33-53.
- Hannula, M. (2006). Motivation in Mathematics: Goals Reflected in Emotions. *Educational Studies in Mathematics*, 36(1), 165-178.
- Holtzman, C., & Susholtz, L. (2011). *Object lessons: Teaching math through the visual arts, K-5*. Stenhouse Publishers.
- Jones, K. (2002). Issues in the Teaching and Learning of Geometry. In: L. Haggarty (Ed.), *Aspects of Teaching Secondary Mathematics: perspectives on practice* (pp. 121-139). London: RoutledgeFalmer.
- Juman, Z. A. M. S., Mathavan, M., Ambegedara, A. S., & Udagedara, I. G. K. (2022). Difficulties in Learning Geometry Component in Mathematics and Active-Based Learning Methods to Overcome the Difficulties. *Shanlax International Journal of Education* 10(2),41-58. <https://doi.org/10.34293/education.v10i2.4299>
- Karimah, R. K. N., Kusmayadi, T. A., & Pramudya, I. (2018). Analysis of difficulties in mathematics learning on students with guardian personality type in problem-solving HOTS geometry test. *Journal of Physics: Conference Series*, 6(1), 12-28.
- Kohlhase, M. (2017). Math Object Identifiers-Towards Research Data in Mathematics. *Proceedings of the LWDA 2017 Workshops: KDML, WM, IR, and DB*. Rostock, Germany. <http://ceurws.org>
- Lavinia, S. J. (2011). Developing A Math Learning Environment–A Learning Object Approach. *Journal of Information Systems & Operations Management*, 5(1), 144-149.
- Lehtinen, E., & Hannula, M. M. (2006). Attentional processes, abstraction and transfer in early mathematical processes. In: L. Verschaffel, F. Dochy, M. Boekaerts, & S. Vosniadou (Eds.), *Instructional psychology: Past, present and future trends* (pp. 39-55). Advances in learning and instruction series. Elsevier.
- Mania, S., & Alam, S. (2021). Teachers' perception toward the use of ethnomathematics approach in teaching math. *International Journal of Education in Mathematics, Science, and Technology (IJEMST)*, 9(2), 282-298. <https://doi.org/10.46328/ijemst.1551>
- Markovits, Z., & Patkin, D. (2021). Preschool In-service Teachers and Geometry: Attitudes, Beliefs and Knowledge. *International Electronic Journal of Mathematics Education*, 16(1), em0619. <https://doi.org/10.29333/iejme/9303>
- Masgoret, A., & Gardner, R. (2003). Attitudes, motivation, and second language learning: a meta-analysis of studies conducted by Gardner and associates. *Language Learning*, 53(1), 123-163.
- Mashingaidze, S. (2012). The Teaching of Geometric (Isometric) Transformations at Secondary School Level: What Approach to Use and Why?. *Asian Social Science*, 8(15).

<https://doi.org/10.5539/ass.v8n15p197>

- McNeil, N.M. & Jarvin, L. (2007). When theories don't add up: Disentangling the manipulatives debate. *Theory into Practice*, 46(4), 309-316.
- Massarwe, K., Verner, I., & Bshouty, D. (2012). Ethnomathematics and multi-cultural education: Analysis and construction of geometric ornaments. *Journal of Mathematics and Culture*, 6(1), 344-360.
- Massarwe, K., Verner, I., Bshouty, D., & Verner, I. (2010). An ethnomathematics exercise in analyzing and constructing ornaments in a geometry class. *Journal of Mathematics and Culture*, 5(1), 1-20.
- Murray, A. (2001). Ideas on manipulative math for young children. *Young Children*, 56(4), 28-29.
- Nagubandi, S. (2018). *An investigation into the impact of visual-spatial difficulties on learning geometry* (Doctoral dissertation). University of Plymouth.
- Nassar, M., & al-Muheisen, Z. (2013). Geometric Mosaic Ornament at Khirbet al-Bediyeh, Jordan. *Greek, Roman, and Byzantine Studies*, 53(3), 591-609.
- Nur, A., Zaenuri, K. & Rochmad, W. (2020a). Ethnomathematics Thought and its Influence in Mathematical Learning. *Jurnal Matematika dan Pembelajaran*, 8, 205-223.
- Nur, A.,S., Waluya, S.,B., Rochmad, R., & Wardono, W. (2020b). Contextual Learning with Ethnomathematics in Enhancing the Problem Solving Based on Thinking Levels. *Journal of Research and Advances in Mathematics Education (JRAMathEdu)*, 5(3), 331-344.
<https://doi.org/10.23917/jramathedu.v5i3.11679>
- Presmeg, N. C. (1998). Ethnomathematics in teacher education. *Journal of Mathematics Teacher Education*, 1(3), 317-339.
- Regmi, K. P. (2019). *Exploring Conceptual and Procedural Learning Difficulties in School Level Coordinate Geometry* (Master's dissertation), University Campus Tribhuvan University.
- Rosa, M. & Orey, D. C. (2011). Ethnomathematics: the cultural aspects of mathematics. *Revista Latinoamericana de Etnomatemática*, 4(2). 32-54.
- Sukestiyarno, Y. L., Nugroho, K. U. Z., Sugiman, S., & Waluya, B. (2023). Learning trajectory of non-Euclidean geometry through ethnomathematics learning approaches to improve spatial ability. *Eurasia Journal of Mathematics, Science and Technology Education*, 19(6), em2285.
- Sunzuma, G. & Maharaj, A. (2019). In-service Teachers' Geometry Content Knowledge: Implications for how Geometry is Taught in Teacher Training Institutions. *International Electronic Journal of Mathematics Education*, 14(3), 633-646.
- Ubi, E. & Igiri, O. (2018). Geometry Viewed as a Difficult Mathematics. *International Journal of Innovative Science and Research Technology*, 3(11), 251-255.

Teacher Candidates' Views on the “Text Analysis Methods” Course in the Context of Language and Literature Education

Mesut Bulut

Atatürk University, Türkiye,  <https://orcid.org/0000-0002-0733-0964>

Abstract: The purpose of this study is to investigate the views of prospective teachers of Turkish language and literature on the "text analysis methods" course. In this study, which used the qualitative research approach, the case study design was used. 13 teacher candidates who are enrolled in the Turkish language and literature teaching program at a university in Turkey make up the research's participant group. The researcher used the literature review and expert comments to build a semi-structured interview form to get the participants' opinions regarding the "text analysis methods" course. The data were examined using a content analysis method. The findings indicate that the "text analysis methods" course provides a significant learning opportunity that presents potential instructors with a range of viewpoints. The course is successful in developing students' abilities to comprehend, analyze, interpret, and think critically about literary works as evidenced by the participants' varied viewpoints of its objectives and content. Participants made a point of emphasizing how the course's material was taught using cutting-edge scientific methods. Additionally, it was claimed that using relevant and trustworthy sources helped pupils develop scientific thinking skills. The requirement for more time and space that promote in-depth learning and support the accomplishment of instructional objectives is evident from differences in opinion regarding lesson duration. To improve the effectiveness of the course and give students a deeper learning experience, pre-service teachers advise using technological resources, interactive learning techniques, and analytical approaches. These results demonstrate how the "text analysis methods" course presents a significant opportunity for teacher candidates to develop their expertise in using literary texts to accomplish a variety of learning objectives. In light of this, it was determined that the research can offer information for the advancement of Turkish language and literary education as well as program updates.

Keywords: Teacher candidates, language and literature education, text analysis methods course, views

Citation: Bulut, M. (2023). Teacher Candidates' Views on the “Text Analysis Methods” Course in the Context of Language and Literature Education. In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023-- International Conference on Social and Education Sciences* (pp. 582-605), Las Vegas, NV, USA. ISTES Organization.

Introduction

Oral or written expressions are commonly considered to be text (Aykanat, 2012: 410). Text is also described as a form of expression and communication intended to communicate ideas at different levels of abstraction

through language. Only when a sentence fully agrees with the context in which it is employed does it have text value? On any topic, however, agreement cannot be reached in a single remark that answers all the questions and eliminates all ambiguity. Consequently, the text is a medium of communication and comprehension that is composed of sentences, or, to use a more precise term, that is interwoven with sentences. The text is formed by each linguistic unit in the line from voice to paragraph. Language is used to communicate and to understand. The text's type, size, style of expression, and linguistic characteristics are determined by the narration and agreement's intended audience, its subject, and the communication channel employed. Texts governing daily life's activities and texts of a scientific, philosophical, literary, or artistic nature differ from one another. The text's organization and style are also influenced by its intended audience. Texts are language-based constructions that organize ideas and emotions during periods of historical, cultural, and social change. So much so that books are the only way to comprehend historical, cultural, and social developments. In other words, without texts, it is impossible to completely comprehend these developments (Aktaş, 2009). A text is a linguistic unit that possesses cohesiveness and cohesion, and it consists of relationships between sentences at different levels. In addition to their inherent meaning, sentences also take on additional meaning based on their surroundings, including the phrases that come before and after them. Because of this, rather than analyzing each sentence individually in text analysis, the sentences are taken as a whole. Text is a unit of language that can be comprehended, and interpreted, and carries specific messages dependent on the social and cultural settings in which it is used (Torusdağ & Aydın, 2017).

The field of textual studies examines the steps taken by a literary work from its conception to its reader. In the domains of literature, linguistics, and criticism, the term "text" is frequently employed as a translation of the Western word "text". Textual studies seek to comprehend the text's intrinsic organization in addition to its surface meaning. examination and examination of text texture are crucial in this situation. The components of the literary work, the theme, the usage of symbols, and the language itself are all examples of text texture. These studies assist us in comprehending the text's weave, or how it is organized and makes sense of. Textual analysis suggests that the literary work is an "analysis and composition" text, meaning that it is being examined and is awaiting the reader's analysis and synthesis. Analyzing is a type of analysis that helps the reader comprehend the material at hand in greater detail and is a crucial part of textual studies (Mengi, 2007: 408). Textual analysis establishes any literary work's integrity. According to a particular technique, textual analysis entails the examination, evaluation, and interpretation of every aspect that makes up the total, including its meaning, structure, language, and style down to the tiniest bits. The study of literature is not merely a subject taught alongside language, ethics, history, or sociology, nor is it a completely aimless, haphazard, and illogical educational activity that falls far short of all pedagogical norms (Çetişli, 2006). The activity of textual analysis has a theoretical foundation. Modern text linguistics is used for text analysis. According to this approach, texts must be "informative", "acceptable", "situational", and "intertextual", as well as generated for a particular "purpose" and "consistent" in both surface and deep structures. Understanding text-linguistic analysis makes it simpler to ascertain the author's intended message in literary writings that cannot be comprehended at first glance and calls for a special reading technique (Torusdağ & Aydın, 2017).

The Turkish literature curriculum is built around the idea that students should first evaluate the texts before examining their meaning and expression. This curriculum is made to assist students in analyzing the texts in light of what they have since learned. It is hoped that students will develop text analysis, critical reading, and comprehension abilities and apply them to enjoy life rather than simply remembering facts without appreciating the value and purpose of Turkish literature studies (MEB, 2011). In secondary Turkish Language and Literature teaching courses, the efficient application of language skills in the context of text analysis requires the employment of advanced cognitive, affective, and social abilities in the learning process. The teaching of fundamental language skills in the Turkish Language and Literature curriculum is centered on reading, writing, and oral communication and is linked to the tasks that must be done during the learning process (Göçer, 2016: 126). Regardless of the context in which it is viewed, literature should be regarded as a branch of the fine arts. Literature is viewed as a discipline of science that tries to analyze, evaluate, and interpret literary works, as interpreted in this evaluation. Many different ideas, methods, and approaches can be used in the study of literature. While there are many reasons to study literature, the main one is to simultaneously give the student a solid language education. Because literary writings frequently feature the most extensive use of a language. In this approach, literary works and the study of literature as a whole function as a fundamental teaching aid for languages. One of the main objectives of literary education in the modern day is to teach pupils about the culture of the society they live in. Through its literary output, a nation transmits its culture. Students naturally gain an understanding of the culture of the nation they are a part of while analyzing and evaluating literary studies (Karadeniz & Gürsoy, 2014: 100-101).

Education is responsible for shaping and upholding social values and directing people's lifestyles in addition to giving knowledge and skills. There is a clear connection between literature and education within this framework. Every country's language and literature serve as the foundation for its culture and aid in its dissemination. The improvement of students' reading comprehension, communication, and expression abilities is the main goal of teaching Turkish language and literature in high schools. It is challenging to assert that elements like student attitudes and the effectiveness of the educational process are effectively recognized and utilized, nonetheless. By looking at the connections between teaching methods, student behavior, and learning, we may now have a better understanding of the state of Turkish language and literature instruction. Therefore, it is crucial to assess the quality of Turkish language and literature instruction (Balçı, 2014). Education in literature is crucial for the development of artistic taste, the concrete expression and interpretation of cultural values, and the expression of life with a higher level of awareness and sensitivity. Lessons in literature are crucial for developing strong reading, thinking, comprehension, and expressive abilities. The literature curriculum contains a sizable quantity of knowledge regarding the background of literature. The methodologies utilized in the literature, however, are insufficient to produce the appropriate results when the course's overall objectives are taken into account (Algül and Selçuk, 2019: 46). An atmosphere is created for students to develop in terms of language, literature, art, and aesthetics through the study, research, and evaluation of works of literary merit within the context of Turkish Language and Literature Education provided in high schools. This viewpoint makes the significance of teaching Turkish language and literature courses clearer. Text analysis, including text selection, should be a part of text-based literary education (Göçer, 2014). Literary texts are the

fundamental teaching resources for both literature and mother tongue instruction. Thus, a key component of these courses is the analysis of literary texts and other text-related disciplines. It can be claimed that text analyses have recently gotten greater attention in literature classes than literary history. But to properly teach a subject, one must first be well-versed in its theoretical underpinnings, choose the best teaching strategies, and comprehend the subject (Günday, 2012: 2). “*Numerous techniques have been created for assessing literary texts during the past century, particularly in more recent times. Some of these include new criticism, structuralism, hermeneutics, textualism, linguistics, semiotics, semantics, and stylistics*” (Çetişli, 2006: 6). One of the crucial questions a literature educator should consider while working with a literary book is how to approach it. This strategy won't be effective if the literature teacher treats the literary material carelessly. This strategy was adopted after other, equally significant strategies for handling or instructing literary works. In other words, when it comes to teaching literature, both content and manner matter. The literary educator should be familiar with these techniques and apply them when analyzing literary studies. Literature teachers will assist pupils in developing different viewpoints by using analysis techniques (Karadeniz & Gürsoy, 2014: 102). Turkish language instruction focuses on reading, analyzing, and interpreting texts. In this regard, texts serve as the primary means of achieving the aim of teaching Turkish (Demir & Açık, 2011: 51). As a result, studying literature entails becoming familiar with a variety of theories and viewpoints, as well as understanding how to evaluate texts and placing them in their historical and social contexts. It's critical to recognize the variations among various textual schools, identify the writing styles of authors who write about related topics, and comprehend the connections between literature and other forms of art. The educational and cultural aspects of literary writings should be taken into account in addition to their aesthetic value. The objective of teaching literature cannot be accomplished if the integrity of these components is not guaranteed. Because of this, a variety of techniques ought to be combined, and departments that teach Turkish and Turkish Language and Literature Teachers ought to create successful curricula in this regard. These initiatives are crucial to ensuring that instructors, who are crucial to the analysis of literary texts and the teaching of literature, successfully employ the techniques (Günday, 2012: 15).

With text analysis or analyses, which have a very important place in Turkish language and literature education, students have the opportunity to understand the subtleties of language, the breadth of culture, and aesthetic value (MEB, 2018). Texts can be used as a tool to develop research skills and critical thinking skills, to understand the cultural context, and to make sense of the relationship between language and mind. Students can improve their grammar and language processing skills by using textual analysis. As a result, text analyses support students' intellectual development and enable them to learn texts related to language and literature in depth. In this context, it is thought that this research on how the students perceive the course content seen in the "text analysis methods" course, which is taught as a course for understanding and analyzing literary texts, each of which contains semantic integrity, what their views on the achievements of this course are, what they think about the importance of text analysis methods is important in terms of skills related to understanding and analyzing text in Turkish language and literature education. In this context, it is aimed to analyze and contribute to the literature by taking their opinions about the course taught for a semester. This study aims to collect and analyze the opinions of prospective Turkish language and literature teachers about the “text analysis methods” course

through a semi-structured interview form consisting of open-ended written questions, and to contribute to the literature by addressing their opinions on “text analysis methods” in the context of “Turkish language and literature education, teacher training and development”.

Purpose of the Study

In this study, which was prepared to determine the opinions of prospective Turkish language and literature teachers about the "text analysis methods" course in the context of language and literature education, answers to the following questions were sought.

- How do prospective Turkish language and literature teachers define the “text analysis methods” course?
- What kind of contributions do prospective Turkish language and literature teachers think that the “text analysis methods” course will make to their careers?
- What do prospective Turkish language and literature teachers think about the adequacy of the “text analysis methods” course duration?
- What do prospective Turkish language and literature teachers think about the importance of the “text analysis methods” course?
- How do the prospective teachers of Turkish language and literature evaluate the current content of the “text analysis methods” course in terms of scientificity and topicality?
- What opinions and suggestions do prospective Turkish language and literature teachers have to increase the efficiency and effectiveness of the course in terms of the learning-teaching process within the scope of the “text analysis methods” course?

Method

In this section, the research design, study group, data collection tools, reliability and validity, and data analysis are presented.

Research Design

The case study design, one of the qualitative research methods designs, was used in this study to examine the opinions of prospective Turkish language and literature teachers about the "text analysis methods" course in the context of language and literature education. A qualitative process is followed to reveal perceptions and events realistically and holistically in the natural environment, and qualitative research techniques provide sensitivity to the natural environment. The researcher has a participatory role, adopts a holistic approach, makes it possible for perceptions to be revealed, and has flexibility in the research process (Yıldırım & Şimşek, 2013: 45-47). Case studies are another name for it. It is employed to find solutions to scientific concerns because of its unique characteristics (Büyüköztürk et al., 2020: 24). There are several names for case studies. The case study, case

study, and case analysis formats are used to provide the material. It is referred to as a "case study" in English. Case study is widely regarded as an excellent technique, particularly in the area of language learning, and has made numerous contributions to the field of social sciences (Taghisoylu, 2022: 1161). Using a variety of sources, including interviews, observations, audio-visual materials, documents, and reports about various limited systems (situations) connected to a real-life, current situation, the researcher gathers information and presents case themes in a case study (Creswell, 2020: 99). The steps in a case study include identifying research questions, developing sub-problems, choosing instances or circumstances, choosing participants, gathering data, and interpreting that data. Even though it appears difficult, the case study is not conducted using a systematic process like other methods are. The case study's conclusions are typically gathered via techniques like documentation, archival records, interviews, direct observation, and participant observation (Poyraz, 2018: 49).

Study Group/participants

The study group for this research was chosen using the criterion sampling approach, one of the purposeful sampling techniques. The fundamental idea behind this sample is to look at all circumstances that fit a certain set of requirements. The researcher may devise the criteria or criteria mentioned below, or they may be taken from a list of criteria that have already been produced (Yıldırım & Şimşek, 2013: 140). The purpose of this sampling is to analyze and assess circumstances that fit certain predefined criteria. The purpose of this sampling is to analyze and assess circumstances that fit certain predefined criteria (Patton, 2014). The completion of the "text analysis methods" course was used as a factor in the selection of participants in the process of collecting data using the semi-structured interview form. Because they did not take the "text analysis methods" course, pre-service teachers enrolled in the first, second, and third grades of the pertinent faculty of education, where the data were collected, were excluded from the study. Participants in the study in this context are pre-service teachers who are enrolled in the 4th-grade Turkish language and literature education department of the education faculty of a university in Turkey. Table 1 contains personal data about the participants.

Table 1. Personal information of the participants

Participants	Age	Gender	Graduated High School
TC ₁	21	Female	Anatolian Imam Hatip High School
İTC ₂	21	Male	Anatolian High School
TC ₃	21	Female	Anatolian High School
TC ₄	21	Male	Anatolian High School
TC ₅	25	Female	Science High School
TC ₆	22	Female	Anatolian High School
TC ₇	23	Female	Anatolian High School
TC ₈	21	Female	Anatolian High School
TC ₉	21	Female	Anatolian High School
TC ₁₀	28	Female	Vocational and Technical Anatolian

Participants	Age	Gender	Graduated High School
			High School
TC ₁₁	23	Female	Social Sciences High School
TC ₁₂	23	Female	Anatolian High School
TC ₁₃	22	Female	Vocational and Technical Anatolian High School

The table above shows the distribution of pre-service teachers who took the "text analyzing methods" course according to their age, gender, and high school: The ages of the participants vary between 21 and 28. It is seen that 11 of the participants and 2 of them are male. It is noteworthy that the majority of the participants are women. The participants graduated from various secondary education/high school institutions. Anatolian High Schools, Science High Schools, Social Sciences High Schools, and Vocational and Technical Anatolian High Schools. This diversity shows that pre-service teachers who graduated from various high schools were in the classroom, participated in the research, and could contribute to the classroom discussions from various perspectives. Students attending Anatolian High Schools and Vocational and Technical Anatolian High Schools tend to be younger. On the other hand, the average age of individuals attending high schools such as Science High School or Social Sciences High School is higher. Anatolian High School (f=8), Vocational and Technical Anatolian High School (f=2), Social Sciences High School (f=1), Science High School (f=1), Anatolian Imam Hatip High School (f=1). It is seen that most Anatolian High School (f=8) graduates participated in the study. Two of the students who graduated from Anatolian High School (f=8) were male and the remaining six were female. It was determined that all of the pre-service teachers who graduated from other high schools were female in terms of gender.

Data Collection Tool

In the study, a semi-structured interview form was employed to collect data using the semi-structured interview technique. In this method, the interview questions are prepared before, but during the interview, the interviewees are given some latitude and the questions can be rearranged and discussed. The interviewees also have control over the research in this kind of interview (Ekiz, 2009: 63). Fixed-choice responses and the capacity to delve deeply into the pertinent field are both combined in semi-structured interviews. The ability to easily analyze the data, letting the interviewees express themselves, and offering in-depth information as needed are the main benefits of semi-structured interviews (Büyüköztürk et al., 2020: 159). Studies utilizing qualitative research techniques are expanding in the social sciences. One of the most popular methods for gathering data in qualitative research across a range of subjects and disciplines is the interview, particularly the semi-structured interview (Polat, 2022: 161). The study's interview questions were carefully crafted to be simple to grasp and devoid of extraneous guidance for the participants. To determine whether the questions were relevant, clear, and pertinent to the research themes, we sought the advice of subject matter experts. Following the advice of two lecturers who are authorities in respective domains, a 6-question open-ended interview form was created. The

form was used, interviews were completed, and data was collected when there were no issues. Six pre-service teachers who were not a member of the research group were assessed by asking these questions to pilot-check the readability and comprehension of the interview questions. The semi-structured interview form was expanded to include a "personal information" component for the participants to complete.

Validity and Reliability

Credibility and transferability are two ways that the concept of validity is expressed in qualitative research. Consistency and confirmability are two ways to describe reliability (Yıldırım & Şimşek, 2013). Instead of using the ideas of validity and reliability in this study's qualitative research methodology, it would be more accurate to utilize the terms credibility, transferability, consistency, and confirmability. Validity and reliability are quantitative research-specific concepts that are incompatible with the fundamental ideas and paradigm of qualitative research (Mills, 2003). The focus of content analysis is "inter-coder consensus" in the data analysis (Creswell, 2020). The reliability formula $\text{Reliability} = \frac{\text{Consensus}}{\text{Consensus} + \text{Disagreement}} \times 100$ was used for the coding of both investigations (1994, Miles & Huberman). According to Yıldırım & Şimşek (2013), coding dependability has been attained when there is an agreement rate of 70% or above. The researcher and a faculty member with experience in separate coding of qualitative research also compared the data gathered during the interview in terms of consistency rate.

A thorough account of the research method is one of the key requirements for demonstrating validity and reliability in qualitative research. It should be clear how the participants were chosen, the selection criteria, the instruments used and how they were prepared, the data collection methods, and the analysis and interpretation methods. Therefore, the essence of dependability and validity is accurately reporting the full study procedure as it occurred (Batdı, 2021: 225).

Analysing of Data

In the study, content analysis was used to categorize and assess the information gathered based on the opinions of prospective Turkish language and literature instructors regarding the "text analysis methods" course in the context of language and literary education. The systematic, comprehensive, and intentional investigation of the contents of interviews, field notes, and written materials is known as content analysis. All forms of text content are the focus of content analysis. These include all genres of texts, including books, journals, etc., as well as verbal expressions from television, ads, and other visual mediums that have been translated into writing. Understanding the meaning of the text's content and its primary emphasis on interpreting it within this context is the goal of content analysis (Bal, 2021: 250). The clear and observable substance of messages can be explained via content analysis in a measured, quantifiable, and verifiable fashion (Cevher, 2015: 391). Finding concepts and correlations that can explain the data that has been gathered is the major goal of content analysis. The data that were summarized and interpreted in the descriptive analysis are subjected to more thorough processing in content analysis, and as a result, concepts and themes that were missed by the descriptive technique might be

identified. The gathered data must first be conceptualized for this goal, after which it must be logically structured by the new concepts and themes that are forming (Yıldırım & Şimşek, 2013). Based on the content analysis technique, frequency analysis and category analysis were performed. By quantifying how frequently events happen throughout time in numerical, percentage, or proportional forms, frequency analysis aids in our understanding of the significance and intensity of various phenomena. Using this analysis method, items are rated in terms of importance, and a frequency-based classification is produced. Contrarily, in categorical analysis, a given message or set of data is first separated into units and then classified by specified criteria. This stage includes the coding of messages or the interpretation of their significance. The meaning units or items are grouped into groups after which the frequencies of the items within each category are computed. These analyses aid in the more meaningful organization and interpretation of the data (Bilgin, 2006). An approach called content analysis enables objective, systematic investigation of verbal, textual, and other information (Tavşancıl & Aslan, 2001). The most cutting-edge research techniques and methodologies are used in every branch of science. The social sciences typically employ the content analysis method. One effective method for locating overarching themes connected to the research topic is content analysis. This method also offers recommendations for further scientific investigation. Both qualitative and quantitative methods can be used when applying content analysis approaches. To get at the truth in qualitative content analysis, the method begins by posing “what, why, and how” questions. This context attempts to disclose some implicit messages that are not immediately visible (Metin & Ünal, 2022: 275). Descriptive (how, what, etc.) and explanatory (why) inquiries are common in qualitative content analysis studies. Instead of focusing on the content's obvious dimensions, the goal is to find hidden messages or messages (Yüksel, 2019: 142). According to the qualitative research methodology, this study was carried out. Using the content analysis method, the data were categorized, themes and codes were identified, and then the results were defined and interpreted. The study comprises the thoughts on the "text analysis methods" course from aspiring Turkish language and literature instructors. The data was gathered using semi-structured interview forms, and similar statements, categories, and codes were created. Themes, categories, codes, frequency distributions, and percentages were displayed in tables. The viewpoints of pre-service instructors were substantiated by direct citations from them. The researcher's professional judgments also had an impact on how appropriate the results were. By talking about the agreed-upon and debated topics regarding the findings, themes and categories were created. The data were coded using the study's questions, after which they were categorized and displayed in tables with frequencies and percentages. Participant comments support the results in the tables. Participants' points of view were communicated, and codes for objectivity and dependability were provided to them. Although the opinions of the participants were clearly articulated and coded in this framework, acronyms based on coding were made for each of them as “Turkish language and literature teacher candidates” (TC1, TC2, etc.).

Research Ethics

Permission was granted by the Atatürk University Social and Human Sciences Ethics Committee Educational Sciences Unit Ethics Committee's decision dated January 16, 2023 and numbered 01/07.

Findings and Comment

The results for the sub-problems related to the study of perspective Turkish language and literature teachers' perceptions of the "text analysis methods" course in the context of language and literature education are presented in this part. The findings were analyzed and presented in tables with themes, codes, participants, frequencies, and perceived frequencies in this context. The findings related to the definition of the text analysis methods course, its contributions to pre-service teachers, the appropriateness of the course duration, the evaluation of the course content in terms of scientificity and topicality, the importance of the course for pre-service teachers, and the opinions on increasing the efficiency and effectiveness of the course.

Table 2. Pre-service teachers' opinions on the question "How would you define the concepts that you think should be included in the content of the course "text analysis methods"?"

	Participants	Code	<i>f</i>	%
Description of Text Analysis Methods Course	TC ₃ , TC ₄ , TC ₆	No response	3	23,07
	TC ₇ , TC ₁₁ , TC ₁₃	A course that examines many prose writing genres, including stories, novels, myths, and folktales	3	23,07
	TC ₉ TC ₁₀ , TC ₁₂	A fruitful lesson that enables thorough text analysis	3	23,07
	TC ₁	A course covering topics including the definition of text, what constitutes a text, and what qualities a good text must have, including content and how to conduct text analyses	1	7,69
	TC ₂	A Course covering ideas like context, semantics, and syntax	1	7,69
	TC ₅	A Course that teaches literary text analysis	1	7,69
	TC ₈	A self-explanatory Course	1	7,69
	Total			13

When Table 2 is examined, "How would you describe the concepts that you think should be included in the content of the text analysis methods course for prospective teachers?" TC3, TC4, TC6; It seems that these participants did not express their opinions about the content of the course. This shows that these participants avoid expressing their opinions regarding the course description. TC7, TC11, TC13; These participants see the course as an analysis of prose genres such as stories, folk tales, legends, and novels. These students stated that the main emphasis of the course was the analysis of various literary genres. TC9 TC10, TC12; these participants see the course as a productive opportunity for text analysis. They seem to emphasize that the course is designed to help students become better at reading materials closely. TC1; According to this participant, the course content includes the concept of text, its prerequisites, and the characteristics of a good text. He stated that the course emphasized basic text features. TC2: In this perspective, the organizational chart of the course is explained by focusing on grammatical and semantic structural ideas such as syntax, semantics, and context. The course aims to examine the linguistic and semantic organization of texts. TC5; According to this participant, the course emphasizes teaching literary text interpretation. He defined it as a course that emphasizes the need to understand the concepts, content, and grammatical structures of literary texts. In general, in the answers given to this question, the opinions of prospective teachers about the content of the "text analysis methods" course are diverse. Some did not express their opinions, some understood the course as literary genre analysis, some evaluated it as an opportunity for text analysis, and some stated that the course was on text features or grammar-semantic structure analysis. Teaching literary text interpretation is also a prominent perspective. These different perspectives show that the goal and content of the course are approached from different angles.

Some of the participants' views on the subject are quoted below:

"Text analysis methods course; "Is a course that includes topics such as the definition of a text, the conditions for being a text, the characteristics that a good text should have, and in which the student can actively participate by analyzing these topics through sample texts." (TC1)

"Concepts such as syntax, semantics, and context may be included." (TC2)

"I think we learned important concepts about how to evaluate any literary text." (TC5)

"I find it sufficient, I do not think there is a need to explain it with other concepts." (TC8)

"Texts are the mention of folk legends, idioms, and proverbs mentioned in the texts. "I think these should happen." (TC11)

"In addition to a superficial reading of a text, we understand what the author wants to tell us by examining the story in depth." (TC12)

Table 3. Pre-service teachers' opinions on the question "In which ways do you think this course will contribute to you in your professional career?"

Contributions to Their Professional Careers	Participants	Code	f	%
	TC ₂ , TC ₄ , TC ₇ , TC ₈ , TC ₁₂	Contribution on how to analyze a text, what to pay attention to when examining a text	5	38.46

TC ₁ , TC ₁₀ , TC ₁₃	Contribution to in-depth text analysis	3	23.07
TC ₃ , TC ₉	Contribution to understanding the importance of the text in the context of textuality criteria	2	15.38
TC ₆ , TC ₁₁	Contribution to explaining the texts in textbooks and presenting different perspectives	2	15.38
TC ₅	A course in which concepts about how literary texts are analyzed are taught	1	7.69
Total		13	100

When examining Table 3, it can be seen that participants with codes TC₂, TC₄, TC₇, TC₈, and provided frequencies (*f*) and percentages (%) of the contributions they believe the 'text analysis methods' course will offer to their professional careers in response to the question, 'In what ways do you think this course will contribute to your professional career?' According to this group of participants, 4 participants (38,46%) expressed that the course provided contributed to helping them understand how to analyze texts and what to pay attention to in text analysis. TC₁, TC₁₀, and TC₁₃, 3 participants in total (23,07%) stated that their skills in analyzing texts in depth were improved. Participants with codes TC₃ and TC₉, a total of 2 participants (15,38%), advocate the contribution of understanding the significance of a text in the context of textual criteria. Participants with codes TC₆ and TC₁₁, totaling 2 participants (15,38%), stated that the course provided contributions to explaining texts in textbooks and offering different perspectives. The participant with code TC₅ (7,69%) stated that this course enhanced their skills in understanding and valuing texts. The responses to this question indicate that teacher candidates evaluating the contributions of the 'text analysis methods' course to their professional careers hold various opinions. Participants expressed that the course provided skills in text analysis (38,46%), improved abilities in in-depth analysis (23,07%), supported understanding the importance of texts (15,38%), contributed to explaining texts in textbooks, and offered different perspectives (15,38%), and enhanced skills in understanding and evaluating texts (7,69%). These findings reflect diverse perspectives on how the course can impact professional development in various aspects.

Some of the participants' views on the subject are quoted below:

"When the topics of stories and novels were covered in the course, it taught me how to approach the text as a teacher - how to examine the text under which headings, and how to present it to the students. Personally, it also allowed me to see a text differently in every sense. I don't read texts empty-mindedly; I look at them differently. I delved into many literary details in the texts I read..." (TC₇)

“Up until now, when I analyzed a text, I generally touched on certain main points. However, I believe that this course has contributed to my attention to the conditions (criteria) for a text, coherence, cohesion principles, etc.” (TC₉)

“I believe that I will be able to explain texts correctly to students while doing my profession. I think that by not just looking at texts superficially, I will also bring creative yet realistic interpretations, and I believe I can convey this to my students.” (TC₁₀)

“I believe that the texts included in Turkish language and literature textbooks will be better understood.” (TC₁₁)

“In teaching practice courses, I observed that students were indifferent to literature classes. I believe that what I learned from the text analysis methods course will greatly contribute to me in explaining a text to students and in making them love a text.” (TC₁₂)

Table 4. Do you find the two-hour duration of the course in the program sufficient, why? Opinions on the question

Sufficiency of Lesson Duration	Participants	Code	f	%
		TC ₁ , TC ₂ , TC ₃ , TC ₄ , TC ₅ , TC ₆ , TC ₇ , TC ₉ , TC ₁₀ , TC ₁₁ , TC ₁₂ , TC ₁₃	Insufficient lesson time	12
	TC ₈	Lesson time is sufficient	1	7.69
Total			13	100

When Table 4 is examined, “Do you find the two-hour duration of the course in the program sufficient?” When Table 4 is examined, “Do you find the two-hour duration of the course in the program sufficient?” Why? The question shows the participants' perspectives on the adequacy of the two-hour class period. According to the distribution of opinions, only one participant TC₈ (7,69%) found the course duration sufficient, while the majority of the participants found the course duration in TC₁, TC₂, TC₃, TC₄, TC₅, TC₆, TC₇, TC₉, TC₁₀, TC₁₁, TC₁₂, TC₁₃ (92,31%). He believes that not enough time has been allocated for this. The fact that the majority of participants found the duration of the course insufficient may be due to the intense content of the course or the inability to fully cover the topics covered. It has been determined that a two-hour lesson duration is not considered sufficient time for effective explanation of the lesson, effective learning, and comprehension. It may be considered that additional time is needed, especially for technical, in-depth, or comprehensive training. However, it is noteworthy in the table that only one participant (TC₈) stated that he found the lesson hours sufficient. This participant may have enjoyed the course structure, topic, or teaching method more. This person, who believes that he can complete the course objectives more effectively, may have believed that a shorter period was sufficient due to his previous experiences or learning habits. In general terms, as shown in the table, the majority of respondents think that the course duration is insufficient.

Some of the participants' views on the subject are quoted below:

“I do not find the two-hour duration of the text analysis methods course sufficient. Because there were times when each person in our class was insufficient to examine and analyze a text in detail and a descriptive manner within the context of the topics we covered in the course.” (TC₁)

“I do not find the course duration sufficient. Because there are many topics to be explained and covered. I don't think it's a lesson that can be taught superficially...” (TC₄)

“Two hours of class time is not enough because it takes a long time to handle, analyze, and interpret every aspect of a text.” (TC₉)

“I do not find the time sufficient. Because learning the concepts first and then doing practice-based activities during the course is only sufficient for permanent learning.” (TC₁₃)

Table 5. How do you evaluate the current content of the "text analysis methods" course in terms of scientificity and topicality? Opinions on the question

Scientific and up-to-date Course Content	Participants	Code	f	%
	TC ₁ , TC ₂ , TC ₃ , TC ₄ , TC ₅ , TC ₆ , TC ₇ , TC ₈ , TC ₉ , TC ₁₀ , TC ₁₁ , TC ₁₁ , TC ₁₃	Current content is scientific and up-to-date	13	100
Total		13	100	

When Table 5 is examined, how do you evaluate the current content of the “text analysis methods” course in terms of scientific and up-to-date? It shows that all participants (100%) evaluated the course content positively in terms of being up-to-date and scientific. The fact that each participant found the course content up-to-date and scientific suggests that the course offers students an approach based on scientific methodology by providing relevant information. This may indicate that the course provides students with an in-depth understanding of these fields by providing students with information from reliable and up-to-date sources. The findings show that the content of the “text analysis methods” course was generally evaluated positively in terms of scientific and up-to-date. Such comments can also be seen as an important sign that the course is considered important.

Some of the participants' views on the subject are quoted below:

“The concepts we see in the course content are extremely scientific. Thanks to these, we learned to approach a text scientifically. I think it is up to date.” (TC₂)

“We learned how to look at texts from a scientific perspective. In terms of topicality, we obtained information about new literature and examined impressions through the texts examined and stories taken from contemporary literature.” (TC₆)

“We use different articles and scientific writings when examining the texts in this course. This adds a scientific nature to the lesson.” (TC₉)

“We evaluated the content of the texts covered in the course in terms of their relevance to today's issues and their scientific nature.” (TC₁₁)

Table 6. What do you think about the importance of the “text analysis methods” course as a Turkish language and literature teacher candidate? Opinions on the question

The Importance of Text Analysis Methods Course	Participants	Code	<i>f</i>	%
	TC ₁ , TC ₂ , TC ₇ , TC ₈ , TC ₁₀ , TC ₁₁	Understanding and analyzing the text based on scientific foundations	6	46.15
	TC ₆ , TC ₉ , TC ₁₂ , TC ₁₃	Gaining different perspectives and higher-level thinking skills	4	30.76
	TC ₃	Understanding and making sense of literature	1	7.69
	TC ₅	Understanding the text, providing critical reading	1	7.69
	TC ₄	No answer	1	7.69
Total		13	100	

When Table 6 is examined, participant perspective teachers' responses to the question “What do you think about the importance of the 'text analysis methods' course for prospective teachers of Turkish language and literature?” can be summarized as follows: According to prospective teachers who have a scientific perspective on text comprehension and analysis, the main purpose of the course in "text analysis methods" for prospective Turkish language and literature teachers TC₁, TC₂, TC₇, TC₈, TC₁₀, and TC₁₁ - 46.15%) is to understand texts and analyze them using scientific methods. These prospective teachers emphasize the importance of methodical and analytical techniques for grasping the fundamental structures, themes, symbols, and language usage in texts. It can be said that these prospective teachers prioritize teaching students how to understand and critically examine texts.

Participants with codes TC₆, TC₉, TC₁₂, and TC₁₃ (30,76%) have different perspectives and focus on using critical thinking skills in this context. They believe that critically analyzing texts is important, and they emphasize the significance of examining texts from various angles. It can be inferred that supporters of this view believe that teaching how to examine texts from various perspectives will strengthen their intellectual flexibility and enhance their capacity for in-depth analysis.

The participant with code TC₃ is focused on understanding and interpreting literature. According to this prospective teacher, the course in "text analysis methods" is particularly important for understanding and interpreting literary works. This perspective highlights that the course helps reveal how the language, theme, style, and narrative in a literary work are influenced.

Prospective teacher participant with code TC₅ (7,69%) believes in the importance of focusing on understanding the text and developing critical reading skills. This perspective emphasizes that the course has a significant

impact on students' knowledge of texts and the development of their critical reading skills. It highlights the importance of not only superficially understanding texts but also delving deeper into comprehension and learning how to analyze conveyed information.

Additionally, there is a participant in the table who did not respond to the question. Therefore, the perspectives of prospective teachers regarding the "text analysis methods" course reflect various aims, such as assisting in understanding and analyzing texts, evaluating from different perspectives, and enhancing critical thinking skills. These diverse perspectives demonstrate the different ways in which the course's effects manifest.

Some of the participants' views on the subject are quoted below:

“As a prospective teacher of Turkish language and literature, the 'text analysis methods' course has very important functions in terms of the gains. These include understanding and analyzing the text, approaching the text with different thinking skills.” (TC₁)

“I think this course has significant benefits. Because, without the text, there is no literature. Literature is filled with texts. Therefore, to understand literature, we need to understand the text.” (TC₃)

“I think the course has added a lot to us in our field. With this course, we understood how to do critical reading through texts. I think it is an important field course for us.” (TC₅)

“As a literature teacher, I think it is a very important and useful course. Because when analyzing a literary text, first of all, it improves reading because we read that text carefully. It enables analytical and versatile thinking.” (TC₉)

Table 7. What can prospective teachers do to increase the efficiency and effectiveness of the course in terms of the learning-teaching process? Opinions regarding the question

	Participants	Code	f	%
Recommendations for the Efficiency and Effectiveness of the Course in Terms of the Learning-Teaching Process	TC ₁ , TC ₁₁	Addressing more senses with the help of technological tools in examining texts	2	15.38
	TC ₇ , TC ₁₀	Focus on text reviews	2	15.38
	TC ₄ , TC ₉	Increase the duration of the lesson	2	15.38
	TC ₅ , TC ₁₂	Focusing on practices and activities	2	15.38
	TC ₃ , TC ₆	No suggestions	2	15.38
	TC ₈	Preparing before a text studies class	1	7.69
	TC ₁₃	Focusing on event-based literary text analysis	1	7.69
	TC ₂	Text review assignment	1	7.69
Total			13	100

When Table 7 is analyzed, the following statements emerged in the responses of the pre-service teachers to this question: "What steps can be taken to increase the efficiency and effectiveness of the lesson in the learning-

teaching process?": TC₁ and TC₁₁ (15,38%) agree that using technology techniques to appeal to more senses and combining technological tools can increase the effectiveness of the lesson. They think that using interactive, auditory, or visual elements can help to better assimilate texts by providing more sensory experiences. TC₇ and TC₁₀ coded pre-service teachers (15,38%) stated that text analyses should be emphasized. TC₄ and TC₉ (15,38%) suggested that the duration of the course should be increased. It is thought that a longer time frame can allow examining the texts in more detail and help the development of in-depth analysis skills. TC₅ and TC₁₂ (15,38%) argued that more emphasis should be placed on practices and activities to increase the effectiveness of the course. It is thought that the effectiveness of the learning process can be increased by students' practical experiences and active participation in textual analysis. TC₃ and TC₆ (15,38%) did not make any suggestions. TC₈ (7,69%) strongly emphasized the need to plan the "text analysis methods" course. Students think that they can be better prepared for the course by accessing the texts in advance or having the chance to study the materials. TC₁₃ (7,69%) suggested giving more importance to event-based literary text analysis in the course material. TC₂-coded pre-service teachers (7,69%) stated that text analysis assignments should be given. This suggestion reflects the aim of the course to increase both students' learning capacities and their participation in the learning-teaching process. In this way, it is thought that by providing pre-service teachers with the opportunity to examine certain texts independently, it is thought that it can help to develop their in-depth understanding of the text and their capacity to analyze texts. The pre-service teacher thinks that there are benefits to developing critical thinking skills and making in-depth literary analyses. Text analysis assignments can allow students to create their methods for text analysis and develop their understanding of many aspects of texts. This approach can enable students to explore texts more independently and engage in active learning.

Some of the participants' views on the subject are quoted below:

"By using visual or auditory tools such as video, audio, recording, etc., texts can be given in a way that appeals to more senses and students' learning can be made permanent." (TC₁)

"To make the lesson effective and efficient, students can be given text analysis homework."

"Course hours should be increased, two hours a week is not enough..." (TC₄)

"The theoretical part of the course can be tiring. Therefore, it is important to emphasize applications in terms of understanding the basic concepts." (TC₅)

"Text analyses in different genres can be emphasized." (TC₇)

"To teach the course efficiently, preparation should be done before the lesson." (TC₈)

"I think that the course will be more productive when analyses are made on more event-based texts." (TC₁₃)

Conclusion, Discussion, and Recommendations

Various results were obtained in this study, which was prepared to examine the opinions of Turkish language and literature teacher candidates regarding the "text analysis methods" course in the context of language and literature education. According to the distribution of the participating teacher candidates who took the "text

analysis methods" course according to age, gender, and the type of high school they graduated from; It was determined that the participants were between the ages of 21 and 28. Although there were only two male participants out of a total of 13, the majority of the participants, namely 11 teacher candidates, were female. While teacher candidates who graduated from Anatolian High Schools and Vocational and Technical Anatolian High Schools represent younger age groups, those who graduated from Science High Schools or Social Sciences High Schools represent older age groups.

The results of the research regarding the definition of the content of the "text analysis methods" course show that prospective teachers have different perspectives on the subject of the course. While some participants preferred not to express their opinions about the content of the course, others appeared to focus on specific course components such as analysis of various literary genres, text analysis, and literary text interpretation. The results of the research coincide with the purpose of the "text analysis methods" course, which is to provide teacher candidates with the knowledge and skills to understand, evaluate, and interpret literary texts. In addition, prospective teachers expressed the opinion that it is important to focus on grammar and semantic structure analysis of the course.

It was determined that prospective teachers discussed the benefits of the course in various ways within the scope of their views on what benefits the text analysis methods course would provide to their professional careers. While some participants said that it helped them understand the issues that need to be taken into consideration in text analysis and text analysis, some participants stated that it increased their skills in doing in-depth text analysis. Participants stated that the course made significant contributions to their understanding of the importance of the text by emphasizing textuality criteria. In addition, these results, in which prospective teachers evaluated the benefit of the course on their professional careers from various perspectives, reveal that the course offers prospective teachers a rich learning experience in various ways.

Regarding whether the prospective teachers found the two-hour duration of the course in the program sufficient, only one participant found the duration of the course sufficient, while the majority of the participants thought that not enough time was allocated for the course. The reason for this may be that the course content is intense or the topics presented cannot be examined in depth. It turns out that additional time is needed for the course to be taught successfully, for students to learn more effectively, and for the course objectives to be fully achieved. However, the fact that only one of the teacher candidates found the length of the course sufficient also shows that individual experiences and learning styles can affect how much time is taken into consideration. As a result, an important topic of discussion has been raised regarding the duration of the course so that the course can be taught more effectively and completely. In addition, it can be said that the typical tendencies of teacher candidates regarding the length of the course duration have emerged. As a matter of fact, in some studies conducted in recent years in which the opinions of prospective teachers about various courses were discussed, it was stated that "the duration of the course should be increased"; research conducted by Bartan (2019), Coşkun (2020), Aslan (2021), Oğur (2022), Şahin (2023) are included in the literature.

It is understood that 100% (all) of the participants expressed their opinions about how scientific and up-to-date the content of the "text analysis methods" course was expressed by teacher candidates in favor. The fact that all participants believe that the course content is up-to-date and scientific can be considered an indicator that the course is taught within the framework of a scientific methodology based on reliable and up-to-date sources. This can also be seen as an important indicator that the course strengthens scientific thinking by giving students in-depth information on related topics. Participants' positive evaluations of the course content highlight how much importance students attach to the quality and content of the course. These results are very important as they reveal that the "text analysis methods" course benefits learners by showing that it has relevant and up-to-date content for academic learning processes.

The answers given to the question regarding teacher candidates' views on the importance of the "text analysis methods" course reveal different perspectives. Different perspectives emerge among the participating teacher candidates regarding "reading, interpreting and critically evaluating texts". While some pre-service teachers emphasize that the primary goal of the course is to examine and understand texts from an analytical perspective, others refer to critical thinking skills by weighing many perspectives and ideas. There are also teacher candidates who focus on examining and understanding literary works. This diversity demonstrates how the course impacts student teachers in a variety of ways and helps them acquire a range of skills for working effectively with texts. The fact that some teacher applicants declined to respond to the question also merits mention because it illustrates the diversity of their viewpoints and attitudes. In light of this, it can be claimed that the "text analysis methods" course provides aspiring teachers with a learning opportunity that takes into account many points of view and aids in the development of their comprehension, analytical, and critical thinking skills.

What actions can be taken to improve the course's efficiency and effectiveness in the learning-teaching process? is the question posed to prospective teachers. It covers a variety of tactics, such as the use of digital tools, interactive teaching tools, and a larger focus on text analysis. Additionally, concepts like extending the course's duration, emphasizing practices and activities, and preparing students for the course in advance with assignments draw attention. These recommendations from teacher candidates demonstrate the need for different approaches and tactics to be developed for the course to give students a more beneficial and effective learning experience. Projects involving the analysis of texts, in particular, can help students hone their analytical and independent thinking skills. This variety is due to the need to compare various approaches, techniques, and methodologies to raise the course's success as well as the fact that pre-service teachers have a lot of suggestions for how to enhance the curriculum and the learning process.

In general, the results of the research; show that prospective teachers have different perspectives on the topics covered in the "text analysis methods" course. This diversity shows that a wide range of topics are covered in the course material, including literary genre analysis and text interpretation. Pre-service teachers' different perspectives on the aims of the course show that they are consistent in terms of developing students' skills in understanding, evaluating, and interpreting literary texts. The outputs of the participants in terms of achieving

the outcomes of the course, developing text analysis skills, comprehending the criteria of textuality, and affecting the professional careers of pre-service teachers emphasize the importance of the course as an educational tool. The different opinions about the duration of the course in the program are a reflection of the fact that the content of the course should help students develop in-depth analytical skills. According to the opinions that the content of the course is up-to-date and scientific, it teaches students to think scientifically with data from reliable sources. The pre-service teachers' different perspectives on the importance of the course reflect various learning objectives in terms of developing comprehension, analysis, and critical thinking skills. As a result, pre-service teachers' suggestions for improving the effectiveness of the course range from technological integration to practice-oriented learning. According to the results of the research conducted by Altınok (2012), pre-service Turkish language and literature teachers stated that they could use technology effectively outside the university education process or that their previous educational experiences may have shaped this attitude. The fact that there is a positive attitude toward technology, in general, is considered an indicator that pre-service teachers have a positive approach toward instructional technologies.

These suggestions emphasize the need to combine more than one strategy, method, and technique to provide a richer and more effective learning environment. The aim is to develop a learning environment that can meet the different learning preferences of pre-service teachers.

The constructivist approach has enabled the use of new student-centered strategies, methods, and techniques in educational environments. Thus, collaborative teaching practices developed with the constructivist approach have replaced traditional classroom and teacher-centered teaching activities (Taş & Akoğlu, 2020: 959). One of the most important factors in achieving the desired success of a learning-teaching activity is the strategy, method, and technique preferred by the teacher (Yılmaz, 2017: 493). Therefore, as in every business, it is very difficult to conduct lessons without a program and plan. Therefore, it is vital to prepare for the lessons in advance. In addition to programs and plans, strategies, methods, and techniques that determine the way the lessons are taught and the way they are applied constitute the basis of these preparations (Arıcı, 2006: 299). The selection and application of teaching strategies, methods, and techniques is the most important decision to be made while structuring the learning-teaching process. To create a quality learning-teaching process, it is of great importance for teachers to be aware of how the strategies, methods, and techniques they choose affect student learning and the issues to be considered when using them (Uysal, 2010: 1). According to Uyar & Doğanay (2018: 196), it was determined that the application of student-centered strategy methods and techniques in various courses increased students' academic achievement.

Based on the research results, we can make the following suggestions:

- Investigating how the text analysis methods course can be more successfully adapted to various learning preferences and styles can contribute to language and literature education. These studies can provide more detailed data on how teacher candidates can achieve different pre-service learning goals. In this context, prospective teachers need to understand technology integration and how they can use

different strategies, methods, and techniques more competently in lessons to increase the effectiveness of the course in light of their suggestions. Therefore, how technological resources such as online resources, interactive platforms, or digital analysis tools can be included in the course content and their impact on student success can be examined in more detail.

- Long-term monitoring and evaluation studies can be conducted to determine how the text analysis methods course can further contribute to the professional development of teacher candidates. More information can be obtained about the long-term effects of the course by conducting studies on how prospective teachers apply what they learn in this course after graduation and how this knowledge affects their professional careers. Such research can enable us to see how the knowledge and skills acquired by students are applied in the learning-teaching process and to understand their situation more clearly.
- Similar research on teacher candidates can be conducted to determine how teachers who are actively working with different genders, age groups, or high school types interpret the course and how they achieve various learning goals. These studies can help us understand how to more accurately portray the inclusivity and diversity of the course. In addition, more comprehensive impact evaluation studies can be conducted to analyze the impact of the course on student success and the extent to which students achieve course outcomes. These studies can help obtain more definitive results by providing quantitative and qualitative evidence about the effectiveness of the course.
- The issue of how critical thinking and literary analysis skills can be improved through course content and teaching practices can be discussed in line with the suggestions of prospective teachers. Effective methods and techniques that will enable students to know their in-depth text analysis and interpretation skills can be researched in this field.
- It can be examined how the text analysis methods course can provide a stronger harmony with literature education. In this way, it can help us understand how to provide students with text analysis skills while also providing a deeper understanding of literary works. These studies can form the basis for research on the success of the “text analysis methods” course and the pedagogical contributions it offers to teacher candidates.
- Lesson durations, which are frequently mentioned by teacher candidates in their opinions about the “text analysis methods” course, can be increased by taking into account the theoretical and practical dimensions.

References

- Aktaş, Ş. (2009). Edebî metin ve özellikleri. *Atatürk Üniversitesi Türkiyat Araştırmaları Enstitüsü Dergisi*, 15(39), 187-200. <https://dergipark.org.tr/en/pub/ataunitaed/issue/2878/39638>
- Algül, F. N. ve Selçuk, S. (2019). “Kitapların dünyasında edebî aydınlanma türk dili ve edebiyatı konularının etkili öğretimi için edebi eserlerden yararlanma: Mai ve Siyah ile Servet-i Fünûn Örneği” *bilar: Bilim Armonisi Dergisi*, 2(2): 45-51. doi: 10.37215/bilar.2019257648

- Altınok, Ş. (2012). Türk dili ve edebiyatı öğretmen adaylarının eğitimde teknoloji kullanımına yönelik tutumlarının değerlendirilmesi. *Eğitim Teknolojileri Araştırmaları Dergisi*, 3(2). <https://www.academia.edu/46169281>.
- Arıcı, A. F. (2006). Türkçe öğretiminde kullanılan strateji-yöntem ve teknikler. *Atatürk Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 7(1), 299-307. <https://dergipark.org.tr/en/pub/ataunisobil/issue/2817/37941>
- Aslan, C. (2021). Uzaktan eğitimle yürütülen özel eğitim dersine ilişkin müzik öğretmeni adaylarının görüşleri. *Buca Eğitim Fakültesi Dergisi*, (52), 648-665. <https://doi.org/10.53444/deubefd.980959>
- Aykanat, T. (2012). Karşılaştırmalı edebiyat bilimi ve karşılaştırmalı bir metin tahlili örneği. *Electronic Turkish Studies*, 7(3),409-427.
- Bal, H. (2021). *Nitel araştırma yöntem ve teknikleri (uygulamalı-örnekli)*. 2. baskı. Sentez Yayıncılık.
- Balcı, V. (2014). *Liselerde Türk dili ve edebiyatı öğretiminin değerlendirilmesi*. (Tez No.117299). [Doctorate dissertation, Anadolu University, Eskişehir]. Council of Higher Education (YÖK) National Theses Center.
- Bartan, M. (2019). Okul öncesi öğretmen ve öğretmen adaylarının okul öncesi öğretmen yetiştirme lisans programı hakkında görüş ve önerileri. *Dumlupınar Üniversitesi Eğitim Bilimleri Enstitüsü Dergisi*, 3(1), 24-36. <https://dergipark.org.tr/en/pub/debder/issue/43652/514123>
- Batdı, V. (2021). *Nitel verilerin toplanması ve analizi. Eğitimde araştırma yöntemleri temel kavramlar, ilkeler ve süreçler içinde*.(ss.201-228). B. Çetin, M. İlhan, M.G. Şahin (Ed.). Pegem Akademi Yayıncılık.
- Bilgin, N. (2006). *Sosyal bilimlerde içerik analizi, teknikler ve örnek çalışmalar*. Siyasal Kitapevi.
- Büyüköztürk, S., Çakmak, E., Akgün, Ö.E., Karadeniz, S., & Demirel, F. (2020). *Eğitimde bilimsel araştırma yöntemleri*. 29. baskı. Pegem Akademi Yayıncılık.
- Cevher, E. (2015). Kamu üniversiteleri web sayfalarının kullanılabilirliğinin içerik analizi ile incelenmesi. *Gaziantep University Journal of Social Sciences*, 14(2), 387-402. <http://jss.gantep.edu.tr>
- Coşkun, M. K. (2020). Sosyal bilgiler öğretmen adaylarının okul uygulaması dersine yönelik tutumlarının incelenmesi. *Uluslararası Sosyal Bilgilerde Yeni Yaklaşımlar Dergisi*, 4(1), 45-61. <https://doi.org/10.38015/sbyy.667685>
- Creswell, J.W. (2020). *Nitel araştırma yöntemleri beş yaklaşıma göre nitel araştırma ve araştırma deseni*. Gözden geçirilmiş 5. baskı. (M. Bütün & S.B. Demir (Çev. Ed.). Siyasal Kitabevi.
- Çetişli, İ. (2006). Edebiyat eğitiminde edebi metnin yeri ve anlamı. *Milli Eğitim Dergisi*, 34 (169), 1-10. <https://dergipark.org.tr/en/pub/milliegitim/issue/36938/422341>
- Demir, A., & Açık, F. (2011). Türkçenin yabancı dil olarak öğretiminde kültürlerarası yaklaşım ve seçilecek metinlerde bulunması gereken özellikler. *Türklük Bilimi Araştırmaları*, (30), 51-72. <https://dergipark.org.tr/en/pub/tubar/issue/16971/177327>
- Ekiz, D. (2009). *Bilimsel araştırma yöntemleri*. Genişletilmiş 2. baskı. Anı Yayıncılık.
- Göçer, A. (2014). Türk dili ve edebiyatı öğretiminde ölçme ve değerlendirme (ss. 183-227), İçinde Türk dili ve edebiyatı öğretimi (Pedagojik formasyon öğrencileri için. Eds.: M. D. Erdem ve A. Akkaya. Pegem Akademi Yayınları.

- Göçer, A. (2016). Öğretmen rolleri ve öğrenci etkililiği bakımından Türk dili ve edebiyatı eğitiminde metin çözümleme süreci. *Afyon Kocatepe Üniversitesi Sosyal Bilimler Dergisi*, 18(2), 115-131. <https://dergipark.org.tr/en/pub/akusosbil/issue/31333/339826>
- Günday, R. (2012). *Edebi metinlerin incelenmesi ve öğretimi*. 2. baskı. Elhan Kitap Yayın Dağıtım.
- Karadeniz, A., & Gürsoy, Ü. (2014). Modern metin çözümleme yöntemlerinin eleştirel düşünme, yaratıcı düşünme ve problem çözme becerilerine etkisi. *Ahi Evran Üniversitesi Kırşehir Eğitim Fakültesi Dergisi*, 15(2), 99-117. <https://dergipark.org.tr/en/pub/kefad/issue/59460/854338>
- MEB (2011). *Ortaöğretim Türk edebiyatı dersi (9, 10,11 ve12. sınıflar) öğretim programı*. MEB Yayınları.
- MEB (2018). *Ortaöğretim Türk dili ve edebiyatı dersi (9, 10, 11 ve 12. sınıflar) öğretim programı*. MEB Yayınları.
- Mengi, M. (2007). Metin incelemesi aşamaları, terimleri ve bunlardan biri: Metin tahlili. *Electronic Turkish Studies*, 2(3), 407-417.
- Metin, O. & Ünal, Ş. (2022). İçerik analizi tekniği: İletişim bilimlerinde ve sosyolojide doktora tezlerinde kullanımı. *Anadolu Üniversitesi Sosyal Bilimler Dergisi*, 22(Özel Sayı 2), 273-294. <https://doi.org/10.18037/ausbd.1227356>
- Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded Sourcebook*. (2nd ed). Thousand Oaks, CA: Sage.
- Mills, G. E. (2003). *Action research. A guide for the teacher researcher*. Upper Saddle River, NJ: Pearson Education, Inc.
- Ogur, E. (2022). Türkçe öğretmeni adaylarının konuşma eğitimi dersine yönelik görüşleri. *Uluslararası İnsan ve Sanat Araştırmaları Dergisi*, 7(4), 373-387. <https://dergipark.org.tr/en/pub/ijhar/issue/73411/1198067>
- Patton, M. Q. (2014). *Nitel araştırma ve değerlendirme yöntemleri*. (M. Bütün ve S. B. Demir, çev.) Pegem Akademi.
- Polat, A. (2022). Nitel araştırmalarda yarı-yapılandırılmış görüşme soruları: Soru form ve türleri, nitelikler ve sıralama. *Anadolu Üniversitesi Sosyal Bilimler Dergisi*, 22(Özel Sayı 2), 161-182. <https://doi.org/10.18037/ausbd.1227335>
- Poyraz, G. T. (2018). *STEM eğitimi uygulamasında kayseri ili örneğinin incelenmesi ve uzaktan STEM eğitiminin uygulanabilirliği*.(Tez No.494244) [Unpublished master's thesis, Anadolu University-Eskişehir]. Council of Higher Education (YÖK) National Theses Center.
- Şahin, M. (2023). Öğretmen adaylarının eğitimde araştırma yöntemleri dersine ilişkin metaforik algı ve görüşleri. *ISPEC International Journal of Social Sciences & Humanities*, 7(1), 74-94. <https://doi.org/10.5281/zenodo.7766236>
- Taghisoylu, R. (2022). Nitel bir araştırma tekniği olarak: durum çalışması. *Social Mentality and Researcher Thinkers Journal (Smart Journal)*, 6(33), 1161-1167. DOI : 10.31576/smryj.556
- Taş, G., & Akoğlu, K. (2020). Sosyal bilgiler öğretiminde işbirlikli öğrenme yaklaşımının etkisi: Meta-sentez çalışması. *Türk Eğitim Bilimleri Dergisi*, 18(2), 956-983. <https://doi.org/10.37217/tebd.790160>
- Tavşancıl, E. & Aslan, E. (2001). *Sözel, yazılı ve diğer materyaller için içerik analizi ve uygulama örnekleri*. Epsilon Yayınevi.
- Torusdağ, G., & Aydın, İ. (2017). *Metindilbilim ve örnek metin çözümlenmeleri*. Pegem Akademi Yayıncılık.

- Uysal, A. (2010). *Sınıf öğretmenlerinin 2009 hayat bilgisi öğretim programında belirtilen strateji, yöntem ve teknikleri uygulamadaki yeterlik düzeylerinin belirlenmesi.*(Tez No: 302017) [Unpublished master's thesis, Ankara University-Ankara]. Council of Higher Education (YÖK) National Theses Center.
- Yeşilpınar Uyar, M. & Doğanay, A. (2018). Öğrenci merkezli strateji, yöntem ve tekniklerin akademik başarıya etkisi: bir meta-analiz çalışması. *Mersin Üniversitesi Eğitim Fakültesi Dergisi*, 14(1), 186-209. <https://doi.org/10.17860/mersinefd.334542>
- Yıldırım, A. & Şimşek, H. (2013). *Qualitative research methods in the social sciences*. 9. baskı. Seçkin Yayıncılık.
- Yılmaz, Ö. (2017). Fen öğretmenlerinin tercih ettikleri öğretim strateji, yöntem ve teknikler: Fen öğretmen adaylarının düşünceleri. *Iğdır Üniversitesi Sosyal Bilimler Dergisi*, (12), 493-510. <https://dergipark.org.tr/en/pub/igdirsosbilder/issue/66817/1045086>
- Yüksel, E. (2019). *Türkiye'de iletişim araştırmalarında içerik analizi uygulamaları, sorunlar ve çözüm önerileri. International Euroasia Congress on Scientific Research and recent Trends-V*, (2), Baku, Azerbaijan, pp.134-152.

Content Analysis of Graduate Thesis Titled World Literature in Turkey

Abdulkadir Kırbaş

Atatürk University, Turkey,  <https://orcid.org/0000-0001-9846-0256>

Abstract: Introducing national and universal values via works of Turkish and international culture and art is one of the goals of teaching Turkish. Texts from different cultures are used in mother tongue education to compare students to works of art and culture that are universally recognized. People learn about national and universal ideals in this way by consuming works of international culture and art. Knowing the best pieces of international literature would not only broaden one's horizons but also enable one to comprehend and assess the sociology of many countries. By reviewing the content of postgraduate theses on international literature authored in our country, this study seeks to understand the literature and future research on the subject. In this study, fourteen master's and doctoral theses with the subject "world literature" were analyzed. Access to the database of the National Thesis Center of the Council of Higher Education was granted for this investigation. The university from which the postgraduate theses were created, the department, the year of publishing, the type of publication, the institute, and the method were all examined. Utilizing the document review technique, data were gathered. The content analysis technique was used to interpret the data that was obtained. The investigation revealed that Osman Gazi University was the site of the majority of studies. The majority of the research was done at the graduate level and in a social sciences institute. It has been determined that the Comparative Literature Department produced graduate theses. The majority of studies in the area of international literature were completed between 2022 and 2019. Eleven studies did not specify their approach, however, it was determined that the other three studies used a qualitative research paradigm.

Keywords: world literature, graduate theses, content analysis, Türkiye.

Citation: Kırbaş, A. (2023). Content Analysis of Graduate Thesis Titled World Literature in Turkey. In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023-- International Conference on Social and Education Sciences* (pp. 606-616), Las Vegas, NV, USA. ISTES Organization.

Introduction

One of the first artistic mediums produced by mankind is literature (Thomson, 1984). Humans are social creatures who build their lives around specific values throughout history. Among the ideals that serve as the foundation for society throughout are cultural values. As a component of educational activity, literature is crucial in imparting scientific, artistic, and cultural values that nations have developed throughout the millennia. Prominent literary works have a significant influence on students' reading habits and enjoyment, education, and personal development. They also help spread cultural and universal values to other countries. People will have the chance to learn about many cultures and gain from the historical and artistic knowledge of various

civilizations through great literary works (Bulut and Orhan, 2012).

Literature is the most important tool that connects all individuals in terms of emotions, thoughts, and values. Because the subject of literature is people and art. This aspect of literature is the greatest power that increases interaction between people in a universal sense. This aspect of literature, whose subject is human, today increases reconciliation and interaction between societies in terms of transferring universal values and artistic skills (Dyserinck 1991). A literary work has its roots in one culture and travels to other cultures and regions through translation into languages other than the original tongue. The great literary works from around the world were written with the same emotions and sentiments. These days, there is more cross-cultural connection due to the quick advancement of technology and the quick spread of all types of information (Wellek-Warren, 1983).

World literature is used in the same sense as general or universal literature (Kefeli, 2006). In terms of the concept of world literature, its formation on the social level constitutes the relationship between literature and sociology. Literature and culture are fields that mutually influence each other. The most important issue highlighted by literature is undoubtedly human. People's lives; Their happiness, sadness, success, failure, and their relationships with each other are the first-hand materials processed by literature. These human-centered issues lead to sociology (Sağlık, 2004). Just as these data tell us about the necessity of evaluating society and culture together, it also considers culture in the first degree to evaluate the human being and therefore the society of which he is a member. Since the science of world literature involves the literature of more than one nation and, in parallel, more than one culture, literature and intercultural communication develop. (Cuma, 2009). By studying how literary works reflect intercultural contact, world literature seeks to investigate literary history, social history, and cultural development. Research on world literature is crucial for translation, image, and typology studies. Moreover, the author's reading habits, their interactions with other literatures and cultures, and the influences of both foreign and domestic sources on national cultures. The methodologies and areas of interest in the study of literature and human-human connections are altered when society is considered in the context of ideas like globalization, multiculturalism, and human-society relations. This area of study looks at how various cultures interact and adds to the fields of literary history and social history research. It also examines how literary works are created. World literature, which focuses on national literature, can be viewed as a "method" that offers diverse viewpoints to national literary material, or it can be examined in terms of the influences and contributions of different cultures and literatures to this literature. A broader and more universal literary perspective on literature can be found in world literature. According to Aytaç (1993), the field of world literature can be characterized as a meta-synthesis that integrates many kinds of literature with a global scope.

Purpose of the Study

The purpose of a literary work is not primarily to provide information, but to bear witness to an existence from an artistic perspective (Kefeli, 2006). The international similarities of documentary findings for literary science are based on the parallelism of the social and literary developments of nations, as well as their cultural and

literary contacts with each other. Some comparative studies try to show that similarities can exist despite cultural differences and extra-literary conditions; Some studies aim to prove how aesthetically and culturally different works created in the same period can be. (Zemanek-Nebrig, 2012; Zima 1992). Based on this function of world literature, it is included in the National Thesis Database of the Council of Higher Education (YÖK) (<https://tez.yok.gov.tr/UlusalTezMerkezi/giris.jsp>), open to access in full text and containing the title of world literature. Theses at undergraduate and doctoral degrees were examined. In the study, answers were sought to the following sub-problems.

1. What is the distribution of master's and doctoral theses titled World Literature according to the universities where they are prepared?
2. What is the distribution of master's and doctoral theses titled World Literature according to the branch of science in which they are prepared?
3. What is the distribution of the publication type of the studies by years?
4. What is the distribution of the methods used in the studies according to publication type?
5. What is the distribution of master's and doctoral theses titled World Literature according to the institute where they are prepared?
6. What is the distribution of the studies in terms of the method in which they are conducted?

Method

This section contains information about the research design, study group, data collection, and analysis.

Design of the Research

This study, which examined postgraduate studies on world literature, was carried out with the qualitative research method. In qualitative research, instead of measurable characteristics such as the amount, average, and number of the events, people, or facts being investigated, they are studies that are conducted in detail and aimed at understanding, trying to reveal questions such as "how and why" (Denzin & Lincoln, 1998; Saban & Ersoy, 2019; Kiral, 2020). In research designed with the qualitative method, it is possible to reach a deep perception of the event or phenomenon examined (Morgan, 1996). In qualitative research, qualitative data collection techniques such as observation, interview, document, and discourse analysis are generally used. In addition, qualitative research, in which it is essential to examine human perceptions and events in depth in social reality and their natural environment, also has a holistic perspective that combines different disciplines (Hatch, 2002; Merriam and Grenier, 2019).

In addition, qualitative research examines the problem in its context with an interpretive approach; When interpreting events and facts, it focuses on the meanings people attribute to them. The exploratory mental processes of a researcher who focuses on qualitative research become functional (Malterud, 2001; Silverman,

2016; Baltacı, 2019). In qualitative research, different relationships between events are discussed (Eysenbach and Köhler, 2002). In qualitative research, it is important to sharpen the details of the event and phenomenon examined. In addition, since it involves a researcher-focused examination process, qualitative research is largely subjective and may be affected by the personal views of the researcher (Shenton, 2004; Silverman, 2016).

Data Collection Tool

The data of the research are from fourteen master's and doctorate degrees titled World Literature, available in full text, in the National Thesis Database of the Council of Higher Education (YÖK) (<https://tez.yok.gov.tr/UlusalTezMerkezi/giris.jsp>). It was collected from his thesis using the document analysis technique. Document analysis is a qualitative research method used to meticulously and systematically analyze the content of written documents (Wach, 2013). Document analysis is a systematic method used to examine and evaluate all documents, including printed and electronic materials. Like other methods used in qualitative research, document analysis requires examining and interpreting data to derive meaning, create an understanding of the relevant subject, and develop empirical knowledge (Corbin & Strauss, 2008). In qualitative research, data is collected through observation, interviews, and documents (Berg & Lune, 2015; Kırıl, 2020).

Analysis of Data

The data obtained in the research were explained in descriptive content analysis. Descriptive content analysis, which is the subject discussed in this study, is a systematic study that includes all studies, published or unpublished, conducted within a specified subject and evaluating their trends and research results in a descriptive dimension (Jayarajah, Saat, & Rauf, 2014; Lin, Lin, & Tsai). , 2014; Suri and Clarke, 2009; Ültay, Aktay and Ültay, 2021).

Working Group

The study group of the research consists of 14 master's and doctoral theses in the field of world literature in Turkey between 2011 and 2022.

Results

This section includes the findings of the research and their interpretation. When the table is examined, studies were conducted at ten master's degrees and four at doctoral degrees. Most studies were conducted at Eskişehir Osmangazi University (f = 21.4) for two master's degrees and one doctoral degree. Additionally, two studies were conducted each at İhsan Doğramacı Bilkent University, Yeditepe University, and Istanbul Bilgi University (f=14.2).

Table 1. Distribution of Master's and Doctoral Theses titled World Literature according to the Universities where they were prepared and their Degrees

	Doctoral Dissertation	Master's Degree	<i>f</i>
Hacettepe University		1	7.1
İhsan Doğramacı Bilkent University	2		14.2
Yeditepe University	2		14.2
İstanbul Bilgi University	2		14.2
Harvard University	1		7.1
İstanbul University		1	7.1
Eskişehir Osmangazi University	1	2	21.4
Necmettin Erbakan University	1		7.1
Mustafa Kemal University	1		7.1

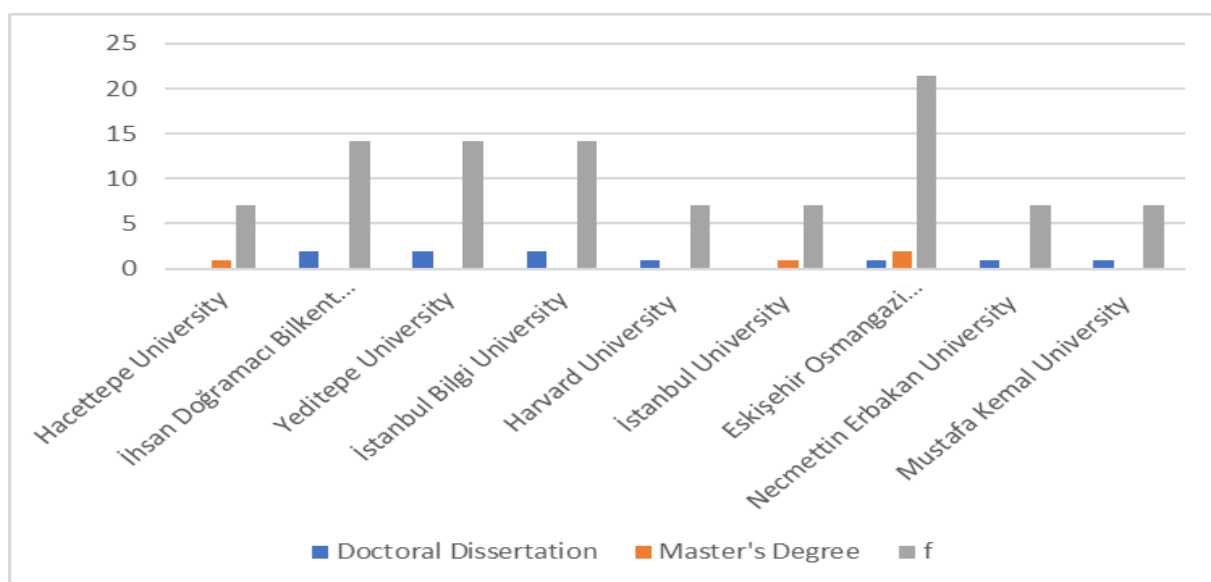
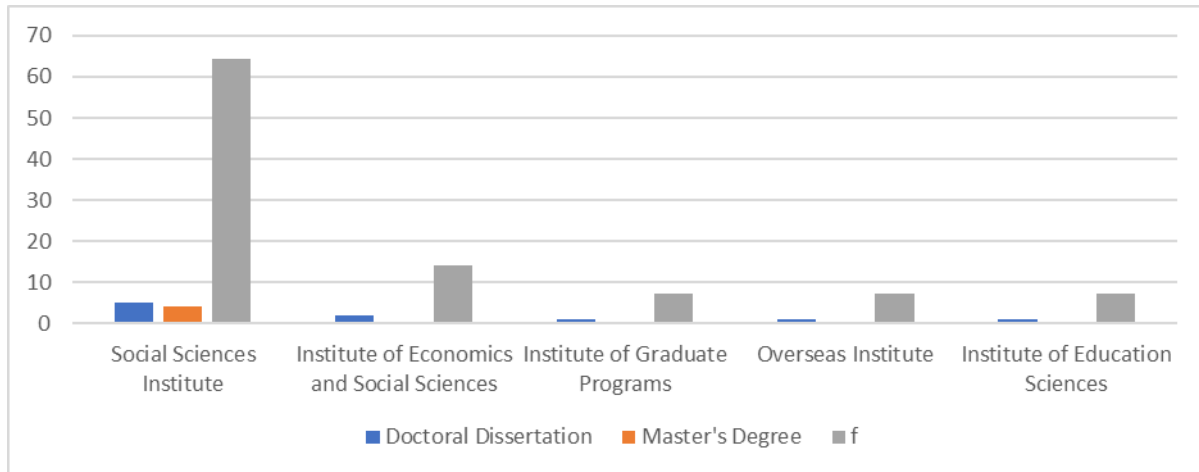


Table 2. Distribution of Master's and Doctoral Theses titled World Literature according to the Institutes where they were prepared

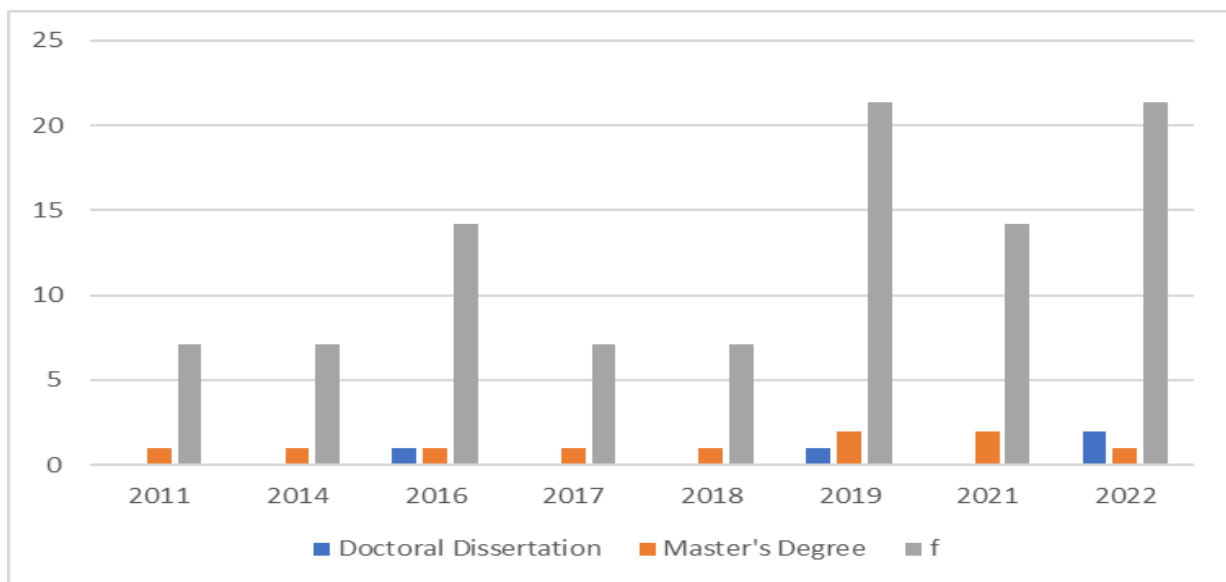
	Doctoral Dissertation	Master's Degree	<i>f</i>
Social Sciences Institute	5	4	64.2
Institute of Economics and Social Sciences	2		14.2
Institute of Graduate Programs	1		7.1
Overseas Institute	1		7.1
Institute of Education Sciences	1		7.1



When the table is examined, it is seen that most studies were conducted in the Institute of Social Sciences with nine studies ($f = 64.2\%$), and the Institute of Economics and Social Sciences with two studies ($f = 14.2$). It was held at the Graduate Programs Institute ($f = 7.1$), Overseas Institute ($f = 7.1$), and the Institute of Educational Sciences ($f = 7.1$).

Table 3. Distribution of Studies by Publication Year

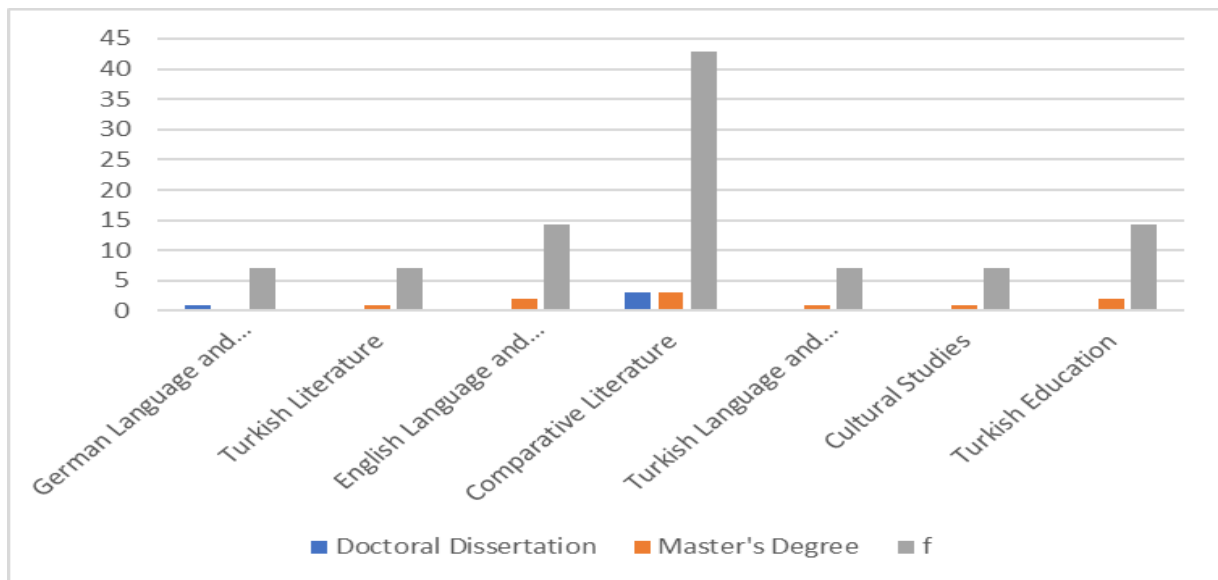
	2011	2014	2016	2017	2018	2019	2021	2022
Doctoral Dissertation								
Master's Degree	1	1	1	1	1	2	2	1
<i>f</i>	7.1	7.1	14.2	7.1	7.1	21.4	14.2	21.4



Upon closer inspection, the table reveals that the highest rates were made between 2019 and 2022 ($f=21.4$). One study at the master's level was found to have been carried out in 2011, 2014, 2016, 2017 and 2018 ($f = 7.1$). Two studies were carried out in 2022 ($f = 14.2$) and one study was carried out in 2016 and 2019 ($f = 7.1$) for the doctorate.

Table 4. The Distribution of Master's and Doctorate Theses named "World Literature" by Scientific Discipline

	German Language and Literature	Turkish Literature	English Language and Literature	Comparative Literature	Turkish Language and Literature	Cultural Studies	Turkish Education
Doctoral Dissertation	1			3			
Master's Degree		1	2	3	1	1	2
<i>f</i>	7.1	7.1	14.2	42.8	7.1	7.1	14.2

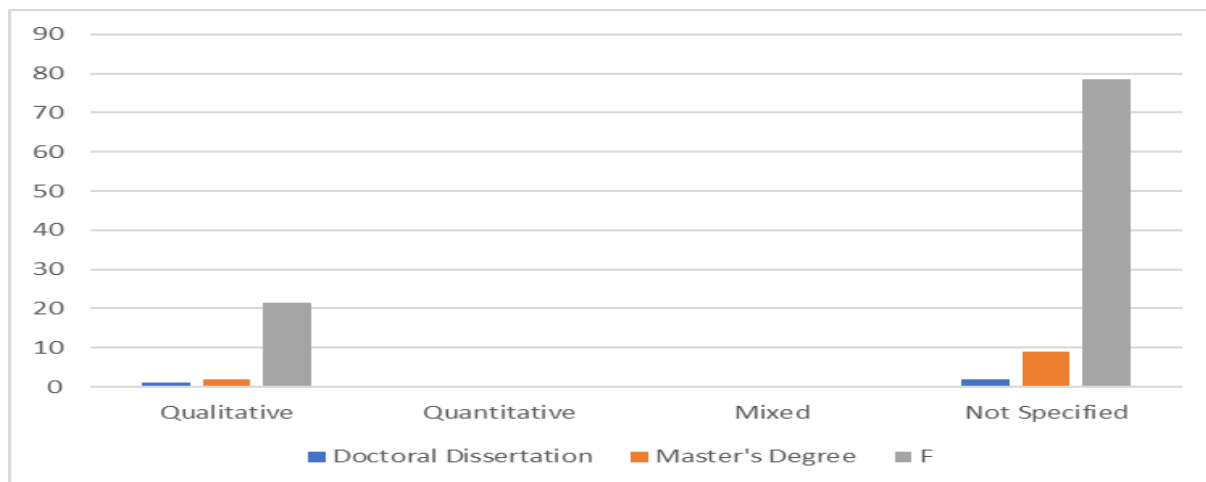


Examining the table reveals that the Department of Comparative Literature has the highest rate of master's and doctoral degrees ($f = 42.8$). Studies were conducted in the Turkish Education Department ($f = 14.2$) and the English Language and Literature Department ($f = 14.2$). The Departments of Turkish Literature, Turkish Language and Literature, and Cultural Studies have determined that only one study was carried out.

Table 5. Study distribution according to methodology

	Qualitative	Quantitative	Mixed	Not Specified
Doctoral Dissertation	1	-	-	2

Master's Degree	2	-	-	9
F	21.4			78.5



Upon examining the table, it was observed that the qualitative technique was used for both master's degrees (n = 1) and doctoral studies (n = 3; f = 21.4). The research methodology (f = 78.5) was not disclosed.

Discussion and Conclusion

The research's findings led to the following conclusions being drawn.

This study looked at 14 master's and doctoral theses on world literature that were released as full texts with open access and were listed in the Higher Education National Thesis Centre database. These theses were evaluated in terms of the department of science, the method used, the university where they were prepared, the degree of publishing, the year of publication, and the institute where they were prepared. Nine different universities, including Harvard University, Hacettepe University, İhsan Doğramacı Bilkent University, Yeditepe University, Istanbul Bilgi University, Eskişehir Osmangazi University, Necmettin Erbakan University, and Mustafa Kemal University, prepared the studies. Furthermore, a doctorate-holding Turkish researcher carried out a study at Harvard University, and the National Thesis Centre database contains this study as well. The university that conducted the most research was Eskişehir Osmangazi. It might be argued that this figure is quite low given the 208 universities in our nation. Nine master's degrees and four doctoral degrees are visible in the studies under the heading "World Literature." It is believed that the fact that there were only 14 studies conducted in 9 different universities between 2011 and 2022 in our nation regarding world literature is insufficient to advance the field's growth and serve as a source for future research in this area. Upon examining the major scientific disciplines and institutions where the studies were made, it was determined that the majority of the studies were produced by the Institute of Social Sciences and were carried out in the Department of Comparative Literature. Upon analyzing the studies according to their publication year, it becomes evident that a single research titled "world literature" was released in 2011, 2014, 2017, and 2018. Three investigations were carried out in the area

of world literature in 2019 and 2022. This finding suggests that there has been a recent rise in interest in the study of world literature. Upon analyzing the studies concerning their preparation process, it was determined that 11 studies did not provide a method, while only 3 research did provide a method. This finding indicates that the research's methodology is deficient.

Recommendations

Some recommendations have been made for the relevant field and researchers based on the research findings.

- * The study of international literature should receive adequate attention from state, foundation, and private universities, as well as funding.
- * Doctorate and master's degree holders should concentrate on international literature research and include various world literary works in their writing.
- * Master's and doctorate advisers should make sure to train experts in this discipline by encouraging faculty members' students to study international literature.
- * Scholars ought to scrutinize the exceptional pieces of global literature, originating from both local and foreign sources, and incorporate them into the body of literature while allocating adequate resources to this area.

References

- Aytaç, G. (2021). *Karşılaştırmalı edebiyat bilimi*. Doğu Batı Yayınları.
- Berg, B. L. & Lune, H. (2015). *Sosyal bilimlerde nitel araştırma yöntemleri*. H. Aydın (Çev. Edt). Konya: Eğitim Kitabevi.
- Baltacı, A. (2019). Nitel araştırma süreci: nitel bir araştırma nasıl yapılır?/ The qualitative research process: how to conduct a qualitative research?. *Ahi Evran Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 5(2), 368-388
- Bulut, M., & Orhan, S. (2012). Türkçe-edebiyat ders kitaplarının dil ve kültür aktarımındaki rolü ve önemi üzerine bir inceleme/Turkish and literature textbooks language and culture transmitting an investigation of the role and importance. *The Journal of Academic Social Science Studies*, 5(8),297-311.
- Corbin, J. & Strauss, A. (2008). *Basics of qualitative research: Techniques and procedures for developing grounded theory*. Thousand Oaks: Sage.
- Cuma, A. (2009). Edebiyat sosyolojisi ve karşılaştırmalı edebiyat bilimi-sanat ve bilimin sınır ötesi etkileşimi/ Sociology of literature and comparative literature- the interaction of art and science beyond boundaries, *Selçuk Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 22, 80-94.
- Denzin, N. K. & Lincoln, Y. S. (1998). *The lanscape of qualitative research: Theories and issues*. Thousand Oaks: Sage.
- Dyserinck, Hugo (1991). *Komparatistik-Eine Einführung*. Bonn: Bouvier Yay.
- Eysenbach, G., and Köhler, C. (2002). How do consumers search for and appraise health information on the

- world wide web? Qualitative study using focus groups, usability tests, and in-depth interviews. *Bmj*, 324(7337), 573-577.
- Hatch, J. A. (2002). *Doing qualitative research in education settings*. Suny Press.
- Jayarajah, K., Saat, R. M. ve Rauf, R. A. A. (2014). A review of science, technology, engineering & mathematics (STEM) education research from 1999–2013: A Malaysian perspective. *Eurasia Journal of Mathematics, Science & Technology Education*, 10(3), 155-163.
- Kıral, B. (2020). Nitel bir veri analizi yöntemi olarak doküman analizi/Document analysis as a qualitative data analysis method. *Journal Of Social Sciences Institute*, 15, 170- 189.
- Kefeli, E. (2006). Karşılaştırmalı edebiyat: tanım, yöntem ve incelemeler, *Türkiye Araştırmalar Literatür Dergisi*, Cilt 4(8), 331-350.
- Lin, T. C., Lin, T. J. ve Tsai, C. C. (2014). Research trends in science education from 2008 to 2012: A systematic content analysis of publications in selected journals. *International Journal of Science Education*, 36(8), 1346-1372.
- Malterud, K. (2001). Qualitative research: Standards, challenges, and guidelines. *The Lancet*, 358(9280), 483-488.
- Merriam, S. B., and Grenier, R. S. (2019). *Qualitative research in practice: Examples for discussion and analysis*. San Francisco, CA: Jossey-Bass Publishers.
- Morgan, D. L. (1996). *Focus groups as qualitative research* (C. 16). New York: Sage publications.
- Saban, A. & Ersoy, A. (2019). *Eğitimde nitel araştırma desenleri*. Anı Yay.
- Sağlık, Ş. (2004): Popüler Romanlar ve Edebiyat Sosyolojisi, içinde: Köksal, Alver, *Edebiyat Sosyolojisi İncelemeleri*, Hece Yay. 181-217.
- Shenton, A. K. (2004). Strategies for ensuring trustworthiness in qualitative research projects. *Education for information*, 22(2), 63-75.
- Silverman, D. (2016). *Qualitative research*. Sage publications.
- Suri, H. ve Clarke, D. (2009). Advancements in research synthesis methods: From a methodologically inclusive perspective. *Review of Educational Research*, 79(1), 395-430.
- Thomson, G. (1984). *Şiir sanatı* (Çev. Cevat Çapan). Üç Çiçek Yayınevi.
- Ültay, E., Akyurt, H., Ültay, N. (2021). Sosyal bilimlerde betimsel içerik analizi/ Descriptive content analysis in social sciences. *IBAD Sosyal Bilimler Dergisi/ IBAD Journal of Social Sciences*, 10, 188- 201.
- Wach, E., & Ward, R. (2013). Learning about qualitative document analysis. *IDS Practice Paper in Brief*, 13, 1-11.
- Wellek, R. ve A. Warren A. (1993). *Edebiyat teorisi*, çev. Ömer Faruk Huyugüzel, Akademi Kitabevi.
- Zemanek, Evi-Nebbrig, A. (2012). *Komparatistik*. Berlin: Akademie Yay.
- Zima, Peter (1992). *Komparatistik*. Tübingen: Francke Yay.
- Arslan, C., C. (2017). *Ambivalences of ottoman modernity: nahda, tanzimat, and world literature* [Unpublished doctoral dissertation]. Harvard University.
- Avcı, Ş. (2011). *Examination of texts from world literature in Turkish course books in terms of their content novels* [Unpublished Master's Thesis]. Mustafa Kemal University.

- Aytekin, E. (2021). *Crime fiction in the translation zone of world literature: A comparison between American and Turkish literature through Mickey Spillane's and Kemal Tahir's Mike Hammer novels* [Unpublished Master's Thesis]. İhsan Doğramacı Bilkent University.
- Balçık, Y. (2022). *The concept of absence in examples of world literature (Death, disappearance, emptiness, silence)* [Unpublished doctoral dissertation]. Eskişehir Osmangazi University.
- Çalışkan, A. (2016). *Examination of works included in world literature that participate in elementary 100 essential readings from the point of education of values* [Unpublished Master's Thesis]. Necmettin Erbakan University.
- Demir, N. (2021). *A comparative approach to boarding school phenomenon in Turkish and world literature* [Unpublished Master's Thesis]. Eskişehir Osmangazi University.
- Hayal, E. (2016). *Ambivalences of Ottoman Modernity: Nahda, Tanzimat, and World Literature* [Unpublished Master's Thesis]. Yeditepe University.
- Işık, E., S. (2022). *Turkish romance fiction and world literature through the case of Nihal Yeğinoğlu* [Unpublished Master's Thesis]. İhsan Doğramacı Bilkent University.
- Kardeş, B. (2022). *Transnationale migrations – und globalisierungsdiskurse in hybridenliteraturen von georgien- und türkeistämmigen literaturschaffenden und eine neuerörterung im kontext der weltliteraturkonzepte* [Unpublished doctoral dissertation]. Hacettepe Universität.
- Küçükislamoğlu, Ü. (2014). *The structure of Nobel Prize in Literature and its function in world literature* [Unpublished Master's Thesis]. İstanbul Bilgi University.
- Özdemir, Y. (2016). *Scapegoating in world literature: A comparative study of victimization and transferring blame in literature* [Unpublished doctoral dissertation]. İstanbul University.
- Süleymanoğlu, N. (2019). *Multilingual writers of Prague in world literature* [Unpublished Master's Thesis]. Yeditepe University.
- Topaktaş Varan, D., A. (2019). *Melancholy as an aspect of third world literature* [Unpublished Master's Thesis]. İstanbul Bilgi University.
- Yetim, A. (2019). *An archetypal approach towards the representations of the myth of medea in contemporary world literature* [Unpublished doctoral dissertation]. Eskişehir Osmangazi University.

Educational Robotics Applications as Tools to Support the Social Interactions and Integration of Refugee Children in the Community of Schools of Primary Education

Anthi Karatrantou

University of Patras, Greece,  <https://orcid.org/0000-0002-5347-6251>

Vassiliki Giannoula

University of Patras, Greece,  <https://orcid.org/0009-0009-5187-4019>

Chris Panagiotakopoulos

University of Patras, Greece,  <https://orcid.org/0000-0003-3162-9218>

George Nikolaou

University of Patras, Greece,  <https://orcid.org/0000-0002-3460-1141>

Abstract: The paper presents an attempt made to use the Arduino platform and the Scratch for Arduino (S4A) environment for the implementation of an educational project for 6th grade primary school students in a classroom attended by refugee, immigrants, and indigenous students. The aim was to investigate the opportunity to use educational robotics as tools to support the social interactions and social inclusion of refugee children in the classroom community. The research was a case study implemented in a primary school in rural Greece. Students had to work in groups to design, build, and program a construction that simulates an ‘Escape Room’. Students of each group solving a riddle of the other groups must discover a code to unlock the door of the ‘Escape Room’, based on a series of six worksheets of increasing difficulty to create their final construction. The research tools were a diagnostic questionnaire, an evaluation questionnaire, specially designed worksheets, an observation sheet for participatory observation, and sociometric test tools. Based on the findings it could be supported that educational robotics are able to support social interactions of refugee children to a certain extent. The intervention supported social interactions and collaboration among students but without solving the problem of difficulties in the social integration of refugee students in the classroom community. Verbally all students stated that they had not any problem cooperating with refugee students, but this was not strongly reflected in practice. Greek students interacted strongly with immigrant students and refugee students seemed to prefer interacting with immigrant students too.

Keywords: Educational robotics, sociometry, sociogram, refugee students, social integration

Citation: Karatrantou, A., Giannoula, V., Panagiotakopoulos, C., & Nikolaou, G. (2023). Educational Robotics

Applications as Tools to Support the Social Interactions and Integration of Refugee Children in the Community of Schools of Primary Education. In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023--International Conference on Social and Education Sciences* (pp. 617-633), Las Vegas, NV, USA. ISTES Organization.

Introduction

The integration of refugees is one of the priorities of the European social inclusion process and their protection has been prioritized in EU policy, with the necessary funding (Kiss, Primecz, & Toarniczky, 2020). Social integration, together with economic empowerment and identity integration, are three main dimensions of refugee integration. Social integration is a dynamic and structured process in which all members participate to achieve and maintain peaceful social relations. Social inclusion focuses on the need to provide a safe, stable, and just society by improving living conditions and enhancing cooperation and cohesion. In recent years in Greece, the systematic increase of refugees and migrant students has resulted in a change of the cultural environment in the primary education sector, which in turn has affected the teaching methods in an attempt to better approach the new situation (Zaragas, Mantzioukas, Stergiou, Nikolaou, 2022). International literature highlights that educational robotics activities could effectively promote the social integration of refugee children in the school environment (Jung, & Won, 2018).

The present study describes an attempt to investigate the opportunity to use educational robotics activities as tools to observe and support the social relationships/interactions and social inclusion of refugee children in the classroom community of primary education schools and discusses the findings.

Educational Robotics and Interculturality in Education

Intercultural education aims to change the school and society so that everyone has equal opportunities to express him/her-self freely, together with the support and cooperation of the state. For the management of the intercultural classroom, many models and approaches emerged in the 1960s. The main models of intercultural education are the assimilationist model, the integrationist model, the intercultural model, the anti-racist model and the multicultural model (Tsaliki, 2023).

Scientific literature highlights the role of Educational robotics applications in schools as effective tools to enhance social skills and support social interactions of students (Karatrantou & Panagiotakopoulos, 2011; Kalamatianou & Karatrantou, 2022). Educational robotics in classrooms has increased at different levels of schooling and supports the development of multiple skills (Lancheros-Cuesta, & Fabregat, 2022). Previous studies have shown that students acquire rich learning experiences with educational robotics activities with an experiential approach to learning, building their own structures and systems and programming them to perform desired behaviors, usually through structured guided exploration. Thus, educational robotics is highly conducive

to the development of interpersonal skills, such as interaction and cooperation with others.

Social robots are used more for interventions with children with disabilities or difficulties, as well as for the smooth social integration and inclusion of refugees. In particular, social robots are widely applied to teach basic social skills to children on the autism spectrum as they resemble humans but are less complex. Regarding the effectiveness of using social robots in teaching a foreign language, recent research suggests that it can lead to interesting results. Furthermore, some studies suggest that robot sociability increased learning by improving learning outcomes (Carolis, Cianciotta, Palestra, & Cervelione, 2019). The design and deployment of robotic systems that can model and recognize human behavior as well as adapt their behavior to the learner is a very critical issue, especially when dealing with students from different social and cultural realities (Agrusti, Gasparetti, Gena, Sansonetti, & Tkalcic, 2021). A good example is the creation of GeeBot that was motivated by the challenge of introducing and integrating refugees into host countries assisting them in cultural and linguistic needs (Simao, Avelino, Duarte, & Figueiredo, 2018).

Arduino, Scratch & Scratch for Arduino

The open-source Arduino electronics prototyping platform is based on flexible and easy-to-use hardware and software intended for anyone who has some programming experience, basic knowledge of electronics and is interested in creating interactive objects or environments. 'Scratch' is an educational programming environment aimed primarily at children aged eight to twelve (8 to 12), but it is attractive to students of all ages. 'Scratch for Arduino' (S4A) environment is a modification of the 'Scratch' programming environment (<https://s4a.cat/>). It provides the additional feature of simple programming of circuits and constructions built with the Arduino platform, providing the ability to create interactive objects or environments through the management of sensors and actuators.

The Aim of the Study and the Research Questions

The aim of the project was to investigate the opportunity to use educational robotics activities as tools to observe and support the social relationships/interactions and social inclusion of refugee children in the classroom community of primary education schools.

The research questions under investigation were:

- To what extent could educational robotics activities support and enhance the *social integration* of refugee children in the primary school classroom community?
- To what extent could educational robotics activities support and enhance the *cooperation* of refugee children with their peers in the community of the primary school classroom?
- To what extent could the *Arduino platform and S4A* be used as *effective tools* to support and enhance social relationships/interactions and social integration of refugee children in the primary school classroom community?

Method

The research was a case study and for the needs of the sociometric part of the research, sociometry based on the indicative method without hierarchical ranking was used. Using the non-hierarchical ranking, elements from different methods of data collection can be combined (e.g., from students' form/questionnaire, researcher's observation, and discussion with teachers), thereby ensuring the validity and reliability of the research (Bukowski, Hoza, & Boivin, 1994, Keliouri, 2019).

Students of the 6th grade of a primary school in rural Greece attended by refugee, immigrant, and Greek students participated. All the educational activities during the intervention were in accordance with the Greek Primary Education curriculum. Students had to work in groups and collaborate to design, build, and program a construction that simulates an 'Escape Room'. The students of each group solving a riddle of the other groups must discover a code to unlock the door of the 'Escape Room' and escape before it is locked again. The project was implemented by the students based on a series of six worksheets of increasing difficulty to create their final project (the Escape Room).

The Arduino platform and S4A coding environment were used to design and implement activities and applications that combine concepts from Physics, Mathematics and Computer Science to solve the problem. Students were required to work harmoniously and interact to solve the problem in a working group, appreciating and accepting knowledge and skills of each group member regardless of their country of origin.

Research Tools

The research tools to support the case study and the sociometry approach based on the indicative method without hierarchical ranking were:

- A. *Interview* with the classroom teacher
- B. *Diagnostic questionnaire* before the intervention
- C. *Evaluation questionnaire* after the intervention
- D. *Worksheets* to support students' work
- E. *Observation sheet* for participatory observation
- F. *Sociometric test* tools (Sociometry table and Sociogram) before and after the intervention

Interview with the Classroom Teacher

The teacher answered questions and offer information about the age, the country of origin, the time living in Greece, the student performance, the social behavior during the lesson, the social behavior during breaks, friendships and general behavior of each foreign student in the classroom.

Diagnostic Questionnaire before the Intervention

The purpose of the questionnaire was to diagnose the previous knowledge and experiences of the students with the tools they would use during the project to better design the educational activities. The diagnostic questionnaire consists of six (6) questions of general content, that include: *the gender of the students, their age, how they would characterize their knowledge in the use of Computers, whether they have attended Educational Robotics courses before and in what framework, whether they have attend Programming courses, if they know what Arduino is, if they know what Scratch is, and if they know what Scratch for Arduino is.*

Evaluation Questionnaire after the Intervention

The purpose of the questionnaire was collecting students' evaluation for the activities during the project, the Arduino and Scratch for Arduino tools, as well as the cooperation and acceptance of the members of their group and their class. The evaluation questionnaire consists of ten (10) questions, that include: *the gender and age of the students, what they liked most about the activities with Arduino and Scratch for Arduino, what they liked least about the activities with these tools, what was difficult for them during the activities, from which lessons they needed knowledge to implement the activities, what new they learnt, if they found the activities easy, if they faced difficulties in cooperation and communication with their team, if they cooperated with all team members and if they would like to change team to work with other students.*

Worksheets to support Students' Work

Five (5) worksheets were used by the students during the activity, which were based on the learning content of the 5th-6th grade level curriculum of Primary school.

Observation Sheet for Participatory Observation

During the participatory observation, the researchers followed the *discussions*, the *activities* and the *reactions* of the students of the refugee children and immigrant students and recorded their observations answering six (6) questions. The observation sheet was based on the observation sheet developed and used in the research of Vezyrtzis (2017). Based on this sheet, it was recorded individually for each student: *if he/she was always in the demarcated area of his/her group, if he/she simply remained in the group during the activities without participating in them, if he/she worked alone so that there was no good cooperation and communication in the group, if he/she was marginalized by members of his/her group, if he/she experienced discrimination due to his/her different origin, how he/she interacted and cooperated in his/her group.* Additionally, comments/observations were recorded, based on the observer's personal notes that include *activity flow (date, time duration, analysis), thoughts, feelings, impressions, behaviors, overview of the class* before, during and after the intervention.

Sociometric Test Tools (Sociometry Table and Sociogram) before and after the Intervention

The sociometric test is a questionnaire that investigates whether a person (a child/student in this case) is *tolerated, popular or isolated* in a group or community according his/her preferences to work with others in the framework of an activity or project. The results of the sociometric test are recorded in a *Sociometry table*, which is represented by the *Sociogram*. The sociogram is a graphic representation of the Sociometry table, giving the necessary information for all the relationships of the group in a complete and comprehensible way. All the students in the classroom answered a questionnaire of positive and negative preferences of their classmates in order to cooperate in a group during the project. They answered it before and after the intervention. The questionnaire of positive and negative preferences was based on the questionnaire that is internationally used in research with such purposes (Bukowski, Hoza, & Boivin, (1994).

Reliability and Validity

All the research tools were checked for validity and reliability as required by the rules of educational research (Panagiotakopoulos & Sarris, 2016). The questions in the Diagnostic Questionnaire and the Evaluation Questionnaire as well as the Worksheets were designed by the researchers, reviewed by two experts in the field (one expert in ICT in education and one experienced Primary Education teacher) in terms of their suitability for the age level of the students, the validity and completeness of the questions on the subject under consideration. Some comments by the experts regarding the wording of the questions and statements and appropriate corrections were made. The Observation sheet and the questionnaire of positive and negative preferences are valid and reliable tools use in research in Greek language.

The Procedure

The educational activity in the classroom had a duration of twelve (12) didactic hours in total implemented during 4 sessions:

Session 1: During two (2) hours, the students completed the diagnostic questionnaire and the questionnaire of positive and negative preferences. After that, students started working in groups of four (4) to be familiarized with Arduino platform and Scratch for Arduino based on the 1st and 2nd worksheet.

Session 2: Students work based on the 3rd worksheet for one (1) hour to put a motor in their circuits and program it to operate.

Session 3: During two (2) hours students working based on the 4th and 5th worksheet had to create a program for the operation of their escape room, compose a riddle to be solved by the other groups and discover the code to unlock the door of the Room. The winning group was the one who solved the most riddles.

Session 4: During the last hour, students completed the evaluation questionnaire and the questionnaire of positive and negative preferences.

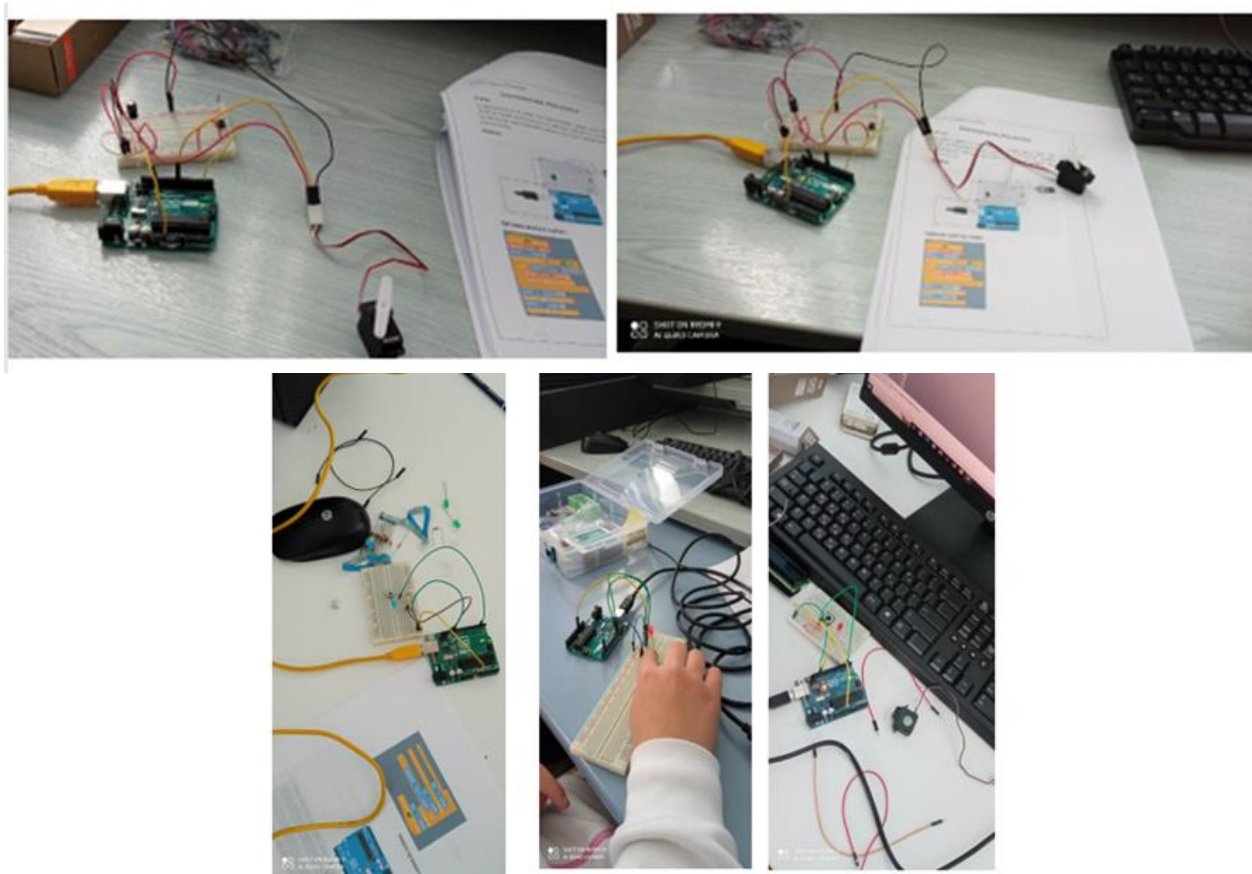


Figure 1. Students are working based on the worksheets.

Students Participants

The participating students were twenty (20) students attended the 6th grade class at the Primary School of Lechena town in western Greece. Two (2) refugee students (2 boys) and five (5) students (one girl and four boys) coming from immigrant families attended the class. It was considered important to discuss all seven (7) cases since all seven students have an impact on the social environment of the classroom. In Table 1 characteristics of the participating refugee and immigrant students are described shortly. This data derived from the interview with the classroom teacher before the start of the intervention.

Table 1. Characteristics of the seven (7) foreign students in the classroom

	Name Initial	Student's description
Refugee children	F.	F. is a 13-year-old boy; he comes from Syria; he is isolated; he lives in a refugee camp and is socializing with other children from the camp (<i>some of which have dropped out of school</i>); he is very nervous; he does not cooperate with other students in the class but prefers to work alone.

Name Initial	Student's description
Mo.	Mo. is an 11-year-old boy; he comes from Syria; he lives in a refugee camp; he has been at this school only for a month; he is quite sociable and open to meeting new people; he is very attentive and actively participates in school activities with his classmates.
E.	E. is a 13-year-old girl; her parents are Romanian, but she was born in Greece; she is a student of average performance; she reads and writes with difficulty; she has two very good friends (a Roma student and an Albanian student).
P.	P. is a 11-year-old; he was born in Greece, but his parents are Albanian; he and his parents do not speak Greek, <i>so he faces acceptance issues at school by classmates</i> ; although he has no friends, he plays with everyone in gym, and during breaks he tries to be with other students.
D.	D. is a 11-year-old boy; his family comes from Albania; he is fully integrated and a very social child.
A.	A. is a 11-year-old boy; his family comes from Romania; he faces various problems of integration at school, as he does not actively participate and there is no communication with his classmates; as he says: <i>he has a hero mother who keeps him going on and progressing</i> .
Ma.	Ma. is a 11-year-old boy; his family comes from Romania; he is mild mannered, silent in the classroom; he enjoys excellent cooperation and communication with his classmates.

Immigrant children

Results and Discussion

The results of the study are presented below as they derived from the analysis of the data collected by the research tools, and they combined with each other in order for the research questions to be answered.

Diagnostic Questionnaire

According to students' answers to the questions of the questionnaire before the start of the intervention, five (5) students were able to use computer applications very well, thirteen (13) students moderately and two (2) students not very well. Ten (10) students were aware of educational robotics and had been involved in such activity in the past but the other ten (10) students were not. All the students had experience in coding (lessons at school), eighteen (18) of them had experience in Scratch but none of them had experience in Arduino and Scratch for Arduino.

Sociometry Table before the Intervention

The sociometry tables offer information for the sociometric status of each student in the study. According to the research of Coie, Dodge and Coppotelli (1982) five categories of sociometric status are defined:

- The popular student garnered the most preferences and no or few rejections.
- The average student usually gets preferences but few rejections.
- The controversial student gets a lot of likes but also rejections.
- The neglected student usually has few or no preferences and rejections.
- The rejected student usually attracts rejections.

Figure 2 presents the sociometric status of each student before the intervention:

	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	A18	A19	A20	STUDENTS' CLASSIFICATION	
A1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	REJECTED
A2			+	+	+											-		+		+		POPULAR
A3		+		+		-												+				AVERAGE
A4		+	+		+	-					+				-	+	-	+	+			POPULAR
A5															-	-		+				CONTROVERSIAL
A6							+	+	+		+					+	+	+		+		POPULAR
A7								+	+	-					+			+				CONTROVERSIAL
A8	+		-			+	+				+					-		+		+		POPULAR
A9	-						-								+		+	+	+	-		CONTROVERSIAL
A10	-			-						-		+	+	+						+		CONTROVERSIAL
A11		+	+			+	+	+								+	-	+				POPULAR
A12	-				-					+			+	+				+			-	CONTROVERSIAL
A13				+	+				+	+		+	+					+	+			POPULAR
A14				-						+		+	+					+				AVERAGE
A15			-															+	-			REJECTED
A16	+							-		-	-	-	-	-				+	-			REJECTED
A17					-													+				REJECTED
A18																						REJECTED
A19									+							+	+	+		-		AVERAGE
A20	+					-	-											+				CONTROVERSIAL

Figure 2. The Sociometry Table for the students before the intervention

Refugee students: F. (A1) was *rejected*, as he was chosen negatively by eight (8) native students and positively by one (1) refugee student. A18 (Mo.) was *rejected*, since he was chosen negatively by three (3) students, and no one selected him positively.

Immigrant students: A. (A6) was *popular*, as he was chosen positively by eight (8) students (native and foreign) while no one chose him negatively. P. (A7) was *controversial*, as he was chosen positively by four (4) students (native and foreign), while only one (1) native chose negatively. D. (A16) was *rejected*, as he was chosen positively by two (2) refugee students, while negatively by seven (7) natives. E. (A17) was *rejected*, as she was selected negatively by four (4) native students and positively by one refugee student. Ma. (A20) was

controversial, as he was chosen positively by two (2) refugee students, while negatively by one (1) native and two (2) foreign students.

Sociogram before the Intervention

Figure 3 presents graphically the sociometric status of each student before the intervention:

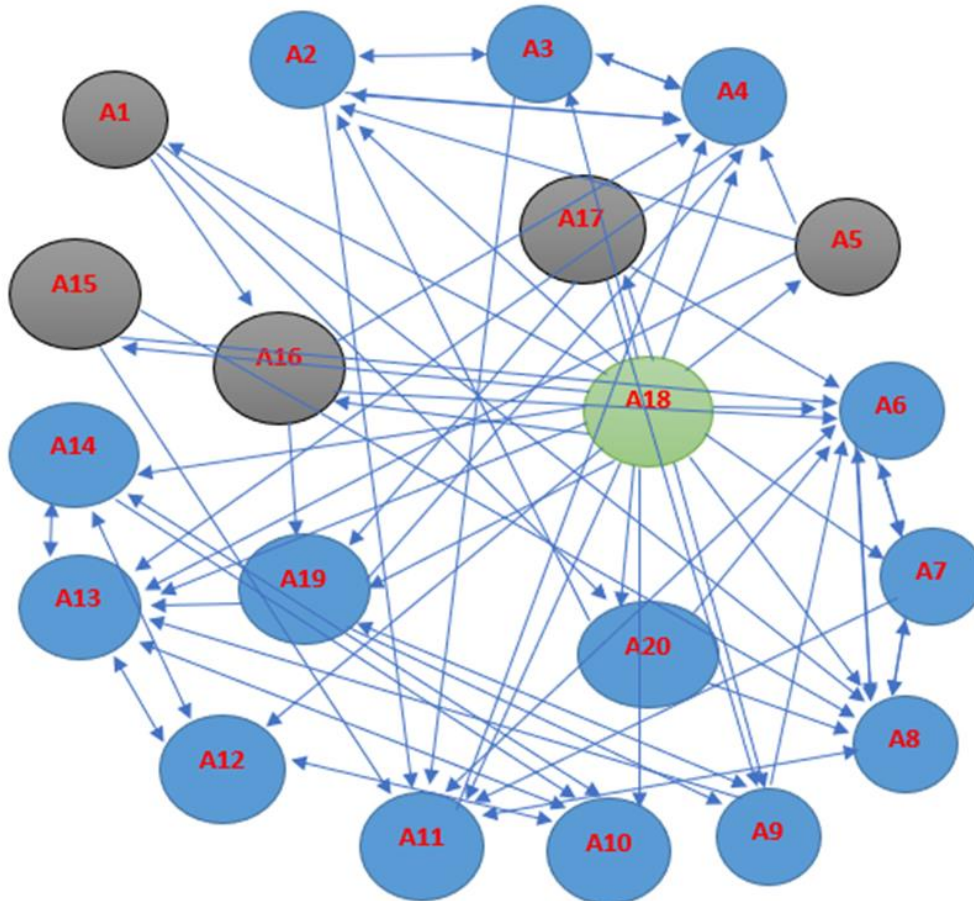


Figure 3. Sociogram before the intervention

The preferences of the students are also observed in the sociogram, according to which Mo. (A18), who is in green, *has positively chose all the other students*, but he was not chosen positively by anyone. Also F. (A1), D. (A16) and E. (A17) in gray were selected positively only by A18. The other immigrant students were chosen by their classmates.

Analysing the Worksheets

While students were working with the worksheets, emphasis by the researchers was placed on how the group members worked together rather than on the knowledge content of the students' answers/notes on the

worksheets. It is worth noting that all groups of students worked on the worksheets, focused on *what* they had to construct and sometimes *without reading the instructions* on the worksheets. Students were interested in the practical outcome of the activities, and they followed the sequence of sub-activities on the worksheets. The two refugee students worked thoroughly with the worksheets and participated in all phases of the construction and project implementation; despite difficulties they faced while working together with the other students. Figure 4 shows students working based on the worksheets as well as the cards with the riddles and one of the circuits students had to create.

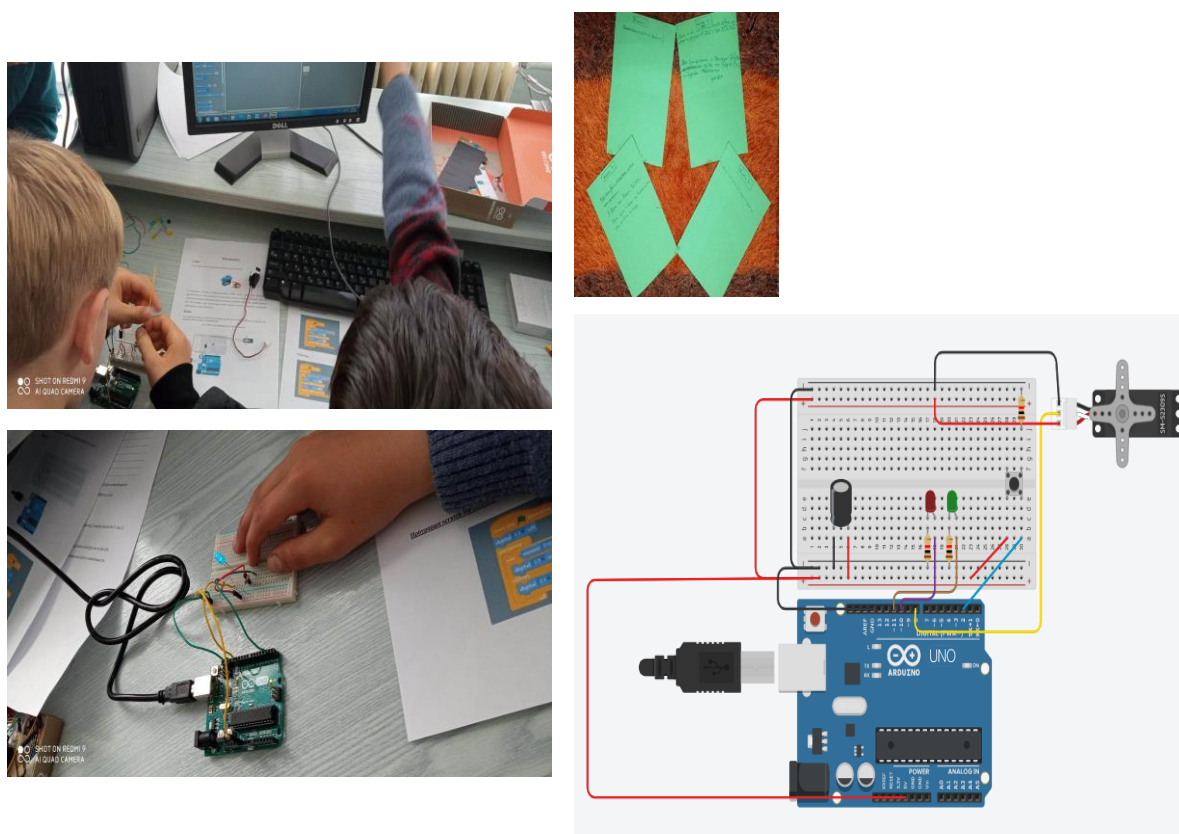


Figure 4. Snapshots of children's work

During the intervention, collaborative activities were highlighted, particularly during the construction phase of the project. Verbally all students, during their work on the project, stated that they had not any problem cooperating with refugee students, but this was not strongly reflected in practice, although improved social interactions between foreign and Greek students were observed by the researchers.

Greek students cooperated and interacted quite strongly and positively with immigrant students or students with an immigrant background. The same was the case with refugee students who seemed to prefer interacting with immigrant students or students with an immigrant background. Figure 5 shows the 'Escape Room' construction and the final program for its operation.

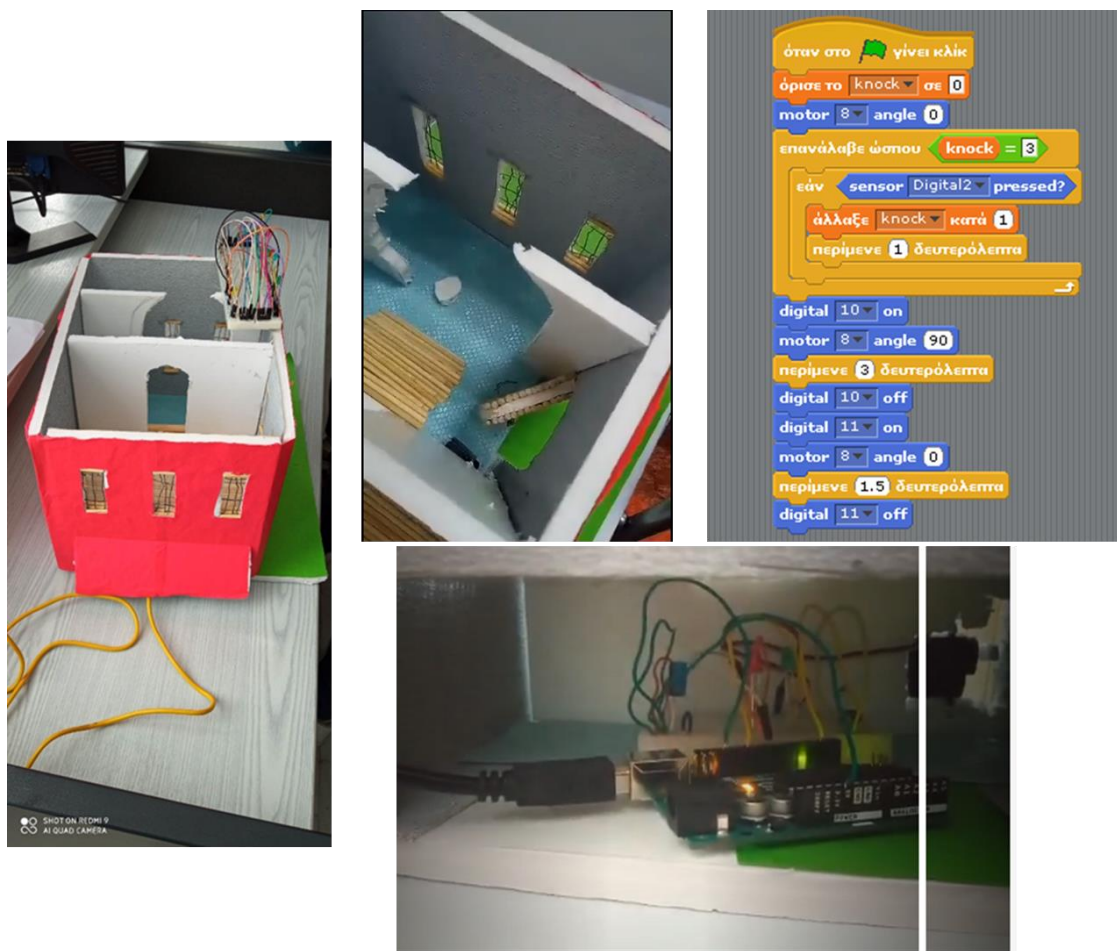


Figure 5. The 'Escape Room' construction and the program for its operation

Observation Sheets

Table 2 describes the findings derived analysis the data based on the Observation sheets for the seven (7) foreign students.

Table 2. Findings based on the Observation sheets for the seven (7) foreign students.

Name Initial	Student's description
F.	F. at the beginning was not cooperating with his group members; he was just looking at them; the other members of the group ignored him; he wanted to work alone; he started working alone; was wearing a hood and looked sad. Before the end of the 1st day, a new group was formed with F, Ma and P (both foreigners) who were also ignored by their groups. The three of them worked together smoothly and had excellent communication during the intervention. On the 2nd day F entered the classroom smiling without the hood.

Refugee children

Name Initial	Student's description
Mo.	Mo. was in the demarcated area of the activity together with his group, he was not marginalized, nor was any kind of discrimination observed during the intervention. He cooperated and participated smoothly and actively showing special interest.
E.	E, was in the demarcated area of the activity, together with her group. However, although she remained with the group during group activities, she did not participate actively. She was marginalized by her group. She probably experiences discrimination, and she has not been able to be integrated into the classroom due to many absences from lessons.
P.	While P. was in the demarcated area of the activity with his group, he was marginalized and left the room crying. Then, he joined another group (with foreign students) and had better cooperation and communication. On the second day, he worked in his new group without any difficulty.
D.	D. cooperated smoothly both days in his group. He was in the demarcated area of the activity with his group and remained there during it, actively participating, without being marginalized or discriminated against by his group.
A.	A. faces various integration problems at school, as during the intervention he did not participate actively and there was no communication in the group.
Ma.	Ma. was in the demarcated area of the activity with his group. He participated in it actively, without any communication problems. No marginalization or discrimination due to his different origin was observed. On the contrary, he had excellent cooperation and leadership in his group

Immigrant children

Sociometry Table after the Intervention

Figure 6 describes the sociometric status of each student after the intervention. Based on this figure:

Refugee students: F. (A1) was again *rejected*, as he was chosen negatively by eight (8) native students and positively by one (1) refugee student. A18 (Mo.) was again *rejected*, since he was again chosen negatively by three (3) students, and no one selected him positively.

Immigrant students: A. (A6) was *average*, as he was chosen positively by five (5) students (native and foreign), while negatively only by one (1) refugee student. P. (A7) was *controversial*, as he was chosen positively by only one (1) native student, while negatively by three (3) native students. D. (A16) was again *rejected*, as he was chosen negatively by seven (7) native students, while positively by two (2) foreign students. E. (A17) was again *rejected*, as she was chosen negatively by three (3) native and foreign students, while no one chose her

positively. Ma. (A20) was *rejected*, as was received negatively by a native and a refugee student, while no one chose him positively.

	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	A18	A19	A20	STUDENTS' CLASSIFICATION		
A1	-	-						-		-	-	-									+	REJECTED	
A2		+	+			+	+	+								+						POPULAR	
A3		+	+			-					+											AVERAGE	
A4		+	+			+	+	+			+		+			-	-					POPULAR	
A5																					-	REJECTED	
A6							+		+						+	+					-	+	AVERAGE
A7															+								CONTROVERSIAL
A8											+							+			-	+	CONTROVERSIAL
A9						+														+		-	CONTROVERSIAL
A10												+		+							+		AVERAGE
A11		+	+			+		+							+	-	-			+			AVERAGE
A12									+	+			+	+								-	CONTROVERSIAL
A13				+	+					+		+	+	+						+	+		POPULAR
A14										+		+	+								+		POPULAR
A15																						-	REJECTED
A16						+															+	-	REJECTED
A17																						-	REJECTED
A18																						-	REJECTED
A19									+							+						-	CONTROVERSIAL
A20																						-	REJECTED

Figure 6. The Sociometry Table for the students after the intervention

Sociogram after the intervention

Figure 7 presents graphically the sociometric status of each student after the intervention:

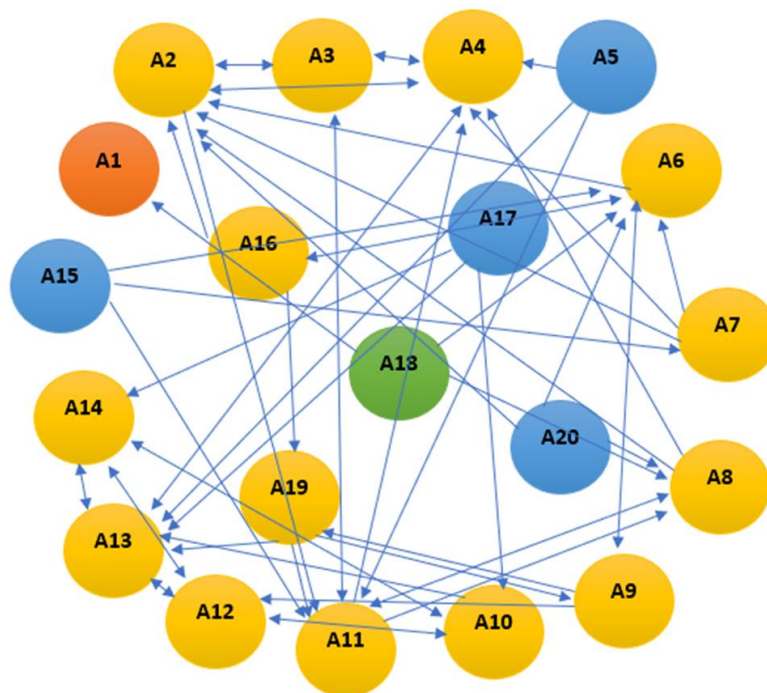


Figure 7. Sociogram after the intervention

According to Figure 7, F. (A1) is in red, because he did not complete anything in the positive and negative preferences questionnaire after the intervention. Also, E. (A17), Mo. (A18) and Ma. (A20) were not positively (Figure 7), by the same students as before the intervention. The other students chose classmates to work together and were also chosen. The classroom the sociometric status was changed after the intervention but no clear improvement in social interaction and relation were recorded.

Evaluation Questionnaire

Answering the questions of the evaluation questionnaire, students expressed their opinions for the activities they were involved in. All the students liked the activities and enjoyed themselves while they were working on the project. Twelve (12) of them found the activities easy but eight (8) students faced difficulties. Three (3) students faced difficulties in collaborating and communicating with others (one refugee students and two immigrants). Three (3) students faced difficulties in collaboration with the members of their working (one refugee students and two immigrants). Six (6) students should you wish to change working group while working group.

Sixteen students answered that they used knowledge concerning Coding, two (2) mentioned Mathematics and Physics and two more answered that knowledge concerning Coding, Mathematics and Physics in combination was needed. Ten (10) students stated that gained new knowledge on creating circuits and systems, six students (6) mentioned new knowledge in coding, but four (4) students talked about collaborating with friends. Eighteen (18) students liked most working on the construction and programming, but two (2) students enjoyed most working together with others. At the same time fifteen (15) students faced difficulties in coding. All students enjoyed discussions at the end of each session.

Conclusion

The aim of the study was to investigate the role of educational robotics activities as tools to observe and support the social relationships/interactions and social inclusion of refugee children in the classroom community of primary education schools. Based on the combination of the findings derived from the data collected by the research tools it could be supported that:

Educational robotics activities seem to be able to support social interaction of refugee children in the classroom community of primary schools to a certain extent. The short duration intervention supported social interactions and collaboration among students but without solving the problem of difficulties in the social integration of these students in the classroom community. Although improved social interactions between foreign and Greek students were observed by the researchers and kept on the observation sheets, this social trend was not recorded strongly in the sociometric test tools.

During the intervention, collaborative activities were highlighted, particularly during the construction phase of

the project. Verbally all students stated that they had not any problem cooperating with refugee students, but this was not strongly reflected in practice. Greek students cooperated and interacted quite strongly and positively with immigrant students or students with an immigrant background. The same was the case with refugee students who seemed to prefer interacting with immigrant students or students with an immigrant background.

The Arduino platform and the Scratch for Arduino programming environment seem to be suitable tools to support such social interactions and relationships in the educational community. Important issues for student collaboration, interaction and social relationships emerged that can be the basis for future interventions to explore educational and social questions in our ever-evolving multicultural society.

The limited number of refugee and immigrant participating children in the study (due to the difficulty in finding a school with refugee pupils, as they easily drop out of school), as well as the short duration of the intervention, serve as limitations of the study, preventing the generalization of the findings and conclusions. However, the observations and results of the intervention indicate a positive result of the intervention to support the social relationships/interactions and social inclusion of refugee children in the classroom community of primary education schools. Longer-term interventions are required to contribute to the scientific discussion regarding the benefits of educational robotics activities for refugee and immigrant children in the classroom.

References

- Agrusti, F., Gasparetti, F., Gena, C., Sansonetti, G., & Tkalcic, M. (2021). *Social and Cultural Integration with Personalized Interfaces (SOCIALIZE)*. ACM ISBN 978-1-4503-8018-8/21/04. <https://doi.org/10.1145/3397482.3450709>
- Bukowski, W., Hoza, B., & Boivin, M. (1994). Measuring Friendship Quality During Pre and Early Adolescence: The Development and Psychometric Properties of the Friendship Qualities Scale. *Journal of Social and Personal Relationships - J SOC PERSON RELAT*, 11, 471–484. DOI: 10.1177/0265407594113011
- Carolis, B. C., Cianciotta, M., Palestra, G., & Cervelione, A. (2019). Social Robots supporting the Inclusion of Unaccompanied Migrant Children: Teaching the Meaning of Culture-Related Gestures, *Journal of e-Learning and Knowledge Society*, v.15, n.2, 43-57.
- Coie, J., Dodge, K. & Coppotelli, H. (1982). Dimensions and types of social status: A cross-age perspective. *Developmental Psychology*, Vol.18(4), pp.557-570.
- Jung, S. E., & Won, E. S. (2018). Systematic Review of Research Trends in Robotics Education for Young Children, 2018, 10, 905, doi:10.3390/su10040905.
- Kalamatianou, M.E., Karatrandou, A. (2022). Utilization of educational robotics in the education of children on the autism spectrum. In C. Panagiotakopoulos, A. Karatrantou, S. Armakolas (eds). *Proceedings of the 7th Panhellenic Scientific Conference "Integration and Use of ICT in the Educational Process"*, 16-18/9/2022. Patras: ETIE ISBN: 978-618-83186-7-0 [in Greek].


- Karatrantou, A. & Panagiotakopoulos C. (2011). 'Educational robotics and teaching introductory programming within an interdisciplinary framework'. In A. Jimoyiannis (ed.), *Research on e-Learning and ICT in Education* (pp. 195-208). DOI 10.1007/978-1-4614-1083-6_15, Springer Science+Business Media, LLC 2011.
- Kiss,J., Primecz, H., Toarniczky, A. (2022). Patterns of Inclusion: Social Enterprises Targeting Different Vulnerable Social Groups in Hungary. *Journal of Social Entrepreneurship*, 13(3), 408-430, DOI: 10.1080/19420676.2020.1806101
- Lancheros-Cuesta, D., & Fabregat, R. (2022). Educational Robotics Intervention in the Motivation of Students. *IEEE Revista Iberoamericana de Tecnologias del Aprendizaje*, 17(2), 131-139.
- Panagiotakopoulos, C., & Sarris, M. (2015). *The preparation of a scientific paper using ICT: An integrated approach*. Athens: IQN Publications [in Greek].
- Simao, H., Avelino, J., Duarte, N., & Figueiredo, R. (2018). GeeBot: A Robotic Platform for Refugee Integration. *ACM*. ISBN 978-1-4503-5615-2/18/03. <https://doi.org/10.1145/3173386.3177833>
- Tsaliki, E. (2023). Educational Models for Managing Diversity: What's Next? *IntechOpen*. doi: 10.5772/intechopen.110069
- Zaragas, H., Mantzioukas, P., Stergiou, A., & Nikolaou, G. (2022). Researching the Behavior of Students Regarding the Multicultural Approach during of Physical Education Lesson in Greek Elementary School. *European Journal of Education and Pedagogy*, 3(6), 29-35.

Children with Autism and Educational Robotics: Education and Development of Social and Cognitive Skills


Anthi Karatrantou

University of Patras, Greece,  <https://orcid.org/0000-0002-5347-6251>

Maria-Evangelia Kalamatianou

University of Patras, Greece,  <https://orcid.org/0009-0004-8046-5306>

Christos Panagiotakopoulos

University of Patras, Greece,  <https://orcid.org/0000-0003-3162-9218>

Abstract: Educational Robotics in Greece is being used increasingly, while it is hesitantly applied in Special Education as it requires a properly educational trained staff. The present study is a case study aiming to discuss the effects of the utilization of educational robotics in a Special Education School classroom and specifically on students with Autism to support their social skills, interaction skills, as well as cognitive skills. Lego WeDo kit and the Scratch environment were used to support the work of the participated students. Observation sheets, evaluation sheets, semi-constructed interviews before and at the end of the interventions, focus group discussion at the end of the whole intervention, were the research tools. The intervention had a positive effect on students improving their social skills. The cooperation and interaction of the students was remarkable. They progressively increased their ability to respond to instructions and were willing to share their effort with each other and the researcher. Most children stayed focused on the activity and tried to use the materials and resources responsibly. Sometimes weakness in respectful behavior towards peers and the researcher was noted, but all children followed socially acceptable behaviors. Children seem to have improved cognitive skills and they showed moderate improvement in content creation. Sometimes they showed enthusiasm, while they seemed to persist when they encountered obstacles or failures.

Keywords: Educational Robotics, Lego WeDo Education, Scratch, Educational Intervention, Autism Spectrum Disorder.

Citation: Karatrantou, A., Kalamatianou, M., & Panagiotakopoulos, C. (2023). Children with Autism and Educational Robotics: Education and Development of Social and Cognitive Skills. In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023-- International Conference on Social and Education Sciences* (pp. 634-651), Las Vegas, NV, USA. ISTES Organization.

Introduction

Educational Robotics has made its appearance in the field of education for children to develop their skills of understanding technological issues from an early age. Educational robotics is a useful tool as teachers can adapt their lessons taking into consideration the needs of their students. Educational robotics has been increasingly used in recent years in all levels of education offering students the opportunity to interact with each other and with the constructions they create. In Greece, educational robotics has been gradually integrated into schools, while its implementation in Special Education has been more hesitant due to the requirement for adequately trained staff and technologically equipped classrooms (Pennazio, 2017, Karatrantou & Panagiotakopoulos, 2011).

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder characterized by a diverse range of symptoms and behaviors that impact an individual's social interaction, communication, and behavior. Individuals with ASD frequently face challenges in social interactions, such as forming and maintaining relationships, interpreting social cues, and sharing emotions and interests with others.

In recent years, the use of robotics in education for children with ASD has been gaining attention as a means of supporting children's learning and social development. *Social Assistive Robotics* designed to promote physical contact, focus on robot-person interactions, and employ neutral interaction strategies, facial expressions, and communication gestures to encourage social relationships, as well as *Cognitive Companion Robots* designed to provide cognitive and emotional support and potentially aid individuals with ASD in various aspects of their daily lives, represent a dynamic new trend in research.

Autism Spectrum Disorder (ASD)

According to the American Psychiatric Association (2013), the term 'Autism Spectrum Disorder' deals with a broad range of neurodevelopmental disorders that share two common elements, impaired social interaction, verbal and nonverbal communication, and patterns of behavior that are characterized as repetitive while interests are limited (Grant & Nozyce, 2013). A person with an autistic disorder demonstrates deprivation in social interactions, communication, while behaviors and interests are attributed as limited and continuous and, in some cases, many difficulties in language development are observed.

According to the 5th edition of the Diagnostic and Statistical Manual of Mental Disorders the deficiency is limited to two domains, *social communication*, and *repetitive behavior* (Albo-Canals et al., 2013; Sharma, Gonda & Tarazi, 2018). Children are mainly unable to communicate and interact with others, and their behaviors are uncontrolled and intermittent as they find it difficult to develop bonds with other people as they cannot understand social rules. They face weaknesses in terms of play that requires cooperation and primarily choose to engage in their own preferences (Albo-Canals et al., 2013; Sharma, Gonda & Tarazi, 2018).

Autism Characteristics

Language and Communication Characteristics

Children show deficiencies in communication that are not compatible with their age and intellectual abilities. These deficiencies are characterised by speech delay, echolalia, pronoun reversal, poor comprehension, and even complete lack of speech. Some children do not develop oral language, but can make simple sounds at an occasional level, or show weaknesses in conversational skills, descriptions, and narratives. In fact, some of them have difficulty in articulating and understanding humour, irony, and metaphor (Sharma, Gonda & Tarazi, 2018). Non-verbal communication is of low-level and may involve reduced eye contact, and difficulties in perceiving facial expressions and gestures (Campisi et al., 2018).

Reduced eye contact and low-level facial expressions are among the characteristics that distinguish children with autism. It is noteworthy that individuals with autism are unable to share their interest in others, and there is a lack of initiative and responsiveness to social interactions in the environment. Children find it difficult to express what they feel and think such as pain, sadness, joy (Sharma, Gonda & Tarazi, 2018). At the same time, they experience difficulty in combining different sensory stimuli which has the consequence of altering their ability to form complex mental representations, which are necessary for understanding abstract language and responding to social cues (Baum, Stevenson & Wallace, 2015).

Behavioral Characteristics

Some behavioral characteristics that children may exhibit include self-injury and externalizing behaviors, such as hitting other people. These behavioral expressions are likely to be exacerbated when children are feeling anxious, such as when they are in a medical setting or in a new place. The duration and presentation of these behaviors may vary from child to child (Johnson, et al., 2016). Other observed behavioral characteristics include limited, repetitive, and stereotypical movements, such as hand flapping, finger flicking, or periodic object manipulation (toy serialization).

In fact, some of the children express limited behaviors and interests, which can be long and focused. Simultaneously, issues with routines arise as some children display a compulsive need for stability, often accompanied by intense outbursts of anger when their schedule changes significantly (Johnson et al., 2016). Very interestingly, the children's behavior that occurs in anything to do with play emerges.

Children's play possesses repetitive and non-functional behavior. Those children prefer not to play in group games, and they show an undue obsession and focus on specific games (Gena, Papadopoulou, Loukrezi & Galanis, 2007). Furthermore, children are sensitive to sensory stimuli, have a reduced reaction to pain, and strong reactions to sounds, lights and smells are observed. Other researchers find other behavioral characteristics such as mood instability, some anger outbursts, disordered behavior, difficulties sleeping or eating (Nicholas et al., 2008).

Educational Robotics in Special Education

Many researchers are recognizing the usefulness of robots or robotic constructions as useful and reliable tools for *intervention, guidance, and support* for students with difficulties. The hypothesis that educational robotics can improve the performance of students with difficulties in both primary and secondary education is related to Papert's theoretical approach (Andruseac et al., 2015; Daniela & Lytras, 2018). Today educational robotics is considered as a fun and interactive educational methodology that fosters *development, critical thinking, creativity, autonomy, responsibility, dialogue and learning* through playful activities and projects. Working in a educational robotics framework, children with special needs communicate and interact with the programming environment, while testing their *physical, mental, and psychological* skills through projects.

Children with special educational needs do not have many opportunities to explore their environment and society because of lack of interaction and independence and may be led to believe that they are not capable of doing anything on their own. Educational robotics can play an important role in developing the self-confidence of children with these difficulties through controlling their own robotic construction (Daniela & Lytras, 2018). Robotic constructions can represent "*real objects*" that exist and act in the external world. They can move in a three-dimensional space and interact physically with both the environment and the person. They also have adjustable sensory stimulation where they can promote a perceptual experience more than that offered by a videogame. Often, robotic construction is described as a partner in activities since it can adapt its behavior at any time and is considered fundamental for social and emotional development. Finally, robots can foster and support interaction and create a connection between children with severe communication difficulties and their peers (Hamdan, Amorri & Hamdan, 2017).

Few studies worldwide confirm in school practice the value of educational robotics in this area, as it requires specialised knowledge by the teachers and tools that are usually not available in the school environment. However, in recent years, efforts have been made to find new ways and methods of integrating robotics in classrooms with students with special needs and abilities. (Andruseac et al., 2015).

Applications of Educational Robotics in Special Education

There are many different educational robotics packages that can be used in the education process, making it more effective and meaningful. Some types of robots stand out for their autonomy and evolution, such as the Interactive Robotic Social Mediators as Companions (IROMECS) or the humanoid robot NAO and offer impressive possibilities regarding their functions. Other robotic kits are distinguished for their flexibility, such as Lego Mindstorms kits, which allow children to form robotic constructions with different characteristics at a time, thus offering exiting possibilities (Pennazio, 2017). In recent years several studies on the use of robotics in children with special educational needs have been implemented.

Fridin and Yaakobi (2011) presented a project in which the humanoid robot NAO was used with children with

ADHD in preschool. The aim of this study was for the children to be supported in learning and attention as well as in other cognitive and intellectual activities. The results of the study were encouraging.

In the research of Neto et al. (2014 as cited in Conchinha, Osóro and de Freitas, 2015), an educational robotics workshop was created for 24 students attending public schools, one of whom had Down syndrome. The researchers concluded that educational robotics could promote interdisciplinarity, adaptive teaching and the inclusion of students with special needs in activities.

In their research Conchinha, Osóro and de Freitas (2015) present a strategy for inclusion and consolidation of knowledge based on playful learning using educational robotics. Participants of this study were 2 students aged 14-15 years old who were diagnosed as having learning difficulties, and were asked to assemble, program, and interact with a robotic construction created with a Lego Mindstorms package.

A typical example is the research of Jacq, Lemaignan, Garcia, Dillenbourg and Paiva (2016) in which they tried to create an activity for students with writing difficulties with the help of a NAO robot. In fact, the CoWriter platform was used to implement the activity in which the child interacts with the robot to teach him/her writing. At each stage of the activity, the robot had to convince the participants that it needed strongly the child's help. CoWriter is based on learning by example and aims to develop the child's self-confidence and motivation. The study involved children with writing difficulties, some had audiovisual deficiencies, and some were under the care of an occupational therapist. The results of the research showed significant engagement of the children in the activities they were asked to complete. In fact, the time spent by the children to plan the activities systematically increased from one session to the next (Jacq, Lemaignan, Garcia, Dillenbourg & Paiva, 2016).

Hamdan, Amorri and Hamdan (2017) used a NAO robot to teach English to students diagnosed with dyslexia. The NAO robot with its capabilities is challenging, as through it students have the opportunity to practice their cognitive and social skills. Indeed, students participated in language processing activities and the results showed that students with dyslexia actively participated, were challenged, and practiced their cognitive, linguistic, and social skills. At the same time, they became more active, efficient, and able to overcome difficulties in writing or reading. Teachers in turn recognized the value of educational robotics, since they were able to adjust their lesson objectives and teaching as best as possible (Hamdan, Amorri & Hamdan, 2017).

The Aim of the Study and the Research Questions

The aim was to investigate whether and to what extent educational robotics activities could support and promote social interaction as well as cognitive skills of children on the Autism Spectrum through the construction and programming of simple robotic structures. The research questions of the study were:

Could educational robotics activities support students on the Autism Spectrum to empower their:

- social skills as *attention*, *collaboration*, and *interaction* skills?
- cognitive skills concerning concepts such as '*direction*', '*orientation*', '*problem design solution*',

'time', 'programming commands' and 'coding'?

Method

The methodology of the research is based on the research works of Albo-Canals et al., (2018), Huijnen et al., (2017) and Sandygulova et al., (2019). The research is designed to be implemented with students in the autistic spectrum attending a special education primary school and it was a case study. The Lego WeDo kit and the Scratch programming environment (<https://www.media.mit.edu/posts/member-collaboration-lego-s-wedo/>, <https://scratch.mit.edu/wedo-legacy/>,) were used as tools to support students' work.

The Research Tools

The research tools of the study are based on the research tools in the research works of Albo-Canals et al., (2018), Huijnen et al., (2017) and Sandygulova et al., (2019) and were adapted according to the needs of the educational procedure and the characteristics of the students.

The research tools used were:

- G. *Observation sheets* during the intervention
- H. *Evaluation sheets* during the intervention
- I. *Semi-constructed interviews before and the end* of the interventions
- J. *Focus group discussion* with the students at the end of the whole intervention.

Observation Sheets

They are based on the ones used in the research of Albo-Canals et al., (2018) and Huijnen et al. (2017).

The sheets based on the research of Albo-Canals et al. (2018) are related to children's *behavior* while they are engaged with robotic constructions. These behaviors are categorized into three main areas:

Non-Verbal Communication: This category involves the observation of non-spoken interactions, such as body language, gestures, facial expressions, and other non-verbal cues expressed by the children during their engagement with robotic construction.

Verbal Communication: This category involves the children's spoken communication, including their use of language, the content of their conversations, and the way they communicate verbally working with robotic constructions.

Construction: The behavior related to the construction category focuses on how the children interact with and

handle the robotic construction itself. This could involve how they assemble, program, or interact with the robotic components.

<i>Category: Non-verbal communication</i>	
Micro-behavior	Description
Gaze at robot	Participant maintains gaze on robot > 1 s
Gaze human	Participant maintains gaze on face/eye > 1s, not reciprocated
Mutual attention	Mutual eye contact between participant and another person
Group attention	Group mates jointly look at same object
Pointing robot	Hand/finger/arms directed to robot
Pointing Person	Hand/finger/arms directed to person
<i>Category: Verbal communication</i>	
Micro-behavior	Description
Meaningful conversation	Meaningful, in relation to activity
Tangential conversation	Non-meaningful relative to activity
Echolalia/ scripting	Repetitive phrases
Initiates conversation	Participant begins talking to another person
Responds	Participant responds to conversation started by others
Interrupts	Participant verbally/non-verbally interrupts another person
<i>Category: Construction/Dynamics</i>	
Micro-behavior	Description
Turn taking	Participants takes turns in activity with one or more other persons
Collaboration	Participant takes part in negotiation, sharing, asking for opinion of others
Affect Sharing	Participant shares positive affect with at least one other person
Proximity	Participant is within 100 cm of another person
Distractive behavior	Participant disrupts activities of group mates (not conversation)
Ask help/permission	Participants seeks out adult input
Collaboration	Participant puts robot together with another student
Independence	Participant puts robot together alone
Disengagement	Participant is not focused on robot
Robot manipulation	Participant is actively attempting to manipulate robot
Robot access	Participant has access to robot

Figure 1. Observation sheets based on the research of Albo-Canals et al. (2018)

The sheets of Huijnen et al., (2017) are designed to capture information related to the *objectives* of the educational intervention and the *role of robotic construction* in ways as:

Educational Objectives: documentation of how educational intervention aligns with the objectives and of how robotic construction contributes to achieving these educational goals.

Intervention Details: The duration, frequency, and location of the educational intervention are described. This information helps in understanding the logistical aspects of the intervention.

Summary of the Intervention: This summary highlights both the aspects that participants found easy and those they found challenging during the activity.

These observation sheets (see Figure 2) serve as a comprehensive record of the educational intervention, allowing researchers and educators to evaluate its effectiveness, identify areas of difficulty, and make informed decisions for improvements in future interventions.

Intervention name:		Goal of the session:			
FOCUS ON OBJECTIVE (S):	Role of the Robot:	Characteristics of the target group:			
On which objective(s) does the intervention focus? Multiple objectives possible	What roles does the robot have? Note multiple possibilities.	Please describe the child		Level of functioning	
Imitation in play	Provoker	<input type="checkbox"/> High		<input type="checkbox"/> Not applicable	
Making contact	Reinforcer	<input type="checkbox"/> Normal		<input type="checkbox"/> Specific level	
Imitation in social/interpersonal interaction and relationships	Trainer	<input type="checkbox"/> Low		<input type="checkbox"/> Multiple levels	
Tum taking	Mediator	Session properties			
Orientation to listen	Prompter	<input type="checkbox"/> Individual session	Duration and frequency	Who? Describe the professional and their role	Where? Describe the environment
Social routines (greet, say goodbye, introduce)	Diagnoser	<input type="checkbox"/> Group session			
Attention	Buddy	<input type="checkbox"/> Free			
Learn a new form of communication		<input type="checkbox"/> Structured			
Talk – use verbal abilities		<input type="checkbox"/> Semi-Structured			
Train or practice new skills		Summary of the intervention			
Follow up instructions		Options for the gradual increase or decrease of difficulty to ensure transfer:		Measurements Reference to literature Scenario code	
Pose a question / ask for help		Easier:			
Having fun		More difficult:			
Develop interest in play					
Other, namely:					

Figure 2. Observation sheets based on the research Huijnen et al., (2017)

Evaluation Sheets

The evaluation sheets are based on the tools of Albo-Canals et al., (2018) which refer to the *Positive Technology Development Checklist*, a structured way to assess and evaluate various aspects related to *technological development* in children describing whether children needed support to complete the activities carried out per session. The checklist addresses the categories of *communication*, *collaborative behavior*, *content creation*, *creativity*, and *behavioral choice*. Each category is rated on a scale from 0 to 3.

Scoring criteria		
0: Particular behavior not observed. Task not complete		
1: Needed almost complete or complete support		
2: Needed moderate support, but partially independent		
3: Needed almost no or no support		
Tasks/ behaviors	Score	Category
Students take directions from teacher (e.g. sits when told)	0 1 2 3	Communication
Students responds back to the teacher (answering questions...)	0 1 2 3	
Student initiates relevant communication with teacher	0 1 2 3	
Student shares their work with teachers	0 1 2 3	Cooperative behavior
Student shares their work with classmates	0 1 2 3	
Student helps to clean up at the end of the session	0 1 2 3	
Student can create a functional program for their robot	0 1 2 3	Content creation
Student is enthusiastic/interested about their project/creation	0 1 2 3	
Student persists in spite of obstacles or setbacks	0 1 2 3	
Student can put robot blocks together	0 1 2 3	
Student can scan the code	0 1 2 3	
Student is playing/exploring different robot parts, blocks	0 1 2 3	Creativity
Student is exploring in unexpected ways	0 1 2 3	
Student is having fun as they work on their projects	0 1 2 3	
Student is focused on the activity chooses to engage with it	0 1 2 3	Choice of conduct
Student is able to focus on the task	0 1 2 3	
Student is respectful to peers and teachers	0 1 2 3	
Student are using materials and resources responsibly	0 1 2 3	

Figure 3. Evaluation sheets based on the research of Albo-Canals et al. (2018)

Semi-constructed Interviews

The interviews (Figure 4) are based on the research of Sandygulova et al., (2019) between the classroom teacher and the researcher and were taken before and at the end of the interventions.

Questions before of the activities.	
What are the child's capabilities?	
What weaknesses does the child express?	
Could you describe the social skills of the child?	
How does the child interact with his/her classmates?	
How does the child interact with the teacher?	
How does the child react to changes in his/her schedule?	
How does the child express his/her emotions?	
To what extent does the child use technological devices such as tablets, mobile phones, and computers?	
Do you believe that engaging with robotics will help the child with his/her social skills?	
	Questions after the end of the sessions
	How did children interact with their classmates during the activities?
	How did they interact with the researcher during the activities?
	How did they interact with the robotic construction?
	Did they express emotions? What emotions?
	Did they express emotions related to the activity before it?
	Did they express emotions related to the activity after it?
	Did they express desires related to the activity? How?
	Do you believe that engagement with robotics helped the child in his/her social skills?
	Have you observed any change in the child's behavior during the activities?
	How would you characterize the child's reaction to the robotic construction?

Figure 4. Semi-constructed interviews based on the research of Sandygulova et al., (2019)

Focus group discussion.

The focus group discussion with the students took place at the end of the whole intervention. Asking children about the positive effects and seeking feedback at the end of the sessions is a child-centered and insightful approach to assess the impact of the educational activities, improve the quality of the educational activities, and ensure that they align with the needs and experiences of the children involved (Figure 5).

"Questions after the end of the sessions for the children"
Did you enjoy the activities?
What did you like the most?
Was there something you didn't like? If so, why?
What was challenging for you?
What do you think you learned from what we did?
How did you cooperate with your classmates?
Did you enjoy working with the other kids?
Could you express your opinion?
Did your classmates listen to you?
Did you listen to the other children?
Were you helped by your classmates?
Did you help any of your classmates?
Would you prefer to do the activity by yourself?
Did you get tired of the activities? If yes, why?
What made you tired?
Do you think you could do the activity on your own?
Would you like to do more activities?

Figure 5. Focus group questions.

Reliability and Validity

All the research tools were checked for validity and reliability as required by the rules of educational research (Panagiotakopoulos & Sarris, 2015). The evaluation and observation sheets used as well as the questions for the interview before and after the intervention, were translated from English to Greek by a person who speak the English language perfectly. Afterwards, a reverse translation was made from Greek to English to check whether the meaning of the statements and the questions remained the same without meaningful differences (back translation) (Brislin, 1970). After that, three experts, one in educational robotics, one educator, and one expert in children with special needs specifically in autism, reviewed the tools and commented on their validity. The purpose was to check whether the statements and questions could answer the research questions, whether they were completed and appropriate for the purpose of the study. Some comments by the experts regarding the wording of the questions and statements and appropriate corrections were made.

Procedure

The educational activity had a duration of twenty (20) hours in total (two (2) 2-hour sessions per week for five (5) weeks), it was based on nine (9) worksheets and consisted of two distinct phases:

A. Familiarization Phase

The Familiarization Phase consisted of two 2-hour sessions in one week:

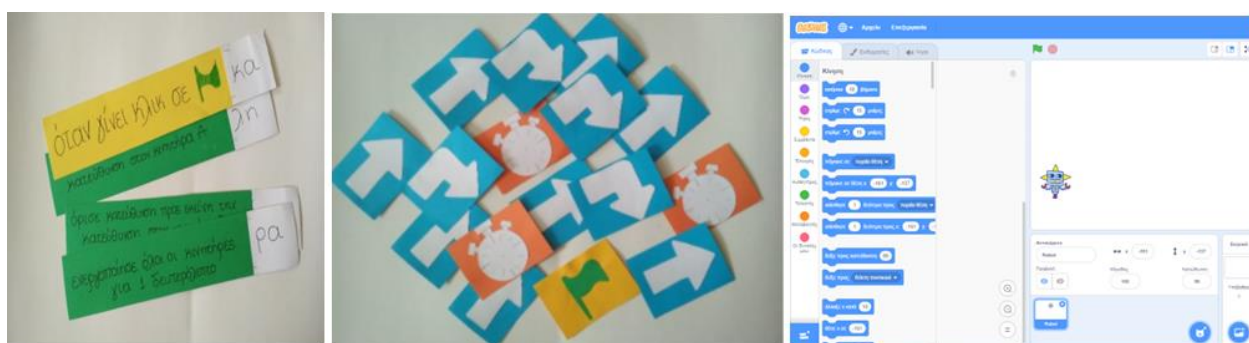


Figure 6. Snapshots of children's tools while working

1st Session: During the first session, students became familiar with the Scratch software (Figure 6). They used basic programming commands, such as those required to move a character on the screen in specific directions in order to follow a predetermined path (*Worksheet 1 - Phase A*).

2nd Session: The second session introduced students to the Lego WeDo educational robotics kit. During this session, students engaged in assembling a robotic construction using numbered images as a guide. They also programed this robotic construction to move within the room (*Worksheet 2 - Phase A*).

B. The main Activity Phase

The Main Activity Phase is structured to progressively introduce students to various aspects of robotics, programming, and problem-solving supporting their creativity and problem-solving skills. It called students for hands-on learning experiences and completed in a session for feedback and discussion, ensuring that students have the opportunity to reflect on their experiences and learning throughout the program (see Figure 7).



Figure 7. Snapshots of children's work

1st Session: Introduction to the world of robotics, playing with a robotic construction - Exploring the students' capabilities (Worksheet 1 - Phase B).

2nd Session: Introduction to the programming environment of Scratch. Programming a screen robot to reach its destination (Worksheet 2 - Phase B).

3rd Session: Building a real robot with the help of images. A game - Children give it a name and provide commands without any conditions (Worksheet 3 - Phase B).

4th Session: Programming a real robot to reach its destination - Condition: the path to the finish (Worksheet 4 - Phase B).

5th, 6th, 7th Session: Programming both virtual and real robots - Condition: guiding the two robots to the correct fruit according to the story-puzzle (Worksheets 5, 6, 7 - Phase B).

8th Session: Interview with the class teacher - Feedback and discussion with the students.

Participants

The participating students were seven (7) boys aged 9-14 years old who attended a Special School in Patras Greece. In Table 1 characteristics of the participating students are described shortly. This data derived from the interview with the classroom teacher before the start of the intervention. Based on these characteristics the

researchers were enabled to prepare and design the educational activities more effectively.

Table 1. Participants' Characteristics

Name	Age	Sex	Stereotypical behaviors	Favourites	Additional notes
DK	14	Boy	Excessive verbosity	Computers Volcanoes, Planets Nature	Easily distracted Accepts changes if they are known in advance Expression of emotions
GB	12	Boy	none	Computer games	Upsets the team's balance Expresses sympathy (especially with BB) Guidance for expressing emotions
BB	11	Boy	none	Computer games Superheroes, Cars	Considerable insecurity Requires guidance Leadership role within the team
E	12	Boy	none		Bilingual environment Inadequate reading and writing skills Desire for socialization Loses interest easily
FD	13	Boy	none	Flags of countries	Isolation Disturbance when the routine changes Guidance and reminder of rules
GS	9	Boy	none		Weaknesses in reading and writing Desire for interaction
D	12	Boy	none		Difficulty in reading and writing Outbursts of anger Difficulty in teamwork

Results and Discussion

The results of the study are presented below as they derived from the analysis of the data collected by the research tools, and they combined with each other in order for the research questions to be answered.

Familiarization Phase

During this phase the results were obtained from the combination of the researcher's and the class teacher's free notes observing the students participating and interacting in the activities. Students expressed enthusiasm for the

screen robot, showing a strong interest in the activity. They actively engaged in the session, indicating their willingness to participate in the learning process. They named the screen robot ‘Phineas’, and experimented with various programming commands, indicating a proactive approach to learning. Students successfully guided the screen robot, Phineas, to reach the finish flags, demonstrating an understanding of the basic commands. During the 2nd session, they were excited about the Lego WeDo educational robotics kit, and they put active participation efforts assembling a robotic construction with the help of numbered images. They named the robot ‘Ferb’ and experimented with programming commands, arranging syllables in the correct order and creating words.

Main Activity Phase

Based on the *evaluation sheets*, figure 8 summarizes the results for each category (*communication, cooperative behavior, content creation, creativity, and behavior selection*) for each child during each session at the Main Activity Phase.

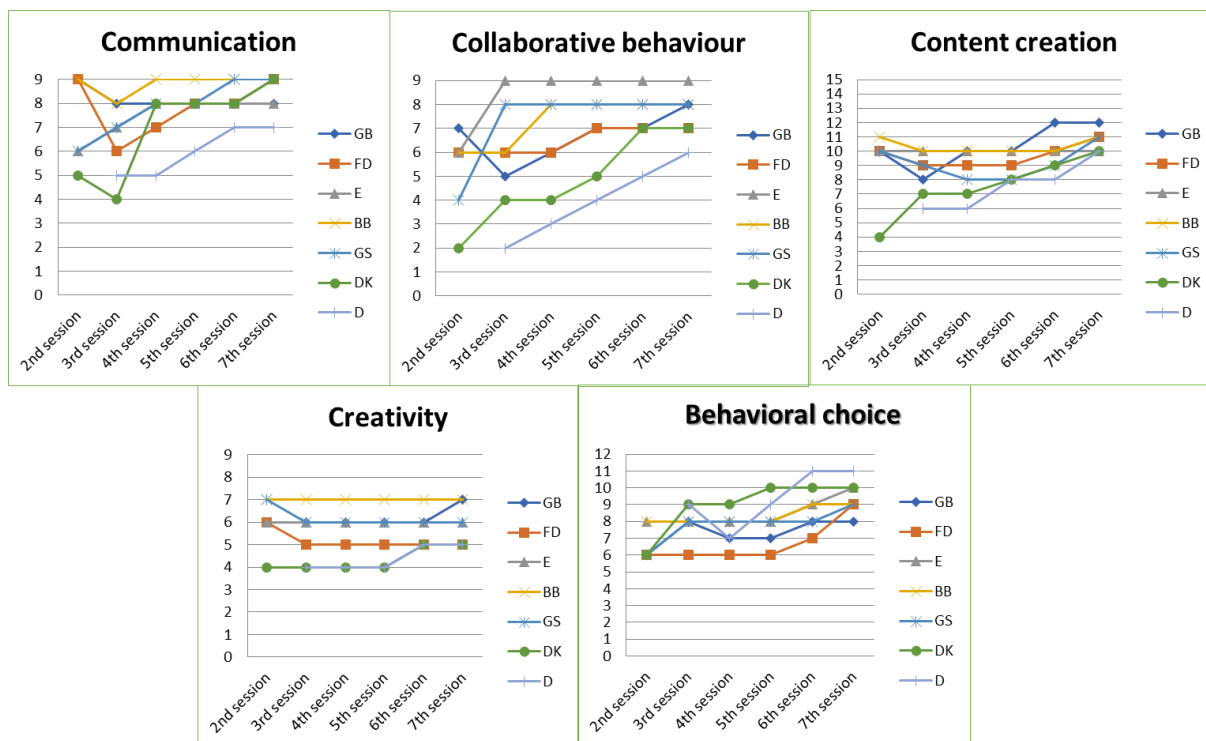


Figure 8. Results of the evaluation sheets for each category, each child during each session during the Main Activity Phase

Combining the results of the observation and evaluation sheets and taking into consideration the verbal and non-verbal communication among children during the construction and the programming can be supported that:

Communication: most children improved their communication and social skills; they could receive and follow

instructions by the researcher, respond to questions as the sessions progressed and were able to start discussions. *Collaborative Behavior*: the cooperation and interaction among students was remarkable, as they worked together on the implementation of each activity. They were willing to share their ideas and efforts with each other and the researcher during the activities, they seemed to interact with each other and to cooperate to solve the problem each time. Most children stayed focused on the activity and tried to use the materials and resources responsibly. It is important to notice that children learned to wait their turn during working. Furthermore, they were willing to help with the classroom cleaning.

Content Creation: children showed enthusiasm for creating the program when it was a functional one. They were characterized by perseverance to solve problems despite obstacles or failures, combining coding commands and paying strong attention to create a functional program. Furthermore, children seem to have improved cognitive skills regarding concepts of ‘direction’, ‘orientation’, ‘problem-solving solution’, ‘time’, ‘programming commands’, ‘code’. Finally, it seemed that the educational intervention was fun and motivating for the students.

Creativity: children were working exploring different parts of robotics construction, sometimes they were exploring in unexpected ways, and they seemed to having fun while working on the activity.

Behavioral Choice: most children were focused on the activity, showed concentration on the work and respect to the team using the material responsibly. Sometimes weakness in respectful behavior towards peers and the researcher was noted, but no extreme behaviors were observed as children followed socially acceptable behaviors and most showed improvement in terms of interaction.

During the *Focus group discussion* remarkable findings arose. The feedback from the children showed that: Most of the children enjoyed the activities while programming *Ferb* and *Phinea* to perform various movements. They stated that the activities were challenging for them as well as easy and enjoyable, particularly when giving commands to the robots. These responses reflect the positive experiences and teamwork observed among the children during the activities, as well as their enjoyment and learning during the process. It also demonstrates the development of social skills such as *patience*, *collaboration*, and *mutual support*.

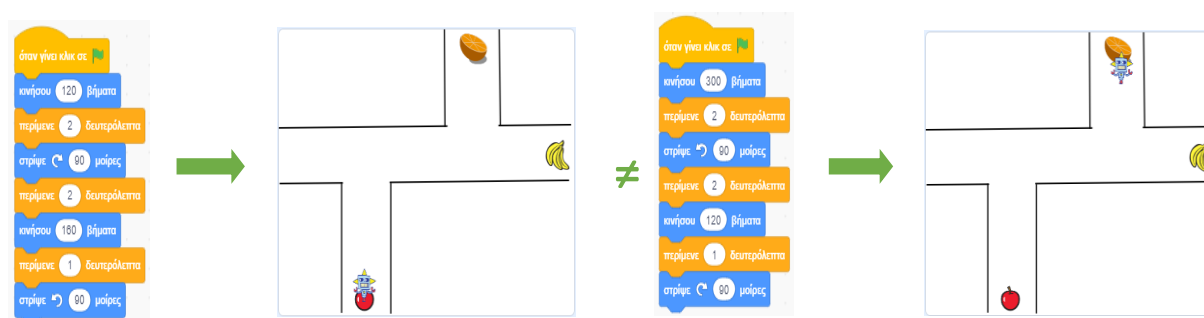


Figure 8. Parts of children codes

Combining the findings of all research tools, and especially based on the *interview with the teacher of the classroom after the end of the intervention*, it is notable that the educational activities had a positive impact on children's learning and understanding of various concepts such as:

Direction and Orientation: Children effectively used auxiliary cards to plan the path that the robotic construction should follow, indicating their ability to understand and apply concepts related to direction and orientation.

Problem-Solving and Design: The activities facilitated problem-solving and the design of solutions. When faced obstacles, children actively attempted to devise solutions, they recognized their mistakes through testing and trial-and-error. They worked hard to identify the incorrect commands each time, demonstrating their problem-solving skills and their ability to adapt and refine their programming. These observations showed how the educational activities not only enhanced technical and cognitive skills but also encouraged the development of problem-solving abilities and the understanding of fundamental concepts related to direction and orientation.

Understanding Programming Commands: Children showed an improved understanding of programming commands, recognizing that each command produces a distinct result in the robotic construction or the screen robot. This signifies their ability to associate specific commands with their corresponding actions.

Understanding the Concept of Code: Children introduced to the concept of code, realizing that the placement of commands in a specific order is crucial to achieving a desired result, recognizing the sequencing and logic required in coding to produce the desired outcomes. These observations highlight the children's increasing proficiency in fundamental programming principles and their ability to manipulate commands and code effectively to control the behavior of the robotic construction and screen robot.

The findings based on the interview with the teacher of the classroom after the end of the intervention confirmed the possible benefits for the children concerning new behaviors or concealment of behaviors with a focus on their collaboration.

It is noteworthy to notice that the heterogeneity of the students in the classroom makes it necessary to have an educational tool that can be adapted to the needs of each student. Adaptive robotics-assisted educational interventions are a powerful educational medium due to their adaptability (Huijnen et al., 2017). Children with their participation in such educational interventions' express feelings and thoughts regarding the programming and assembly of robotic constructions (Conchinha, Osóro & de Freitas, 2015). They develop social skills through their collaboration and understand the importance of solution planning (Andruseac et al., 2015, Kalamatianou & Karatrandou 2022). Through their work with simple robotic constructions, childrens'creativity, responsibility and dialogue are developing as found in the research of Conchinha, Osóro & de Freitas (2015) and Andruseac et al., (2015).

Conclusion

The aim of the study was to investigate whether and to what extent educational robotics activities could enhance social interaction and cognitive skills in children on the Autism Spectrum, achieved through the construction and programming of simple robotic devices - constructions.

The findings of the study showed that the educational intervention with the Lego WeDo kit had a positive effect on students improving their social skills. The cooperation and interaction of the students was remarkable, as they worked together on the implementation of the activities. They progressively increased their ability to take instructions from the researcher and responded to her questions. In addition, children were willing to share their effort with each other and the researcher during the activities. Most children stayed focused on the activity and tried to use the materials and resources responsibly. The children's ability to focus and concentrate on the activities improved gradually, indicating an increasing ability for sustained attention.

Children appeared to engage with each other and collaborate effectively in problem-solving activities. They demonstrated responsiveness to both the researcher's guidance and questions, as well as those posed by their classmates, creating an engaging and interactive learning environment. Collaboration was a prominent aspect, with the children working together to tackle the assigned tasks.

They initiated discussions and asked questions, showcasing their cooperative spirit. They also learned important social rules, such as the need to wait one's turn. This illustrates the integration of essential social norms within the educational setting, contributing to social development. It is worth noting that one student gained recognition from their peers for active participation in the activities, which suggests the acknowledgment of individual efforts within the group. Over the sessions, there seemed to be a gradual improvement in the children's behavior. While occasional lapses in respectful behavior towards peers and the researcher were observed, no extreme behaviors occurred, as the children generally adhered to socially acceptable behavior and showed improvement in their interactions.

In terms of content creation, children showed moderate improvement as the sessions progressed. At times, they exhibited enthusiasm during the activities, while in other instances, they demonstrated persistence when faced with obstacles or failures. It appeared that the children enhanced their cognitive skills related to concepts such as 'direction,' 'orientation,' 'problem-solving solutions,' 'time,' 'programming commands,' and 'code'. Finally, the educational intervention seemed to be enjoyable and motivating for the students.

The limited number of participating children in the study, as well as the short duration of the intervention, serve as limitations of the study, preventing the generalization of the findings and conclusions. However, the observations and results of the intervention collectively indicate a positive and collaborative learning environment in which children improved their cognitive and technical skills. More importantly, they also

demonstrated support for their essential social and interpersonal competencies. Longer-term interventions are required to contribute to the scientific discussion regarding the benefits of educational robotics activities for children on the Autism Spectrum, particularly in promoting their social interaction and cognitive skills.

References

- Albo-Canals, J., Martelo, A. B., Relkin, E., Hannon, D., Heerink, M., Heinemann, M., Bers, M. U. (2018). A pilot study of the KIBO robot in children with severe ASD. *International Journal of Social Robotics*, 10(3), 371-383. <https://doi.org/10.1007/s12369-018-0479-2>
- Andruseac, G.G., Adochiei, R.I., Pasarica, A., Adochiei, F.C., Corciova, C. & Costin, H. (2015). Training program for dyslexic children using educational robotics. In *E-Health and Bioengineering Conference* (1-4). <https://doi.org/10.1109/EHB.2015.7391547>
- Baum, S. H., Stevenson, R. A., & Wallace, M. T. (2015). Behavioral, perceptual, and neural alterations in sensory and multisensory function in autism spectrum disorder. *Progress in neurobiology*, 134, 140-160.
- Campisi, L., Imran, N., Nazeer, A., Skokauskas, N., & Azeem, M. W. (2018). Autism spectrum disorder. *British Medical Bulletin*, 127(1).
- Conchinha, C., Osório, P., de Freitas, G.C. (2015). 'Playful learning: Educational robotics applied to students with learning disabilities,' *International Symposium on Computers in Education (SIIE)*, Setubal, Portugal, 2015, pp. 167-171. <https://doi.org/10.1109/SIIE.2015.7451669>
- Daniela, L., & Lytras, M. D. (2019). Educational robotics for inclusive education. *Technology, Knowledge and Learning*, 24, 219-225.
- Fridin, M., & Yaakobi, Y. (2011). Educational robot for children with ADHD/ADD. *Architecture Design*.
- Gena, A., Papadopoulou, E., Loukrezi, S., & Galanis, P. (2007). The play of children with autism: Theory, assessment, and research on treatment. *Autism research advances*, 1-40.
- Grant, R. & Nozyce, M. (2013). Proposed changes to the American Psychiatric Association diagnostic criteria for autism spectrum disorder: Implications for young children and their families, *Maternal and child health journal*, 17(4), 586-592. . <https://doi.org/10.1007/s10995-013-1250-9>
- Hamdan, K., Amorri, A., & Hamdan, F. (2017). Robot technology impact on dyslexic students' English learning. *International Journal of Educational and Pedagogical Sciences*, 11(7), 1944-1949.
- Huijnen, C. A. G. J., Lexis, M. A. S., Jansens, R., & De Witte, L. P. (2017). How to Implement Robots in Interventions for Children with Autism? A Co-creation Study Involving People with Autism, Parents and Professionals. *Journal of Autism and Developmental Disorders*, 47(10), 3079-3096. <https://doi.org/10.1007/s10803-017-3235-9>
- Jacq, A., Lemaignan, S., Garcia, F., Dillenbourg, P., & Paiva, A. (2016, March). Building successful long child-robot interactions in a learning context. In *2016 11th ACM/IEEE International Conference on Human-Robot Interaction (HRI)* (pp. 239-246). IEEE.
- Johnson, N. L., Burkett, K., Reinhold, J. & Bultas, M. W. (2016). Translating research to practice for children

- with autism spectrum disorder: Part I: Definition, associated behaviors, prevalence, diagnostic process, and interventions. *Journal of Pediatric Health Care*, 30(1), 15-26. <https://doi.org/10.1016/j.pedhc.2015.09.008>
- Kalamatianou, M.E., Karatrandou, A. (2022). Utilization of educational robotics in the education of children on the autism spectrum. In C. Panagiotakopoulos, A. Karatrantou, S. Armakolas (eds), *Proceedings of the 7th Panhellenic Scientific Conference "Integration and Use of ICT in the Educational Process"*, 16-18/9/2022. Patras: ETIE ISBN: 978-618-83186-7-0 [in Greek].
- Karatrantou, A. & Panagiotakopoulos C. (2011). 'Educational robotics and teaching introductory programming within an interdisciplinary framework'. In A. Jimoyiannis (ed.), *Research on e-Learning and ICT in Education* (pp. 195-208). Springer LLC. https://doi.org/10.1007/978-1-4614-1083-6_15
- Nicholas, J. S., Charles, J. M., Carpenter, L. A., King, L. B., Jenner, W., & Spratt, E. G. (2008). Prevalence and characteristics of children with autism-spectrum disorders. *Annals of epidemiology*, 18(2), 130-136.
- Panagiotakopoulos, C., & Sarris, M. (2015). *The preparation of a scientific paper using ICT: An integrated approach*. Athens: IQN Publications [in Greek].
- Pennazio, V. (2017). Social Robotic to help children with autism in the Interaction through imitation, *Research on Education and Media*. DOI: <https://doi.org/10.1515/rem-2017-0003>
- Sandygulova, A., Zhexenova, Z., Tleubayev, B., Nurakhmetova, A., Zhumabekova, D., Assylgali, I., Rzagaliyev, Y., & Zhakenova, A. (2019). Interaction design and methodology of robot-assisted therapy for children with severe ASD and ADHD. *Paladyn*, 10(1), 330-345. <https://doi.org/10.1515/pjbr-2019-0027>
- Sharma, S. R. & Gonda, X. & Tarazi, F. I. (2018). Autism spectrum disorder: classification, diagnosis and therapy. *Pharmacology & therapeutics*, 190, 91-104. <https://doi.org/10.1016/j.pharmthera.2018.05.007>

Navigating Global Concerns: Comprehensive Examination of the Fukushima Wastewater Release: Scientific Communication and Citizen Science Engagement in the Information Age

Kuixi Du

University of Southern Mississippi, USA,  <https://orcid.org/0009-0009-6418-3356>

Denise Williams

University of Southern Mississippi, USA,  <https://orcid.org/0000-0003-4467-6259>

Jonathon Geiger

University of Southern Mississippi, USA,  <https://orcid.org/0000-0001-5911-6612>

Tommie Killen

University of Southern Mississippi, USA,  <https://orcid.org/0009-0007-9144-5935>

Abstract: In August 2023, Japan initiated a 30-year release of one million tons of water from the Fukushima nuclear plant into the Pacific Ocean, triggering global concerns. China, Japan's largest seafood importer, halted Japanese seafood imports, highlighting the contentious nature of the event. While Japan and international bodies assert water safety, dissenting voices call for further research and a cessation of the release. South Korea cautiously emphasizes Japan's commitment to scientific standards but faces public opposition. Similar discontent arises in Hong Kong and Tokyo. Environmental groups advocate prolonged storage. In China, domestic seafood consumption dropped due to nuclear wastewater fears, leading to emotional debates among fishermen, who grapple with the safety of locally sourced seafood. This reaction is mirrored by a surge in demand for table salt, motivated by concerns over potential sea salt contamination—an echo of the early days of the COVID-19 pandemic when toilet paper and face masks were stockpiled. These pronounced and, at times, visceral public reactions underscore the profound disconnect between scientific experts and the general public on specialized issues. This schism is further exacerbated by the potent influence of governments and financial interests on scientific research, casting a shadow on scientific impartiality and transparency. This research paper posits four areas illuminate the complex interplay between scientific communication, citizen science engagement and international collaboration in addressing the Fukushima water release and its broader implications.

Keywords: Fukushima Nuclear Wastewater; Citizen Science; Crisis Scientific Communication, International Collaboration, Social Media.

Citation: Du, K., Williams, D., Geiger, J., & Killen, T. (2023). Navigating Global Concerns: Comprehensive

Examination of the Fukushima Wastewater Release: Scientific Communication and Citizen Science Engagement in the Information Age. In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023-- International Conference on Social and Education Sciences* (pp. 652-679), Las Vegas, NV, USA. ISTES Organization.

Introduction

In the aftermath of the catastrophic earthquake that struck Fukushima, Japan, on March 11, 2011, a sequence of devastating events unfolded at the Fukushima Daiichi nuclear power plant, leading to a calamitous nuclear accident (World Nuclear Association, 2023). Triggered by a colossal 15-meter tsunami, the plant's infrastructure suffered severe damage, resulting in the disabling of power supply and cooling systems for three reactors. This led to a rapid and severe escalation of consequences, with all three reactor cores experiencing extensive meltdown within the initial three days following the disaster. Recognizing the gravity of the situation, the incident was officially classified as a level 7 event on the International Nuclear and Radiological Event Scale (IAEA, 2023). This classification primarily stemmed from the substantial release of radioactive materials, notably around 940 petabecquerels (PBq) of iodine-131 equivalent (I-131 eq) radiation discharged into the environment between days 4 and 6.

Beyond the immediate destruction of the reactor cores, the Fukushima Daiichi nuclear accident had profound and lasting consequences. All four reactors at the site, contributing a collective 2,719 megawatts electric (MWe) of net capacity, were rendered inoperable due to extensive damage. In the weeks that followed, a dedicated effort was made to stabilize the three most severely affected reactors (Units 1 to 3) through measures such as water injection. By July of the same year, a significant milestone was achieved with the successful maintenance of reactor cooling using recycled water from a newly established treatment facility. The culmination of these efforts was the official declaration of a state of "cold shutdown condition" in mid-December, marking a pivotal step in crisis management (IAEA, 2023).

One of the primary challenges in the aftermath of the Fukushima Daiichi nuclear accident was preventing the release of radioactive materials, particularly the containment of contaminated water that had leaked from the affected reactor units. This issue gained widespread attention and became a focal point in public discourse, particularly in August 2013. Despite the immense scale of the disaster and the significant challenges it presented, there were no recorded deaths or cases of radiation sickness directly attributed to the nuclear accident. Nevertheless, as a precautionary measure, over 100,000 people were evacuated from their homes, highlighting the gravity of the situation and the potential health risks associated with the release of radioactive materials (World Nuclear Association, 2023; BBC News, 2023). The cautious approach taken by the government, driven by concerns for public safety, consequently delayed the return of many evacuees to their homes (BBC News, 2023).

Official data from the World Nuclear Association (2023) reveals 2,313 disaster-related deaths among individuals evacuated from Fukushima Prefecture post-catastrophe. It is crucial to note that these disaster-related deaths are distinct from the approximately 19,500 fatalities attributed to the earthquake and tsunami itself. This tragic confluence of events underscores the profound and lasting impact of the Fukushima Daiichi nuclear accident, encompassing both immediate consequences and long-term challenges related to nuclear safety and disaster management.

Transitioning from the environmental concerns arising from the Fukushima Daiichi nuclear accident, we turn our attention to the global discussions ignited by the Japanese government's decisions regarding wastewater release from the Fukushima plant into the Pacific Ocean. In April 2021, this pivotal move set the stage for a broader and more prolonged initiative. By August 2023, Japan embarked on a 30-year project, intending to release one million metric tons of wastewater into the ocean as a means of addressing an ongoing environmental challenge (Wong, 2023). The international response to this decision was robust, marked by concerns and reactions worldwide. China responded by halting seafood imports from Japan (Jozuka, Yeung, Subramaniam, & CNN's Beijing bureau, 2023), while protests erupted in South Korea, Hong Kong, and Tokyo. Simultaneously, environmental groups passionately advocated for a delay in the implementation of the project (Kim & Jung, 2023). The repercussions extended beyond geopolitical and trade considerations (Yamaguchi, 2023). In China, a parallel reaction unfolded as individuals began hoarding table salt, driven by concerns about potential radiation contamination in sea salt (Guzman, 2023; Hall & Zhang, 2023). This phenomenon echoed the panic-buying witnessed during the early days of the COVID-19 pandemic, prompting a critical examination of public reactions to perceived threats.

These events served as a catalyst for contemplation on the underlying reasons for public panic, the dynamics of information access, and the strategies required to address rumors and misinformation in the context of complex scientific issues. Moreover, these occurrences prompted an in-depth reflection on the state of science communication, outreach efforts, and citizen science education. Recognizing the importance of accurate and accessible information in the information Age, this study aims to explore four key areas: strategies of enhancing public participation, leveraging digital platforms and social media for science communication, improving Citizen Science Education and participation, and investigating Educational Approaches and International Collaboration for Scientific Literacy.

The overarching goal of this research is to better connect the public with science, utilizing contemporary methods to share accurate scientific information. By delving into the realms of digital platforms and social media, we seek to understand how these tools can facilitate effective science communication. Simultaneously, our exploration of citizen science education aims to enhance public participation in scientific endeavors, fostering a more informed and engaged citizenry. Furthermore, we will investigate educational approaches and international collaborations to determine how they can contribute to scientific literacy on a global scale. Through a comprehensive analysis of these four areas, we aspire to develop strategies that bridge the communication gap between experts and the public, making intricate scientific topics more accessible and

understandable. Ultimately, our aim is to encourage widespread public involvement in science, both locally and globally, fostering a society that values accurate information, critical thinking, and active participation with scientific advancements.

Defining Key Concepts in Science Communication and Public Participation

Prior to delving into the detailed exploration of four pivotal areas, a clarification of key definitions will frame the subsequent discourse.

Science Outreach, also referred to as Science Communication, plays a crucial role. It involves connecting scientists with the public through effective communication and education, with the overarching goal of fostering mutual learning and shared objectives (Lopes et al., 2018; Garbarino, 2020). This concept functions as a bridge between the scientific community and the broader public, emphasizing the significance of clear, accessible, and engaging communication to promote understanding and collaboration.

Citizen Science is considered, denoting public participation and engagement in scientific research and knowledge production. In this context, ordinary individuals, devoid of specialized qualifications, actively contribute to scientific endeavors, such as collecting information. This collaborative approach aims to assist the work of scientists, underscoring the potential for collective intelligence and the democratization of scientific processes (Cambridge Advanced Learner's Dictionary & Thesaurus).

Scientific Literacy, as defined by the Organization for Economic Co-operation and Development (OECD, 2002; Cansiz & Turker, 2011), extends beyond possessing basic factual knowledge established by science, encompassing a broader understanding that includes awareness of scientific practices and recognition of science as a social process. This multifaceted definition underscores the importance of a comprehensive comprehension of science, acknowledging its content, methodology, and societal implications.

Key Area 1: Strategies of Public Participation & Scientific Communication

Central to this key area is the question of how to actively involve the public in science outreach, elevate scientific knowledge, and bridge the divide between experts and non-experts, particularly in critical realms like public health crises exemplified by Fukushima nuclear waste disposal, COVID-19, the BP Oil Spill, and exposure to air pollution.

As “participation” gains prominence in the development mainstream, its interpretation exhibits significant variation among different stakeholders. This section delves into two primary models of participation, grounding the subsequent discussion in foundational theoretical frameworks. Sherry Arnstein’s (1969) Ladder of Citizen Participation model places a crucial emphasis on power and control, categorizing participation into “citizen

power” and “tokenism.” Within the former, citizen control, delegated power, and partnership are key components, while the latter includes consultation, informing, and placation. A contrasting perspective is observed in the World Bank’s approach, which equates information provision and consultation with the concept of “empowerment” (1996). See figure 1 below (Wilcox, 1998).

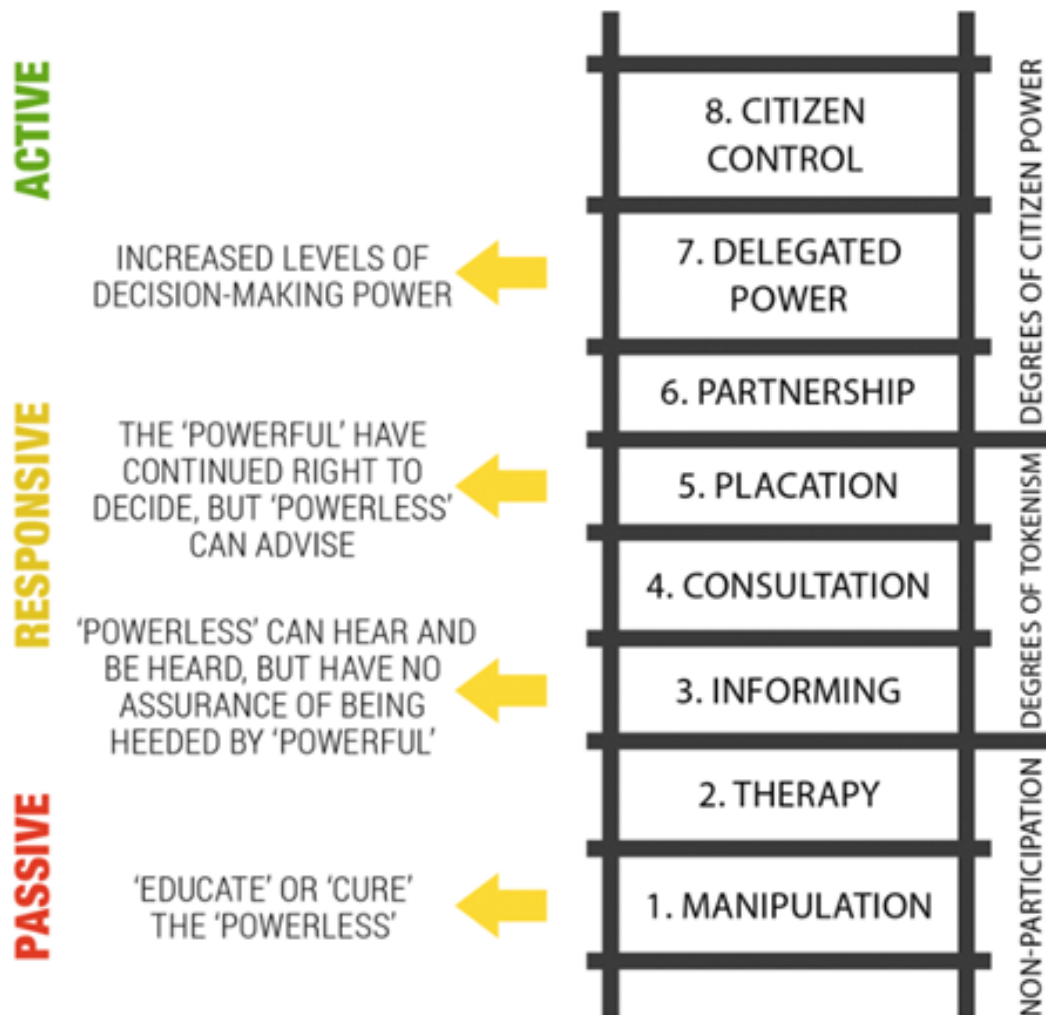


Figure 25. Sherry Arnstein’s Ladder of Citizen Participation (1969), originally published in the Journal of the American Planning Association. This visual representation delineates eight “rungs” characterizing three overarching categories of citizen influence in democratic decision-making: Nonparticipation (lack of power), Degrees of Tokenism (illusory power), and Degrees of Citizen Power (real influence).

In contrast, Jules Pretty’s (1995) typology of participation shifts the focus to the user of participatory approaches, presenting a normative spectrum from “bad” forms to “better” forms. Manipulative and passive participation fall under the former, while interactive participation and self-mobilization characterize the latter. The motivations driving those who initiate participation are recognized as integral aspects of this typology (see Figure 2).

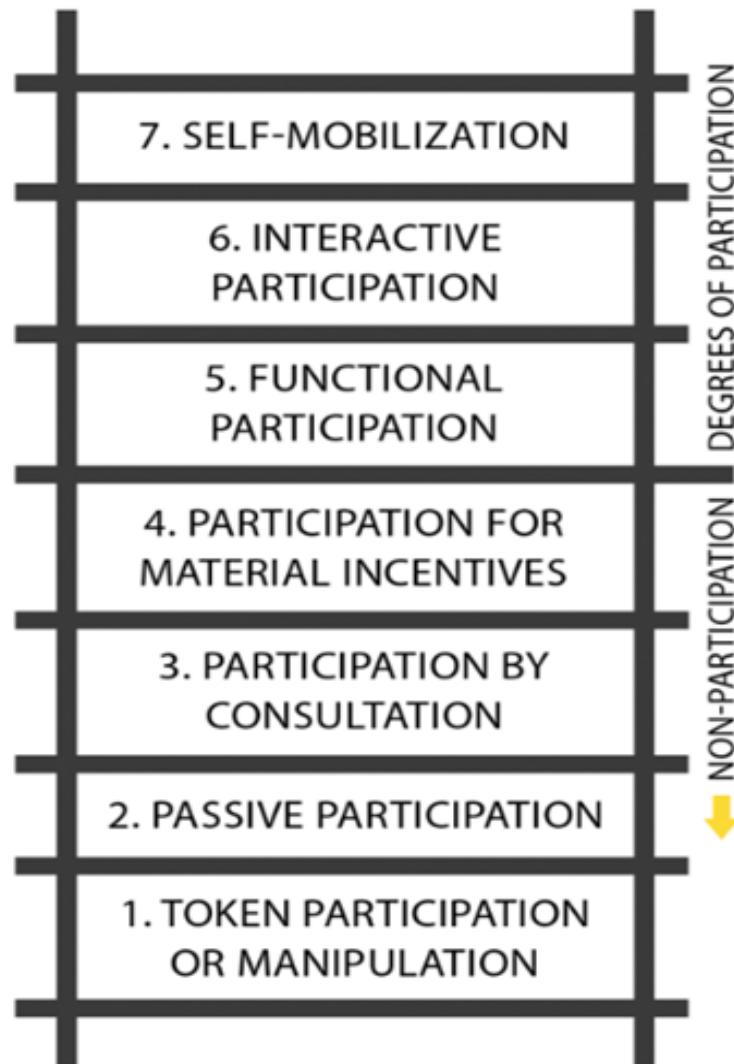


Figure 26. Jules Pretty’s participation stages (World Development, 1995): Manipulative Participation: Pretense, unelected, powerless; Passive Participation: Receive decisions, no involvement; Participation by Consultation: Input without problem sharing; Participation in Material Incentives: Short-term benefits; Functional Participation: Superficial power-sharing; Interactive Participation: Joint responsibility, goal achievement; Self-Mobilization: Independent initiatives, local control.

However, Cornwall’s (2001) assessment introduces a practical dimension to the theoretical discourse. She highlights the complexity inherent in participatory processes, noting that various forms and meanings of participation identified in these typologies may coexist within a single project or process, each stage manifesting distinct aspects. The distinctions articulated in typologies emerge as indistinct in practice, reflecting the diverse perceptions of various actors engaged in participatory processes. Cornwall emphasizes that participation transcends the often-used distinction between instrumental participation (as a means) and transformative participation (as an end in itself), adding further nuance to our understanding of participatory dynamics. This nuanced exploration sets the stage for a comprehensive examination of the role of participation in citizen

science programs and science communication, emphasizing the critical importance of understanding its diverse models and meanings in the context of fostering public engagement and addressing complex societal challenges. Navigating the landscape of science communication during crises demands a nuanced and multifaceted approach. The following ten key strategies represent a comprehensive framework aimed at not only disseminating information effectively but also fostering trust, empathy, and community engagement in the face of high-stakes situations (World Health Organization,2017; Vanderpool et al., 2023; Crescentini, N., & Padricelli, G. M.,2021; Adam et al., 2023; Hyland-Wood et al.,2021; Liu, Z., & Yang, J. Z. ,2023; McCarron et al., 2023; Toomey, A. H., 2023).

- *Clarity and Simplicity*

Effective crisis communication begins with the clarity and simplicity of the message. In times of distress, individuals seek information that is easily understandable. To achieve this, communication efforts should employ accessible language devoid of technical jargon, ensuring that the information resonates with a broad audience. By simplifying complex concepts, communicators can facilitate comprehension and alleviate anxiety, offering a solid foundation for effective dialogue.

- *Building Trust*

Trust is the linchpin of successful crisis communication. Establishing and maintaining trust is a continuous process that hinges on providing accurate information, acknowledging uncertainties openly, and fostering transparent communication channels. By cultivating a relationship of trust, communicators can influence public perception positively, encouraging cooperation and adherence to recommended guidelines during crises.

- *Empathy and Understanding*

Recognizing and addressing the emotional impact of a crisis is fundamental to effective communication. Demonstrating empathy involves acknowledging the challenges faced by individuals and communities, showcasing a genuine understanding of their concerns. This approach fosters a sense of connection and community resilience, acknowledging the human side of crisis situations and reinforcing the shared experience.

- *Honesty and Openness*

Transparency is an essential component of crisis communication, underlining the importance of honesty and openness. Communicators should candidly discuss the situation, including its uncertainties, and openly convey the measures being taken. This not only builds credibility but also mitigates the spread of misinformation, ensuring that the public remains well-informed and can make informed decisions.

- *Acknowledging Uncertainty and Updates*

Uncertainty is inherent in crises, making it imperative to acknowledge uncertainties openly and provide regular updates. Communicators should communicate the evolving nature of the situation and share information consistently to keep the public informed. This transparency enhances public trust, even in the face of

uncertainty, and reinforces the commitment to sharing accurate and timely information.

- *Tailoring Messages*

Recognizing that diverse audiences possess varying levels of knowledge is key to effective communication. Tailoring messages to different knowledge levels ensures that information remains relevant and accessible across a broad spectrum of the audience. This approach acknowledges the diversity within the community and strives for inclusivity in communication efforts.

- *Encouraging Protective Action*

Empowering individuals with actionable steps contribute to both safety and community resilience. Communicators should provide tangible and practical steps for individuals to protect themselves and their environment. By instilling a sense of agency and responsibility, communication efforts go beyond information dissemination to actively engaging the public in safeguarding measures.

- *Promoting Community-Fit Behaviors*

Aligning recommendations with existing community behaviors facilitates the seamless adoption of new practices. By understanding and integrating communication strategies within the existing fabric of community practices, communicators enhance the likelihood of behavioral adherence. This approach respects established norms and promoted a smoother transition to recommended actions.

- *Understanding Unique Community Needs*

Diverse communities harbor distinct needs that necessitate tailored communication approaches. Recognizing cultural, linguistic, and socio-economic factors, communicators should customize their strategies to address the specific needs of varied communities. This ensures that communication efforts resonate and are impactful across diverse demographic groups.

- *Fighting False Information*

Proactively countering false information is pivotal for maintaining accuracy during crises. Vigilant efforts to combat misinformation involve providing verifiable sources, correcting inaccuracies promptly, and reinforcing the importance of relying on credible information sources (Toomey,2023). By actively addressing false information, communicators contribute to a more informed public discourse and prevent the spread of potentially harmful misinformation.

These ten strategies offer a universal application, proving effective across diverse crisis scenarios such as nuclear waste releases, oil spills, and public health emergencies like COVID-19. By consistently applying these research-backed principles, communicators can contribute significantly to public safety and well-being in multifaceted crisis scenarios.

Key Area 2: Leveraging Digital Platforms and Social Media for Science Communication

Within this key area, our focus is directed toward optimizing the strategic use of digital platforms and social media for the dissemination of accurate scientific information. These platforms, including stalwarts like Facebook, YouTube, Twitter, and emerging platforms like X, have evolved into dynamic spaces that foster collaboration and participation among users sharing common goals or interests (Margo, 2012). Additionally, they play a pivotal role in facilitating public engagement in governmental decision-making—a fundamental aspect of democratic systems (Feeney & Porumbescu, 2022).

The transformative shift towards social media as a primary information source, notably during the COVID-19 pandemic, has given rise to a significant challenge termed the “infodemic.” Coined by Mheidly and Fares (2020), the infodemic characterizes the surge of misinformation and disinformation disseminated through social media channels. Despite the widespread use of social media for sharing diverse information (Pang et al., 2022; Pang & Ng, 2017), limited research has probed how adults specifically engage with scientific and research content on these platforms (Hargittai et al., 2018).

Researchers have identified critical areas for improvement by social media platforms to enhance access to platform data and processes. These areas encompass measurement and design, understanding the dynamics of misinformation engagement, exploring unique datasets (e.g., the data platform WhatsApp) with increased validity, studying disinformation campaigns, and implementing interventions (Liu et al., 2021; Pasquetto et al., 2020a).

A pivotal distinction lies in expression data (publicly available data like likes and shares) and impression data (how long someone looks at misinformation), with the latter not readily accessible to researchers through social media websites (Liu et al., 2021). Social media platforms can significantly contribute to researching individuals who share and read misinformation versus those who only read it (Paquetto et al., 2020a). Platforms like DartPost have demonstrated improved access to impression data (Liu et al., 2021), and randomized control trials (RCT) have proven effective in studying how misinformation spreads (Winters et al., 2021).

The research findings reveal a noteworthy trend wherein older individuals, particularly those with more conservative leanings, exhibit a higher likelihood of sharing misinformation—an alarming observation considering the heightened voting activity of this demographic within the country (Guess et al., 2019; Grinberg et al., 2019). The impact of misinformation-induced fear during the COVID-19 pandemic is particularly pronounced among older individuals, who are inherently more vulnerable to the virus. Although social media data holds the potential to offer valuable insights into the motivations behind individuals sharing misinformation, prevailing limitations hinder researchers from obtaining a precise measure of the volume of misinformation generated on these platforms (Pasquetto et al., 2020a). The role of platforms like WhatsApp in the dissemination of misinformation during the COVID-19 pandemic has been substantiated (Bowles et al.,

2020). Researchers underscore the significance of gaining access to grouped information about users on social media platforms, a crucial step that has the potential to curtail the virality of misleading content and facilitate the study of random samples within these platforms (Pasquetto et al., 2020a).

The challenges in tracking and quantifying disinformation are exacerbated by the capabilities of bot and troll accounts, allowing them to create and delete multiple accounts and comments across various platforms. Recognizing the imperative need for comprehensive data-sharing protocols, researchers advocate for access to historical accounts and deleted comments to furnish the resources essential for measuring the scope of disinformation spread on social media platforms (Pasquetto et al., 2020a).

Researchers have proposed interventions to mitigate the spread of false and misleading content online, notably suggesting measures such as labeling news headlines with fact-checking warnings (Clayton et al., 2020). Complementary interventions involve incorporating prompts that encourage individuals to critically reflect on the veracity of information, probing into the reasons behind their beliefs in the truth or falsehood of certain content (Pillai & Fazio, 2023). Importantly, these interventions bear relevance to the overarching theme of effective science communication, as discussed in the first key area of this study. In the context of crisis situations, such as nuclear waste releases or pandemics, the strategic deployment of these interventions on digital platforms and social media could significantly enhance the accuracy and reliability of scientific information reaching the public. As this research unfolds, a connection between these proposed interventions and their potential impact on shaping public perceptions and behaviors in response to science-related crises will be explored.

In conclusion, this section underscores the paramount importance of data sharing within the digital landscape. It contends that data collected by social media accounts should be acknowledged as constituting a crucial aspect of an individual's cultural identity, emphasizing the need for recognizing ownership. Advocating for a collaborative approach to data sharing, the section underscores its indispensability for a comprehensive assessment and measurement of misinformation spread during crisis situations. This collaborative ethos aligns with the broader objective of fostering effective science communication, integrating seamlessly with the first key area of this study.

Key Area 3: Enhancement of Citizen Science Education and Participation

The third key area of focus centers on the advancement of citizen science education and participation, tracing its historical roots to the Manhattan Project. A historical lens is applied to contextualize changes in scientific inquiry and theoretical development throughout the years. The Manhattan Project, an ambitious collaborative scientific endeavor, exemplifies the harnessing of atomic power, leading to the catastrophic events in Nagasaki and Hiroshima and the subsequent development of nuclear power (Malate, 2020). This initiative brought together diverse talents from various sectors, including science, organizations, engineering, industry, military,

and government, as well as ordinary workers (Reed, 2014). Its enduring legacies encompass the creation of nuclear weapons, public apprehension regarding nuclear waste, and the establishment of a public funding model for diverse research endeavors, such as human genomics and early internet components (Reed, 2014).

The impact of the Manhattan Project on science and society is evident in the development of modern national laboratories, advancements in high-speed photography, and the utilization of Plutonium-238 in powering spacecraft (Malate, 2020). Lecturer Eric D. Issacs notes a significant shift in federal funding for scientists during the early 20th century, attributing this change to the transformative influence of the Manhattan Project on science, research funding in the U.S., global scientific collaboration, and society's perceptions of scientists (Lerner, 2017). This paradigm shift spurred the formation of institutions like the National Science Foundation (NSF) in the U.S., established to fund research in the national interest (Lerner, 2017). Scientists, once distant from their work, began working collaboratively, engaging in policy, and forming scientific organizations (Lerner, 2017).

Within the realm of recently established scientific organizations, the Citizen Science Association (CSA) (n.d.) emerges as a membership-based entity that articulates the purpose and value of citizen science as advancing knowledge “through research and monitoring done by, for, and with members of the public” (para. 1). Citizen science, both on a localized and global scale, is expanding the influence and reach of scientific inquiry across various domains. Against this historical backdrop and recognizing the potential for meaningful scientific engagement among scientists and the public, the role of education emerges as a critical consideration in fostering effective participation in these endeavors.

While existing literature on citizen science has often delved into the contributions of participants to scientific research, a burgeoning professional interest revolves around unraveling the educational outcomes for individuals engaged in citizen science initiatives (Hsu, Kao, & Chai, 2023). Numerous programs have directed their attention toward expansive areas of study, exemplified by initiatives like the Earthwatch Institute's focus on conservation engagement (Earthwatch Institute, 2023), as well as more specific themes such as water quality, as explored in the work of Hung, Wang, and Yeh (2023). The relationship between citizen science projects and established learning theories has been explored intermittently, with varying degrees of connection to theoretical frameworks evident across different studies (refer to Table 1). This collective body of research underscores the mutual benefits reaped by both citizens and the scientific community through their collaborative endeavors (Collier et al., 2012; Day et al., 2022; Haywood, Parrish & Dolliver, 2016).

These studies collectively highlight a range of positive outcomes experienced by participants in citizen science initiatives. Notable gains encompass heightened knowledge and awareness, as observed in the findings of Collier et al. (2013), Hang, Wang, and Yeh (2023), and Kountoupes and Oberhauser (2008). The impact extends beyond mere knowledge acquisition, with participants demonstrating strengthened intentions for proactive engagement (Day et al., 2022), fostering deeper connections to their communities (Haywood, Parrish, & Dolliver, 2016), and exhibiting enhanced critical thinking aligned with pro-environmental behavior (Hang,

Wang, & Yeh, 2023). This rich tapestry of research underscores the multifaceted benefits and positive educational outcomes associated with citizen science involvement.

Table 1. Citizen Science and Learning Theories: Literature Synopsis

Authors & Theory	Topic & Theory	Relevant Findings
Collier et al. (2023)	Citizen-Science-Inspired Laboratory Investigations (microplastics in the environment) Constructivism	<ol style="list-style-type: none"> 1. Improved laboratory skills and science capital 2. Increased awareness of microplastics issues 3. Increased awareness of potential to change 4. Promotion of inclusiveness (underserved schools; poverty; labs not common) 5. Enhanced possibility of future citizen scientists 6. Authenticity to students
Day et al. (2022)	Earthwatch Institute Citizen Science (Conservation Engagement) Transformative Learning	<ol style="list-style-type: none"> 1. Generated participation (nature-based aspects) 2. Provided opportunity for transformation 3. Strengthened awareness 4. Strengthened intention-to-act influenced only by sense of contribution
Haywood, Parrish, & Dolliver (2016)	Coastal Observation and Seabird Survey Team (COASST) Experiential Learning	<ol style="list-style-type: none"> 1. Increases in knowledge and skills 2. Greater place connection 3. Greater community connection 4. Increasing ecosystem understanding (and factors affecting ecosystem)
Hidalgo-Ruz & Thiel (2013)	National Sampling of Small Plastic Debris No Learning Theory	<ol style="list-style-type: none"> 1. Students were able to follow the instructions 2. Students were able to generate reliable data 3. Schoolchildren’s participation was effective in large-scale sampling of small plastic debris on Chilean beaches
Hung, Wang, & Yeh (2023)	Experiential-Learning Based Marine Debris (ELBMD) Beach Cleanup Curriculum Experiential Learning	<ol style="list-style-type: none"> 1. Deepened understanding of marine debris 2. Created sense of responsibility 3. Increased analytical skills confidence 4. Increased intention to act responsibly 5. Encouraged deep thinking (human–environment relationship), which induced pro-environmental behavior/awareness of political engagement 6. Induced refined conception architecture 7. Induced values-forming

Authors & Theory	Topic & Theory	Relevant Findings
Kountoupes & Oberhauser (2008)	Monarch Monitoring Larva Project (MMLP), University of Minnesota Free-Choice Learning	Program Evaluation, Perceived Outcomes Reported from Adults about Children 1. Understanding of real scientific research 2. Feeling like real scientists 3. Contributing something important (pride) 4. Discovering about living things outside 5. Enjoying time outside (connecting to nature) 6. Going on to study science 7. Opportunity for leadership
Mugar et al. (2015)	Planet Hunters Situated Learning	1. Volunteers engaged in multiple forms of (a) access to practice (b) feedback (c) relationship building 2. Authority–subject and agent-centered access, feedback, and relationship building are important to learning
Roth & Lee (2004)	3-year ethnographic research (middle schools) local creek & environmental health Cultural-Historical Activity Theory (Sociocultural Theory, Hsu, Kao, & Chai, 2023)	1. Science education should include student engagement in community life 2. Science education should not simply prepare students for post-school opportunities 3. Science education should provide a lifelong learning foundation 4. Science education should be a bridge between formal education and everyday life

More specifically tailored to the present study, citizen science has left an indelible mark on professional literature, particularly within the realm of water-related projects, offering invaluable insights into pertinent outcomes and considerations for prospective endeavors (refer to Table 2). The spectrum of water quality projects spans both short-term and long-term initiatives, tailored to the specific needs of diverse geographical areas, sponsored by governmental bodies and other entities, and characterized by distinct goals and training regimens. Such projects have left an indelible mark across the global landscape, emphasizing the ubiquity and versatility of citizen science applications in this domain. Critical considerations that have surfaced in the literature include the pivotal roles of trust and effective communication. Moreover, themes such as resource allocation, data quality, time commitments, societal benefits, and the involvement of tourist volunteers with a keen interest in specific biospheres have all found a place in the discourse.

The diverse array of water-centric programs has showcased the flexibility of citizen science initiatives, ranging from single-body projects to those encompassing multiple water bodies, such as various rivers. Training

methodologies and levels have exhibited variability across projects, with Dittman et al. (2023) illustrating both the challenges, such as time constraints, and the value derived from involving school children in training sessions to enhance environmental awareness and scientific literacy. The role of databases for streamlined data collection and reporting has been a recurrent theme in these studies. Despite the diversity in project scope and objectives, a consistent thread emerges regarding the reliability of data collection, evident when compared against similar measures across these studies (refer to Table 2).

Table 2. Water-Related Citizen Science Education Programs Sample

Title, Location, and Descriptors	Relevant Outcome(s)
<p><i>Blue Thumb Project</i> Oklahoma, USA</p> <ul style="list-style-type: none"> • https://www.bluethumbok.com/about-us.html • Training: Volunteers; Project WET incorporation 	<p>Over 75 streams monitored</p>
<p><i>Citizen Science Data Study</i> (Ho et al., 2020) Hong Kong</p> <ul style="list-style-type: none"> • Water quality • 7 rivers and streams • Studied monthly, 2 years • Group of citizen scientists <p>Main Goal: Examine reliability of data collected as compared with official data in Hong Kong</p>	<ul style="list-style-type: none"> • Some data highly comparable to official data • Citizen science data as high as 70% relevance to official data • Successful outcome for monitoring urban rivers
<p><i>Groundwater Education through Water Evaluation & Testing: GET WET!</i> (Thornton & Leahy, 2012) Connecticut, Maine, New Hampshire, Rhode Island, & Vermont, USA</p> <p>Training:</p> <ul style="list-style-type: none"> • Teachers and community member volunteers (1day) • Included sampling & lab procedures • Included computer apps (e.g., Google Earth, Excel, & PowerPoint) <p>Students trained to collect well water samples</p>	<ul style="list-style-type: none"> • Database of groundwater quality, baseline for resources management • Trust: A major theme
<p><i>Groundwater Net and Groundwater Online Citizen-Science Monitoring Program</i> (Jamieson et al., 2020) Queensland Government (2013) Fully operational (2018) <i>Groundwater Net:</i></p>	<p>Increased reach and frequency of monitoring</p> <ul style="list-style-type: none"> • Landowners: Educated about groundwater systems • Borehole Owners: Gains in confidence about others' monitoring

Title, Location, and Descriptors	Relevant Outcome(s)
<ul style="list-style-type: none"> • Community-based • Education & groundwater monitoring • 500+ landholders (n=16 local groups) <p><i>Groundwater Online:</i></p> <ul style="list-style-type: none"> • Complimentary program • Continuous monitoring • Loggers and telemetry on private boreholes (n=46) <p>Training: Workshops & Discussions</p>	<ul style="list-style-type: none"> • Public: Increased confidence for robust discussions about complicated groundwater issues • Landholders and Company (CS) Representatives: Potentially reduced antagonism between • Trust: A theme
<p><i>National Citizen Science Program</i> (van der Velde et al. (2017) Australia</p> <ul style="list-style-type: none"> • National research program • Studies sources, distribution, and effects of litter entering ocean <p>Trained volunteers able to follow instructions & collect reliable data</p>	<p>Has engaged nearly 7000 primary and secondary students, teachers and corporate participants to collect marine debris data</p> <ul style="list-style-type: none"> • Time Commitment: Temporarily increased as compared to solely researcher data collection • Societal Benefits: Possibly cost-effective
<p><i>Plastic Pirates</i> (Dittman et al., 2023)</p> <ul style="list-style-type: none"> • Environmental awareness & scientific literacy of schoolchildren • Communications strategies continuously revised and adapted since start—2016 <p>Communication (4 phases):</p> <ol style="list-style-type: none"> 1) Recruiting/motivating participants 2) Participants' coordination/guidance 3) Data reception and revision 4) Sharing updates and results 	<p>Obstacles to successful communication included:</p> <ul style="list-style-type: none"> • Time constraints to obtaining scientific data from the participants • Time lag between participants' involvement and other aspects (e.g., data analysis, publication of results) • Limited personnel resources • Provided 10 best communication practices for the context
<p><i>Scuba Tourism for the Environment (STE)</i> Branchini et al. (2015) Egypt, Sudan & Saudi Arabia (3 countries facing the Red Sea)</p> <ul style="list-style-type: none"> • Coral reefs, biodiversity • Practical conservation • Recreational monitoring • Volunteer divers & snorkelers (non-specialists) • Collect data on presence and abundance of coral 	<p>Red Sea Tourists' Environmental Education Level: Low</p> <ul style="list-style-type: none"> • 32.1% scored more than 7 in pre-questionnaire • 86.8% scored same in post-questionnaire <p>Tourists with Higher Education: Higher initial environmental knowledge/awareness than others</p> <ul style="list-style-type: none"> • Education can change attitudes

Title, Location, and Descriptors	Relevant Outcome(s)
<p>reef taxa</p> <p>Training:</p> <ul style="list-style-type: none"> • Courses for professional divers • Provided by research team before project and yearly through project • Trainers assist and consult 	<ul style="list-style-type: none"> • Changed attitudes can change human intentions and behavior <p>More effective on divers than snorkelers</p>

Lastly, professional literature has diligently cataloged the limitations and primary obstacles associated with citizen science research, offering crucial insights for those contemplating involvement in such initiatives. These concerns, as delineated in scholarly discourse, span a spectrum of challenges, encompassing resource constraints, both in terms of financial backing and scientific quality within the discipline. Community collaboration emerges as a crucial facet, with a particular emphasis on the importance of co-designing projects to ensure meaningful engagement. Additionally, institutional autonomy, or the lack thereof, surfaces as a pivotal concern, as highlighted by Turrini et al. (2018). Further hurdles include low publication rates and underutilization of data, as underscored by Theobald et al. (2015), alongside cultural and organizational barriers elucidated by Dwivedi et al. (2022). Throughout this literature, recurring themes emphasize the paramount importance of effective communication and trust-building in mitigating these challenges.

Key Area 4: Educational Approaches and International Collaboration for Scientific Literacy

The focus of the fourth key area centers on educational methodologies and international collaboration, aiming to understand the diverse impacts of educational approaches on scientific literacy and the ways in which citizens can be encouraged to participate in scientific activities at both local and global levels. Moreover, it seeks to explore how international collaborations in citizen science contribute to knowledge sharing and collective problem-solving. In this context, classroom education assumes a pivotal role, not only in imparting essential skills to students but also in fostering an environment conducive to lifelong learning.

Citizen science initiatives, in particular, can leverage the foundational skills acquired through classroom education, igniting sustained interest in the scientific process by involving citizens in personally relevant topics. As national standards increasingly advocate for scientific literacy for all individuals, emphasis has been placed on training students and motivating them to actively engage with scientific issues throughout their lives. Existing research in this domain reveals that involving students in science through local issues, collaborating with scientists to collect data, and addressing community-specific concerns effectively enhances interest in science, both within and beyond the academic setting (DeBoer, 2000; Engels et al., 2019; Hodson, 2003).

Recent studies have delved into various programs aimed at enhancing science literacy, including the confluence

approach (TCA) and science, technology, and society (STS). The outcomes of these approaches underscore the effectiveness of educational practices that actively involve students in the creation of scientific knowledge, thereby fostering a lasting interest in science that extends beyond the confines of formal education.

Table 3. STS research findings

Authors	Title	Relevant Findings
Autieri, 2016	<i>The Science-Technology-Society Framework for Achieving Scientific Literacy: An Overview of the Existing Literature</i>	<p>Reviewed existing literature and found that STS effectively improves student engagement and interest in science while not reducing conceptual mastery.</p> <ul style="list-style-type: none"> • Students who participated in a learning environment enriched with STS techniques demonstrated increased interest in studying science and pursuing STEM careers. • In the classroom, teachers noted increased process and creativity skills when students are engaged in instruction that promotes meaningful discourse with peers. • Classroom learning environments moved from passive, didactic atmospheres to those that featured active, constructivist-based learning techniques.
Yager, 1994	<i>Success with STS in LifeScience Classrooms, Grades 4-12</i>	<ul style="list-style-type: none"> • Life science students master basic concepts in STS environments
Pedretti, 1999	<i>Decision Making and STS Education: Exploring Scientific Knowledge and Social Responsibility in Schools and Science Centers Through an Issues-Based Approach</i>	<ul style="list-style-type: none"> • Using a town meeting style lesson encouraged students to discuss and think critically about local socio-scientific problems.
Kim, 2008	<i>Rethinking the Ethics of Scientific Knowledge: A Case Study of Teaching the Environment in Science Classrooms.</i>	<ul style="list-style-type: none"> • Found with elementary students that studying ecosystem issues using a STS framework understood their role in the environment but did not feel empowered to help solve the problem.
Yager, 2009	<i>Comparing Science Learning Among 4th-, 5th-, and 6th-Grade Students: STS Versus Textbook-Based Instruction.</i>	<ul style="list-style-type: none"> • Concept mastery is the same or higher with STS when compared to non-STS classrooms focused on text centered instruction. • Used Quasi experimental methods.

Authors	Title	Relevant Findings
		<ul style="list-style-type: none"> • STS group scored higher on concept, process, application, creativity, attitude, and worldview scales
Yager, 2006	<i>The Advantages of an STS Approach Over a Typical Textbook Dominated Approach in Middle School Science. School Science and Mathematics</i>	<ul style="list-style-type: none"> • Students' gains from STS were found with both novice and expert teachers using quasi experimental methods.

Citizen science seamlessly aligns with the foundational principles of educational programs, extending its reach to empower adults to actively participate in the scientific process, all while focusing on personally relevant topics. Robust evidence supports the assertion that citizen science significantly enhances science literacy among adults, as demonstrated by various studies (Aristeidou & Herodotou, 2020; Bonney et al., 2009; Brandt et al., 2022; Cronje et al., 2011). The sponsorship of citizen science initiatives has emerged as a key driver in augmenting adult science literacy, further emphasizing the valuable role these initiatives play in the broader educational landscape (Brandt et al., 2022; Queiruga-Dios et al., 2020). Beyond individual enrichment, citizen science initiatives provide a unique avenue to surmount international barriers to cooperation by actively involving motivated citizens in the collection of scientific data.

The global implications of the Fukushima wastewater release underscore a distinct opportunity for citizen science organizations to make meaningful contributions. The international and nuanced aspects of the decision to release the wastewater necessitate Japan's ongoing efforts to communicate effectively and provide reliable measurements of pollution levels, both locally and across the Pacific Ocean. Citizen science initiatives, especially in the aftermath of the Fukushima nuclear disaster, have proven instrumental in measuring radiation levels and disseminating this information to diverse audiences (Brown et al., 2016). Organizations like Safecast have exemplified successful strategies in overcoming barriers to international cooperation, effectively measuring and communicating radiation levels. Crucial to the success of citizen initiatives is the commitment to open access to data and the provision of summarizations that cater to audiences with varying levels of scientific literacy (Brown et al., 2016). This approach ensures widespread engagement with scientific data, irrespective of individual proficiency levels.

Continued exploration of citizen science initiatives highlights their optimal effectiveness when addressing issues of significant public interest, as evidenced by research findings (Peters, 2020). These initiatives play a crucial role in enhancing the agency of citizens, empowering them to make informed decisions on matters of paramount importance. In the Pacific Ocean region, the heightened sensitivity to radiation issues, rooted in historical nuclear testing practices on islands, amplifies the relevance of citizen science. Public remarks from entities like the Pacific Islands Forum underscore the region's concern, making citizen science instrumental in facilitating

transparent data collection across international borders. This open accessibility to the public becomes vital for effective communication on the environmental impacts of the Fukushima wastewater release.

The contested opinions among Pacific Ocean-bordering governments regarding the wastewater release, despite the endorsement by the International Atomic Energy Agency and multinational monitoring (IAEA, 2023), underscore the complex landscape of international perspectives. While organizations like the Pacific Island Forums express support for Japan's release plans, concerns within the organization persist. Simultaneously, nations like China and Russia actively oppose the release, deeming it dangerous and potentially harmful on an international scale (Murakami, 2023; Reuters, 2023). This diversity of stances, coupled with the inherent distrust some countries harbor toward international organizations, presents an opportune moment to elevate public science literacy through citizen science initiatives. These initiatives, designed to traverse international borders, hold the potential to build trust through clear and open communication.

Conclusion

In the wake of global challenges like the Fukushima Daiichi nuclear disaster and the release of wastewater into the Pacific Ocean, the role of citizen science has emerged as a pivotal force in shaping public engagement, scientific communication, education, and international collaboration. This research delves into four key areas: enhancing public engagement and scientific communication, leveraging digital platforms, improving citizen science education and participation, and exploring educational approaches with international collaboration for scientific literacy. The Fukushima incident serves as a poignant backdrop, illustrating the profound consequences of a nuclear disaster and the subsequent challenges in communication, education, and global cooperation.

As we navigate through the intricate tapestry of citizen science, this study aims to unravel its impact on fostering public understanding, utilizing digital platforms, and propelling educational initiatives. From the lessons learned in crisis communication to the opportunities presented by social media, the research explores the intricate intersections between citizen science, technological advancements, and global scientific literacy. The investigation into communication strategies during crises emphasizes the paramount significance of transparent, empathetic, and precisely targeted communication in the aftermath of events like the Fukushima disaster, COVID-19 pandemic. Strategies addressing public concerns, dispelling misinformation, and tailoring messages to diverse audiences are identified as critical components of crisis communication. The scrutiny of digital platforms and social media in science communication reveals both the potential and challenges inherent in these mediums. From tracking misinformation to gauging public sentiment, the study advocates for strategic interventions and collaborations to harness the power of these platforms for accurate and impactful science communication.

The exploration of citizen science education and participation underscores the transformative potential of

involving the public in scientific endeavors. Building on historical precedents like the Manhattan Project, the study highlights the collaborative nature of citizen science and its capacity to enhance scientific literacy, particularly regarding issues of public interest. The research emphasizes the value of educational programs, international collaboration, and transparent data collection in fostering a more informed and engaged public. In the final key area, focusing on educational approaches and international collaboration for scientific literacy, the study underscores the pivotal role of classroom education in instilling lifelong learning skills. Citizen science initiatives are positioned as a natural extension of formal education, enabling individuals to actively participate in the scientific process on topics personally relevant to them. This section highlights the importance of international collaboration in addressing global environmental challenges.

Synthesizing these key areas, this research paper advocates for a holistic and interdisciplinary approach. By integrating effective crisis communication, strategic use of digital platforms, citizen science engagement, and innovative educational practices, we can not only navigate the complexities of environmental crises but also nurture a more informed, empowered, and resilient global community capable of proactively addressing the challenges of the future.

Recommendations

As we traverse the dynamic terrain of environmental challenges and science communication, the study's findings give rise to various directions for future research and recommendations:

- *Advanced Crisis Communication Strategies:*

Future research could delve deeper into the development of advanced crisis communication strategies, leveraging emerging technologies such as artificial intelligence and machine learning. These technologies can aid in real-time sentiment analysis, proactive misinformation detection, and dynamic adaptation of communication approaches to evolving public sentiments.

- *Ethical Considerations in Digital Platforms:*

Further investigation is needed to explore the ethical implications of utilizing digital platforms for science communication. Research can focus on developing ethical guidelines for content dissemination, user data privacy, and combating algorithmic biases, ensuring responsible and equitable engagement on these platforms.

- *Enhanced Citizen Science Models:*

Future efforts should concentrate on refining and expanding citizen science models to enhance public participation and contribution. This includes exploring innovative ways to integrate citizen-generated data with traditional scientific research, ensuring data quality, and addressing challenges related to inclusivity and diversity in citizen science initiatives.

- *Cross-Cultural Science Communication:*

Research should aim to understand the cultural nuances influencing science communication effectiveness, especially in cross-cultural and international contexts. Strategies for tailoring communication to diverse cultural backgrounds can contribute to more impactful and universally accessible science messages.

- *International Collaboration Platforms:*

Developing robust international collaboration platforms for citizen science initiatives is essential. Future research could focus on creating standardized protocols for data sharing, fostering cooperation among nations, and addressing legal and logistical challenges associated with cross-border citizen science projects.

By exploring these avenues, researchers, policymakers, and practitioners can contribute to a more resilient, informed, and collaborative global community in the face of environmental challenges and science communication complexities.

Acknowledgements

This work was made possible through the collaborative efforts of each listed author. Additionally, the authors express appreciation for the continuous encouragement from friends and colleagues who supported them throughout the research.

References

- Adam, C., Bailly, C., & Dugdale, J. (2023). Communication During Bushfires, Towards a Serious Game for a Serious Matter: Communication During Bushfires. In I. Management Association (Ed.), Research Anthology on Managing Crisis and Risk Communications (pp. 100-130). IGI Global. <https://doi.org/10.4018/978-1-6684-7145-6.ch007>
- Amirshokoohi, A., & Kazempour, M. (2010). The Biodiversity Community Action Project: An STS Investigation. *The American Biology Teacher*, 72(5), 288-293.
- Aristeidou, M., & Herodotou, C. (2020). Online Citizen Science: A Systematic Review of Effects on Learning and Scientific Literacy. *Citizen Science: Theory and Practice*, 5(1), Article 1.
- Arnstein, S. R. (1969). A Ladder of Citizen Participation. *Journal of the American Planning Association*, 35(4), 216–224.
- Autieri, S. M., Amirshokoohi, A., & Kazempour, M. (2016). The Science-Technology-Society Framework for Achieving Scientific Literacy: An Overview of the Existing Literature. *European Journal of Science and Mathematics Education*, 4(1), 75–89.
- BBC News. (2023, August 23). Fukushima disaster: What happened at the nuclear plant? <https://www.bbc.com/news/world-asia-56252695>.
- Bowles, J., Larreguy, H., & Liu, S. (2020). Countering misinformation via WhatsApp: Preliminary evidence

- from the COVID-19 pandemic in Zimbabwe. *PLOS ONE*, 15(10).
<https://doi.org/10.1371/journal.pone.0240005>
- Bonney, R., Cooper, C. B., Dickinson, J., Kelling, S., Phillips, T., Rosenberg, K. V., & Shirk, J. (2009). Citizen Science: A Developing Tool for Expanding Science Knowledge and Scientific Literacy. *BioScience*, 59(11), 977–984. <https://doi.org/10.1525/bio.2009.59.11.9>
- Bowles, J., Larreguy, H., & Liu, S. (2020). Countering misinformation via WhatsApp: Preliminary evidence from the COVID-19 pandemic in Zimbabwe. *PLOS ONE*, 15(10).
<https://doi.org/10.1371/journal.pone.0240005>
- Brandt, M., Groom, Q., Magro, A., Misevic, D., Narraway, C. L., Bruckermann, T., Beniermann, A., Børsen, T., González, J., Meeus, S., Roy, H. E., Sá-Pinto, X., Torres, J. R., & Jenkins, T. (2022). Promoting scientific literacy in evolution through citizen science. *Proceedings of the Royal Society B: Biological Sciences*, 289(1980), 20221077. <https://doi.org/10.1098/rspb.2022.1077>
- Brown, A., Franken, P., Bonner, S., Dolezal, N., & Moross, J. (2016). Safecast: Successful citizen-science for radiation measurement and communication after Fukushima. *Journal of Radiological Protection*, 36(2), S82. <https://doi.org/10.1088/0952-4746/36/2/S82>
- Branchini, S., Meschini, M., Covi, C., Piccinetti, C., Zaccanti, F., & Goffredo, S. (2015). Participating in a citizen science monitoring program: Implications for environmental education. *PloS One*, 1-14.
<https://doi.org/10.1371/journal.pone.0131812>
- Cansiz, M., & Turker, N. (2011). Scientific literacy investigation in science curricula: The case of Turkey. *Western Anatolia Journal of Educational Sciences, Special Issue*, 359-366.
- Citizen Science Association. (n. d.). CSA – About. <https://citizenscience.org/about/>
- Clayton, K., Blair, S., Busam, J. A., Forstner, S., Glance, J., Green, G., Kawata, A., Kovvuri, A., Martin, J., Morgan, E., Sandhu, M., Sang, R., Scholz-Bright, R., Welch, A. T., Wolff, A. G., Zhou, A., & Nyhan, B. (2019). Real solutions for fake news? measuring the effectiveness of general warnings and fact-check tags in reducing belief in false stories on social media. *Political Behavior*, 42(4), 1073–1095.
<https://doi.org/10.1007/s11109-019-09533-0>
- Collier, K. M., McCance, K., Jackson, S., Topliceanu, A., Blanchard, M. R., & Venditti, R. A. (2023). Observing microplastics in the environment through citizen-science-inspired laboratory investigations. *Journal of Chemical Education*, 100(5), 2067–2079. <https://doi.org/10.1021/acs.jchemed.2c01078>
- Cornwall, A. (2008). Unpacking ‘Participation’: Models, Meanings, and Practices. *Community Development Journal*, 43(3), 269–283. <https://doi.org/10.1093/cdj/bsn010>.
- Crescentini, N., & Padricelli, G. M. (2021). The Relevance of Scientific Dissemination during the Vaccine Campaign: The Italian Virologist Communication on Social Media. *Athens Journal of Mass Media and Communications*, 8, 1-20. <https://doi.org/10.30958/ajmmc.X-Y-Z>.
- Day, G., Fuller, R. A., Nichols, C., & Dean, A. J. (2022). Characteristics of immersive citizen science experiences that drive conservation engagement. *People and Nature*, 4(4), 983–995.
<https://doi.org/10.1002/pan3.10332>
- DeBoer, G. E. (2000). Scientific literacy: Another look at its historical and contemporary meanings and its relationship to science education reform. *Journal of Research in Science Teaching*, 37(6), 582–601.

[https://doi.org/10.1002/1098-2736\(200008\)37:6<582::AID-TEA5>3.0.CO;2-L](https://doi.org/10.1002/1098-2736(200008)37:6<582::AID-TEA5>3.0.CO;2-L)

- Dittmann, S., Kiessling, T., Mederake, L., Hinzmann, M., Knoblauch, D., Böhm-Beck, M., Knickmeier, K., & Thiel, M. (2023). Sharing communication insights of the citizen science program Plastic Pirates—best practices from 7 years of engaging schoolchildren and teachers in plastic pollution research. *Frontiers in Environmental Science*, 11. <https://doi.org/10.3389/fenvs.2023.1233103>
- Dwivedi, D., Santos, A. L. D., Barnard, M. A., Crimmins, T. M., Malhotra, A., Rod, K. A., Aho, K. S., Bell, S. M., Bomfim, B., Brearley, F. Q., Cadillo-Quiroz, H., Chen, J., Gough, C. M., Graham, E. B., Hakkenberg, C. R., Haygood, L., Koren, G., Lilleskov, E. A., Meredith, L. K., ... Weintraub-Leff, S. (2022). Biogeosciences perspectives on Integrated, Coordinated, Open, Networked (ICON) Science. *Earth and Space Science*, 9(3), e2021EA002119–n/a. <https://doi.org/10.1029/2021EA002119>
- Earthwatch Institute. (2023). Earthwatch: Our mission and values. <https://earthwatch.org/about/overview>
- Encyclopedia Britannica [Editors]. (2023, October 23). Fukushima accident: Japan [2011]. <https://www.britannica.com/event/Fukushima-accident>
- Engels, M., Miller, B., Squires, A., Jennewein, J. S., & Eitel, K. (2019). The Confluence Approach: Developing Scientific Literacy through Project-Based Learning and Place-Based Education in the Context of NGSS. *Electronic Journal of Science Education*, 23(3), 33–58.
- Falk, J. H., Dierking, L. D., Swanger, L. P., Staus, N., Back, M., Barriault, C., Catalao, C., Chambers, C., Chew, L.-L., Dahl, S. A., Falla, S., Gorecki, B., Lau, T.-C., Lloyd, A., Martin, J., Santer, J., Singer, S., Solli, A., Trepanier, G., Verheyden, P. (2016). Correlating Science Center Use With Adult Science Literacy: An International, Cross-Institutional Study. *Science Education*, 100(5), 849–876. <https://doi.org/10.1002/sci.21225>.
- Feeney, M. K., & Porumbescu, G. (2020). The limits of Social Media for Public Administration Research and Practice. *Public Administration Review*, 81(4), 787–792. <https://doi.org/10.1111/puar.13276>.
- Fortus, D., Lin, J., Neumann, K., & Sadler, T. D. (2022). The role of affect in science literacy for all. *International Journal of Science Education*, 44(4), 535–555. <https://doi.org/10.1080/09500693.2022.2036384>.
- Garbarino, J. (2020). Recommendations for the Continued Professionalization of Science Outreach within the Scientific Enterprise. The Rockefeller University. Available online at: http://rockedu.rockefeller.edu/new_outreach/professionalization.
- Grinberg, N., Joseph, K., Friedland, L., Swire-Thompson, B., & Lazer, D. (2019). Fake news on Twitter during the 2016 US presidential election. *Science*, 363(6425), 374–378.
- Guess, A., Nagler, J., & Tucker, J. (2019). Less than you think: Prevalence and predictors of fake news dissemination on Facebook. *Science advances*, 5(1), eaau4586.
- Guzman, C. D. (2023, August 24). Japan Is Releasing Wastewater Into the Pacific: What to Know About Radioactivity and Seafood. Retrieved from TIME: <https://time.com/6307923/fukushima-wastewater-seafood-safety-radioactive-science/>
- Hall, C., & Zhang, A. (2023, August 25). In China, Fukushima discharge met with bans, panic buying and wariness. Retrieved from Reuters: <https://www.reuters.com/markets/commodities/chinas-biggest-salt-maker-urges-public-not-panic-buy-after-fukushima-discharge-2023-08-25/>

- Hargittai, E., Füchslin, T., & Schäfer, M. S. (2018). How do young adults engage with science and research on social media? some preliminary findings and an agenda for future research. *Social Media + Society*, 4(3), 205630511879772. <https://doi.org/10.1177/2056305118797720>
- Haywood, B. K., Parrish, J. K., & Dolliver, J. (2016). Place-based and data-rich citizen science as a precursor for conservation action. *Conservation Biology*, 30(3), 476-486. <https://doi.org/10.1111/cobi.12702>
- Hidalgo-Ruz, V., & Thiel, M. (2013). Distribution and abundance of small plastic debris on beaches in the SE Pacific (Chile): A study supported by a citizen science project. *Marine Environmental Research*, 87-88, 12–18. <https://doi.org/10.1016/j.marenvres.2013.02.015>
- Ho, S.Y-F, Xu, S. J., Lee, F. W-F. (2020). Citizen science: An alternative way for water monitoring in Hong Kong. *PLoS ONE*, 15(9): e0238349. <https://doi.org/10.1371/journal.pone.0238349>.
- Hodson, D. (2003). Time for action: Science education for an alternative future. *International Journal of Science Education*, 25(6), 645–670. <https://doi.org/10.1080/09500690305021>
- Hsu, C.-H., Kao, W.-C., & Chai, L. (2023). Revolutionizing informal education: Intersection of citizen science and learning theories. *Interdisciplinary Journal of Environmental and Science Education*, 19(4), e2319. <https://doi.org/10.29333/ijese/13726>
- Hung, L.-Y., Wang, S.-M., & Yeh, T.-K. (2023). Kolb's experiential learning theory and marine debris education: Effects of different stages on learning. *Marine Pollution Bulletin*, 191, 114933–114933. <https://doi.org/10.1016/j.marpolbul.2023.114933>
- Hyland-Wood, B., Gardner, J., Leask, J., & Ecker, U. K. H. (2021). Toward effective government communication strategies in the era of COVID-19. *Humanities and Social Sciences Communications*, 8, 30. <https://www.nature.com/articles/s41599-020-00701-w>.
- IAEA. (2023, August 20). International Nuclear and Radiological Event Scale (INES). Retrieved from International Atomic Energy Agency: <https://www.iaea.org/resources/databases/international-nuclear-and-radiological-event-scale>
- IAEA. (2023, July 4). IAEA Finds Japan's Plans to Release Treated Water into the Sea at Fukushima Consistent with International Safety Standards [Text]. IAEA. <https://www.iaea.org/newscenter/pressreleases/iaea-finds-japans-plans-to-release-treated-water-into-the-sea-at-fukushima-consistent-with-international-safety-standards>
- Jamieson, M., Elson, M., Carruthers, R., & Ordens, C. M. (2020). The contribution of citizen science in managing and monitoring groundwater systems impacted by coal seam gas production: An example from the Surat Basin in Australia's Great Artesian Basin. *Hydrogeology Journal*, 28(1), 439–459. <https://doi.org/10.1007/s10040-019-02050-8>
- Jozuka, E., Yeung, J., Subramaniam, T., & CNN's Beijing bureau. (2023, August 24). China bans seafood from Japan after Tokyo begins releasing treated radioactive water. Retrieved from CNN: <https://www.cnn.com/2023/08/23/asia/japan-fukushima-water-release-thursday-intl-hnk/index.html>
- Kim, D., & Jung, J. (2023, August 26). South Korean protesters call for government action on Fukushima water. Retrieved from Reuters: <https://www.reuters.com/world/asia-pacific/south-korean-protesters-call-government-action-fukushima-water-2023-08-26/>
- Kim, M. & Roth, W.M. (2008). Rethinking the Ethics of Scientific Knowledge: A Case Study of Teaching the

- Environment in Science Classrooms. *Asia Pacific Education Review*: 9(4), 516-528.
- Kountoupes, D. L., & Oberhauser, K. S. (2008). Citizen science and youth audiences: Educational outcomes of the monarch larva monitoring project. *Journal of Community Engagement and Scholarship*, 1(1), 10. <https://www.semanticscholar.org/reader/d09c6892bdde7524967c259d8da7b303a5000bbc>
- Lerner, L. (2017, Nov. 22). 'The Big Bang of Big Science:' How the Manhattan Project transformed the field. University of Chicago, Office of Communications, UChicago News. <https://news.uchicago.edu/story/big-bang-big-science-how-manhattan-project-transformed-field>
- Liu, J., Wright, C., Williams, P., Elizarova, O., Dahne, J., Bian, J., & Tan, A. S. (2021). Smokers' likelihood to engage with information and misinformation on twitter about the relative harms of e-cigarette use: Results from a randomized controlled trial. *JMIR public health and surveillance*, 7(12), e27183.
- Liu, R., Greene, K. T., Liu, R., Mandic, M., Valentino, B. A., Vosoughi, S., & Subrahmanian, V. S. (2021). Using impression data to improve models of online social influence. *Scientific reports*, 11(1), 16613.
- Liu, Z., & Yang, J. Z. (2023). Communicating Per- and Polyfluoroalkyl Substances (PFAS) Contamination to the Public Through Personal Relevance. *Journal of Health Communication*, 28(2), 73-81. <https://doi.org/10.1080/10810730.2023.2183284>.
- Lopes, L.E.; Waldis, S.J.; Terrell, S.M.; Lindgren, K.A.; Charkoudian, L.K. (2018). "Vibrant symbiosis: Achieving reciprocal science outreach through biological art," *PLoS Biol* 16(11).
- Lu, Y., Yuan, J., Du, D., Sun, B., & Yi, X. (2021). Monitoring long-term ecological impacts from release of Fukushima radiation water into ocean. *Geography and Sustainability*, 2(2), 95–98. <https://doi.org/10.1016/j.geosus.2021.04.002>
- Malate, A. (2020, July 15). The unexpected outcomes of the Manhattan Project: The Manhattan Project resulted in reactions both new and unforeseen. *Inside Science: Reliable News for An Expanding Universe*. <https://www.insidescience.org/manhattan-project-legacy/infographic>
- Magro, M. J. (2012). A review of social media use in e-government. *Administrative Sciences*, 2(2), 148-161.
- McCarron, A., Semple, S., Braban, C. F., Swanson, V., Gillespie, C., & Price, H. D. (2023). Public engagement with air quality data: Using health behavior change theory to support exposure-minimizing behaviors. *Journal of Exposure Science & Environmental Epidemiology*, 33, 321-331.
- Mheidly, N., & Fares, J. (2020). Leveraging media and health communication strategies to overcome the COVID-19 infodemic. *Journal of Public Health Policy*, 41(4), 410–420. <https://doi.org/10.1057/s41271-020-00247-w>
- Mugar, G., Østerlund, C., Jackson, C., & Crowston, K. (2015). Being present in online communities: learning in citizen science. *Proceedings of the 7th International Conference on Communities and Technologies*, 129–138. <https://doi.org/10.1145/2768545.2768555>
- Muhammed T, S., & Mathew, S. K. (2022). The disaster of misinformation: A Review of Research in social media. *International Journal of Data Science and Analytics*, 13(4), 271–285. <https://doi.org/10.1007/s41060-022-00311-6>
- Murakami, S. (2023, August). Fukushima wastewater released into the ocean, China bans all Japanese seafood. Reuters. <https://www.reuters.com/world/asia-pacific/japan-set-release-fukushima-water-amid-criticism-seafood-import-bans-2023-08-23/>

- National Oceanic and Atmospheric Administration (NOAA). (2023, October 20). Deepwater Horizon. Damage Assessment, Remediation, and Restoration Program (DARRP). <https://darrp.noaa.gov/oil-spills/deepwater-horizon>
- National Oceanic and Atmospheric Administration (NOAA). (2023, October 20). What we do. Damage Assessment, Remediation, and Restoration Program (DARRP). <https://darrp.noaa.gov/what-we-do/natural-resource-damage-assessment>
- Oh, O., Agrawal, M., & Rao, H. R. (2013). Community intelligence and social media services: A rumor theoretic analysis of tweets during social crises. *MIS quarterly*, 407-426.
- Pang, H., Qin, K., & Ji, M. (2022). Can social network sites facilitate civic engagement? Assessing dynamic relationship between social media and civic activities among young people. *Online Information Review*, 46(1), 79-94.
- Pang, N., & Ng, J. (2017). Misinformation in a riot: A two-step flow view. *Online Information Review*, 41(4), 438–453. <https://doi.org/10.1108/oir-09-2015-0297>
- Pasquetto, I., Swire-Thompson, B., & Amazeen, M. A. (2020a). Tackling misinformation: What researchers could do with social media data. *Harvard Kennedy School Misinformation Review*. <https://doi.org/10.37016/mr-2020-49>
- Pedretti, E. (1999). Decision Making and STS Education: Exploring Scientific Knowledge and Social Responsibility in Schools and Science Centers Through an Issues-Based Approach. *School Science and Mathematics*, 99(4), 174-181.
- Peters, M. A. (2020). Citizen science and ecological democracy in the global science regime: The need for openness and participation. *Educational Philosophy and Theory*, 52(3), 221–226. <https://doi.org/10.1080/00131857.2019.1584148>
- Pillai, R. M., & Fazio, L. K. (2023). Explaining why headlines are true or false reduces intentions to share false information. *Collabra: Psychology*, 9(1). <https://doi.org/10.1525/collabra.87617>
- Pretty, J.N. (1995) ‘Participatory Learning for Sustainable Agriculture’, *World Development*, Vol. 23 (8), 1247 – 1265.
- Puna, H. (2023). STATEMENT: Pacific Islands Forum Secretary General Henry Puna On the Fukushima Treated Nuclear Wastewater – Pacific Islands Forum. Pacific Island Forum. <https://www.forumsec.org/2023/06/26/statement-pacific-islands-forum-secretary-general-henry-puna-on-the-fukushima-treated-nuclear-wastewater/>
- Queiruga-Dios, M. Á., López-Iñesta, E., Díez-Ojeda, M., Sáiz-Manzanares, M. C., & Vázquez Dorrió, J. B. (2020). Citizen Science for Scientific Literacy and the Attainment of Sustainable Development Goals in Formal Education. *Sustainability*, 12(10), Article 10. <https://doi.org/10.3390/su12104283>
- Reed, B. C. (2014). The Manhattan Project. *Physica Scripta*, 89(10), 108003–108026. <https://doi.org/10.1088/0031-8949/89/10/108003>
- Roth, W. M., & Lee, S. (2004). Science education as/for participation in the community. *Science Education*, 88(2), 263-291. <https://doi.org/10.1002/sce.10113>
- Reuters. (2023, October). Russia says Japan did not inform it fully about radioactive Fukushima water. Reuters. <https://www.reuters.com/world/russia-says-japan-failed-provide-full-information-about-water->

fukushima-nuclear-2023-10-04/

- Toomey, A. H. (2023). Why facts don't change minds: Insights from cognitive science for the improved communication of conservation research. *Biological Conservation*, 278, 109886. <https://doi.org/10.1016/j.biocon.2022.109886>.
- Storksdieck, M., Shirk, J. L., Cappadonna, J. L., Domroese, M., Göbel, C., Haklay, M., Miller-Rushing, A. J., Roetman, P., Sbrocchi, C., & Vohland, K. (2016). Associations for Citizen Science: Regional Knowledge, Global Collaboration. *Citizen Science: Theory and Practice*, 1(2), Article 2. <https://doi.org/10.5334/cstp.55>
- Sullivan, B. L., Aycrigg, J. L., Barry, J. H., Bonney, R. E., Bruns, N., Cooper, C. B., Damoulas, T., Dhondt, A. A., Dietterich, T., Farnsworth, A., Fink, D., Fitzpatrick, J. W., Fredericks, T., Gerbracht, J., Gomes, C., Hochachka, W. M., Iliff, M. J., Lagoze, C., La Sorte, F. A., ... Kelling, S. (2014). The eBird enterprise: An integrated approach to development and application of citizen science. *Biological Conservation*, 169, 31–40. <https://doi.org/10.1016/j.biocon.2013.11.003>
- Theobald, E. J., Ettinger, A. K., Burgess, H. K., DeBey, L. B., Schmidt, N. R., Froehlich, H. E., Wagner, C., HilleRisLambers, J., Tewksbury, J., Harsch, M. A., & Parrish, J. K. (2015). Global change and local solutions: Tapping the unrealized potential of citizen science for biodiversity research. *Biological Conservation*, 181, 236–244. <https://doi.org/10.1016/j.biocon.2014.10.021>
- Thornton, T. & Leahy, J. (2012). Trust in citizen science research: A case study of the Groundwater Education Through Water Evaluation & Testing Program. *Journal of the American Water Resources Association (JAWRA)* 48(5): 1032-1040. DOI: 10.1111/j.1752-1688.2012.00670.x
- Turrini, T., Dörler, D., Richter, A., Heigl, F., & Bonn, A. (2018). The threefold potential of environmental citizen science - Generating knowledge, creating learning opportunities and enabling civic participation. *Biological Conservation*, 225, 176–186. <https://doi.org/10.1016/j.biocon.2018.03.024>
- van der Velde, T., Milton, D. A., Lawson, T. J., Wilcox, C., Lansdell M., Davis, G., Perkins, G., & Hardesty, B. D. (2017). Comparison of marine debris data collected by researchers and citizen scientists: Is citizen science data worth the effort? *Biological Conservation*, 208, 127-138. <https://doi.org/10.1016/j.biocon.2016.05.025>
- Vanderpool, R. C., Gaysynsky, A., Chou, W.-Y. S., & Tonorezos, E. S. (2023). Using Behavioral Science to Address COVID-19 Vaccine Hesitancy Among Cancer Survivors: Communication Strategies and Research Opportunities. *Journal of Behavioral Medicine*, 46, 366–376.
- Winters, M., Oppenheim, B., Sengeh, P., Jalloh, M. B., Webber, N., Pratt, S. A., & Nordenstedt, H. (2021). Debunking highly prevalent health misinformation using audio dramas delivered by WhatsApp: evidence from a randomized controlled trial in Sierra Leone. *BMJ global health*, 6(11), e006954.
- Wong, T. (2023, August 24). Fukushima: China retaliates as Japan releases treated nuclear water. Retrieved from BBC News: <https://www.bbc.com/news/world-asia-66577769>
- Wong, T. (2023, August 25). What are the concerns over wastewater release? Retrieved from BBC: <https://www.bbc.com/news/world-asia-66106162>
- Wong, T. (2023, August 24). Fukushima: China retaliates as Japan releases treated nuclear water. Retrieved from BBC News: <https://www.bbc.com/news/world-asia-66577769>
-

- Wong, T. (2023, August 25). What are the concerns over waste water release? Retrieved from BBC: <https://www.bbc.com/news/world-asia-66106162>
- World Health Organization. (2017). Communicating risk in public health emergencies: A WHO guideline for emergency risk communication (ERC) policy and practice (Recommendations). Geneva.
- World Nuclear Association. (2023, August). Fukushima Daiichi Accident. World Nuclear Association website. <https://world-nuclear.org/information-library/safety-and-security/safety-of-plants/fukushima-daiichi-accident.aspx>.
- Yager, R.E. Tamir, P., Kellerman, L. (1994). Success with STS in Life Science Classrooms, Grades 4-12. *The American Biology Teacher*, 56(5), 268-272.
- Yager, R.E., Choi, A., Yager, S.O. & Akcay, H. (2009). Comparing Science Learning Among 4th-, 5th-, and 6th-Grade Students: STS Versus Textbook-Based Instruction. *Journal of Elementary Science Education*, 21(2), 15-24.
- Yager, R.E., Tamir, P., & Huang, D. (1992). An STS Approach to Human Biology Instruction Affects Achievement & Attitudes of Elementary Science Majors. *The American Biology Teacher*, 54(6), 349-35.
- Yamaguchi, M. (2023, August 28). Japan calls on China to ask citizens to stop harassment in wake of Fukushima wastewater discharge. Retrieved from PBS News Hour: <https://www.pbs.org/newshour/world/japan-calls-on-china-to-ask-citizens-to-stop-harassment-in-wake-of-fukushima-wastewater-discharge>

Impact of Cultural Competence in Graduate School Settings

Rita DiLeo

University of Scranton, United States of America,  <https://orcid.org/0009-0000-4674-5145>

Abstract: The range of challenges for educators in the graduate school setting includes student's differences associated with age, language barriers, learning styles, disability, and culture. The literature also demonstrates student populations in higher education differ in academic ability, gender, socioeconomic factors, religion, and life experiences. Thus, the integration of cultural competence in the graduate school settings is imperative as the student populations becomes increasingly more diverse. The educators must demonstrate an understanding to the student to engage and motivate them to learn. Higher education faculty and administrators must determine the strategy they will employ to meet the student demands and simultaneously compete with other colleges. The strategy should address arenas where the curriculum engages the diverse student population in humanities, liberal arts, professional activities, and conveys the career opportunities. The purpose of this research is to understand the types of learning barriers in higher education, assess the importance of cultural competence, and evaluate the correlation between cultural competence and learning outcomes.

Keywords: Cultural competence, Higher education, Student diversity, Graduate school

Citation: DiLeo, R. (2023). Impact of Cultural Competence in Graduate School Settings. In M. Shelley & Akerson (Eds.), *Proceedings of IConSes 2023—International Conference on Social and Education Sciences* (pp. 680-690). Las Vegas, NV, USA. ISTES Organization.

Introduction

The integration of cultural competence in higher education settings is imperative as the diverse student population continues to escalate. Colleges and universities must determine the strategy they will implement to meet student demands amid the demographic differences present among student populations and faculty populations. The range of challenges in the education environment include differences associated with cultural background, religion, sexual orientation, age, disability, learning styles, and language barriers. According to Browers & Ho (2022), to facilitate success, all school settings must address the nuances of student backgrounds, including their social and emotional needs.

Research shows that understanding the culturally and racially diverse needs of students is vital for academic success, achieving educational goals, and priorities. Furthermore, it is necessary to adequately prepare students to thrive in increasingly diverse communities after they graduate. This is more challenging to accomplish in the United States as increasingly more diverse across racial, ethnic, religious, and socio-economic groups in higher education settings. The level of diversity present on college campuses could be correlated to the geographic

location of the school. For example, urban versus rural or densely populated versus sparsely populated.

Clearly, college and universities located in metropolitan areas would possess a more diverse student population than higher education institutions in rural areas. The campus demographics and culture present are important factors in creating an environment of inclusivity to students. Based on the research of Nicola Bianchi, even within nations, there tends to be a significant gap between urban and rural education outcomes. According to one 2015 standardized assessment, 15-year-olds studying in urban schools in 37 countries outperformed rural students by roughly the equivalent of one full year of schooling, even after controlling for students' socioeconomic backgrounds (Kellogg Insight, 2021).

As noted by Jayakumar (2008), as the United States becomes increasingly diverse and a global society, neighborhoods and schools are paradoxically returning to levels of racial segregation not seen since the 1960's. As such, incoming students within higher education environments have been primarily exposed to people of their same race prior to college entry. To further illustrate the challenge in developing cultural awareness, Browers & Ho (2022) note rural universities primarily enroll students near the primary campus.

Cultural competence enables individuals to respect and appreciate the diversity of human experiences, and work towards creating inclusive environments that support the needs of diverse populations. The benefits of university students' exposure to diversity and inclusion experiences have been discussed in multiple publications. The Council for Higher Education Preparation (CHEP) notes Diversity, Equity and Inclusion are rooted in cultural identity. Moreover, college and universities are the bedrocks of change and foster free thinking, individualism, and freedom the just the simple right to "be".

Sandell and Tupy (2015) explain that students' actual knowledge, understanding, and reflections are not based on life experiences that enable them to deeply understand and accept the other culture and its complexities. Exposure to other cultures or environments is important aspect of life experience. Focus-group interviews of graduate and undergraduate students completed by Browers and Ho (2022, p. 9) revealed the importance of life experience in developing cultural awareness. For example, one student commented, "I grew up in a small town of 8,000 people and I went to school with every single person from preschool to my senior year in high school." Another student claimed, "out of 557 students that I graduated with I think 555 of them were White, and we all grew up in that area."

Jayakumar (2008) suggests universities need to produce cross-culturally competent citizens who can work in diverse environments. Research findings of Bikson and Law who assert colleges are failing to develop students who can work effectively with individuals who norms, preferences, beliefs, styles, and values are different from their own. As such, exposure to racial diversity in college is important for individuals from segregated backgrounds as they are unlikely to gain such exposure and associated interpersonal challenges within their neighborhoods as adults. Therefore, the aim of this research is to understand the impact of cultural competence in graduate school settings and the influencing factors related to learning outcomes and student engagement.

Defining Cultural Competency

There are several working definitions of cultural competency depending on the industry or focus. For example, The National Education Association defines it as “having an awareness of one’s own cultural identity and views about difference, and the ability to learn and build in the varying cultural and community norms of students and their families” (Fostering Culturally Competent Classrooms, 2023). Whereas the National Quality Forum defines cultural competency as “ongoing capacity of healthcare systems, organizations, and professionals to provide for diverse patient populations high-quality care that is safe, patient and family centered, evidence based and equitable” (NQF, 2009).

Overall, culturally competent individuals effectively interact with people from cultures different from one’s own. In the education arena, cultural competence emphasizes the ability to serve students and families from diverse cultures and backgrounds in an effective manner. Organizations should demonstrate several characteristics along the cultural competence continuum (Gilbert, et al., 2007). Thus, the topic of cultural competency requires an understanding of other key terms such as culture, cultural awareness, cultural sensitivity, Intercultural Competency (ICC), and linguistic competence.

Gilbert, et al. (2007) describe culture as the “lens” through which people in a specific group view the world. learned and shared knowledge that specific groups use to generate their behavior and interpret their experience in the world. These authors point out that (1) cultural groups are not synonymous with racial groups and (2) culture is not genetically transferred as it is learned through language and modeling. As such, race is a social construct used to identify people by physiological characteristics such as skin color, facial features, and hair texture. Therefore, when members of a society routinely divide people into groups based on the possession of these characteristics race becomes socially significant. Of importance, the subjectivity of race and the heterogeneity within population groups add further ambiguity to classifying different populations by race (National Academies of Science, 2004).

It is important to understand cultural awareness is the foundation for cultural competence. The National Center for Cultural Competence (NCCC) define it as being cognizant, observant, and conscious of similarities and differences among and between cultural groups (Gilbert, et al., 2007). Whereas Purnell (2014) discusses cultural awareness as the appreciation of external and material signs of diversity such as music, dress, or physical characteristics. These distinctions are important because cultural awareness has far reaching ramifications when coupled with implicit bias. Thus, it is important for faculty to assess both because the classroom experience could be impacted significantly (Hanover Research, 2019).

There is an increasing number of intercultural encounters occurring in higher educational settings supporting the importance of cultural sensitivity in educational settings. This is a soft skill that can be measured, learned, and developed. The term, cultural sensitivity, is generally viewed as one’s ability and desire to develop a positive emotion towards understanding and appreciating cultural differences that stimulates appropriate and effective

behavior in cross-cultural encounters. Further, it should be acknowledged that it is important when interacting with others who are linguistically and culturally different (Szoke, 2023).

Sandell & Tupy (2015) discuss the importance of ICC and that primary, secondary, and post-secondary teachers should demonstrate proficiency. These authors note the “ability to accommodate cultural differences into one’s reality in ways that enable an individual to move easily into and out of diverse cultures and to adjust naturally to the situation at hand” as the definition for ICC. However, they also illustrate the definition of ICC for teachers is the “ability to effectively respond to students from different cultures and classes while valuing and preserving the dignity of cultural differences and similarities between individuals, families, and communities.” Effective responses are an important differentiating factor when working with varied cultures.

Linguistic competence is defined as the capacity of an organization and its personnel to communicate effectively and convey information in a manner that is easily understood by diverse audiences including persons of limited English proficiency, those who have low literacy skills or are not literate, and individuals with disabilities. Organizations must have policy, structures, practices, procedures, and dedicated resources to support this capacity (Gilbert et al.,2007).

Research Theory

Leininger’s Theory of Culture Care Diversity and Universality also known as the Culture Care Theory (CCT) roots are to guide research and discovery for evidence-based nursing practice. Its design also guides future culturally competent administrative and leadership policies and procedures and informs public policy related to cultural diversity and underserved populations; thus, it is applied to this research. McFarland & Wehbe-Alamh (2017) point out the purpose of Leininger’s theory is to “discover, document, know, and explain the interdependence of care and culture phenomena with differences and similarities between and among cultures.” In addition, it is possible to apply Leininger’s theory to explore organizational cultures. As such, CCT guides the research in determining the influence of cultural competency proficiency on students and faculty.

Method

A systemic literature review was undertaken of the following databases: Ebsco, Google Scholar, JSTOR, ProQuest and PubMed. All papers reviewed were published from 2004 to 2023. The National Council for Accreditation of Teacher Education - (NCATE), Council for Higher Education Accreditation – (CHEA) and the United States Census Bureau were key resources for this research.

Discussion

Diversity and cultural competence discussions are more widespread than ever with the changing demographics

in the United States. The surge of immigrants over the last thirty years has brought an abundance of foreign language and cultures. To illustrate, the Diversity Index published by the United States Census Bureau shows California, Nevada, Maryland, Texas, New York, Florida, and Georgia are above 63% on the scale. Percentages are 69.7%, 68.8%, 67.3%, 67.0%, 65.8%. 64.1% 64.1% respectively. The Diversity Index predicts the chance that two people chosen at random would be from different racial or ethnic backgrounds (The United States Census Bureau, 2021b). These are important when we consider that 16.6 million undergraduate students and 4.6 million graduate students were enrolled in school in 2021. Furthermore, approximately 11.1 percent of undergraduate students and 19.8 percent of graduate students were foreign-born (Census.gov, 2023a).

The changing demographics of the United States population is critical when developing cultural competency. It is critical to understand that environmental influences further that impact student learning styles, retention, engagement, and attitudes. Goodwin (2019) reviews Gay's indicators of a culturally competent teacher as developing a knowledge base about cultural diversity, including ethnic and cultural diversity content in the curriculum, demonstrating caring and building learning communities, communicating with ethnically diverse students, and responding to ethnic diversity in the delivery of instruction. Awareness of current events and other cultures beliefs is often key in acquiring knowledge about cultural groups' points of view (Guzman et al., 2016).

Examination of the literature reveals a strong mandate to remove barriers present in academic settings to improve learning outcomes, engage the student, and prepare students for professional work environments. Morrison and Conway (2006) note that communication takes place between individuals not cultures. Preparing students to thrive in diverse academic and professional environments requires an understanding of the students' actual knowledge. According to Sandell and Tupy (2015) university students are in a life-stage in which coming together around commonalities is important for tasks such as succeeding at a career or achieving a university degree. Thus, it is important for teachers to understand the invisible rules within different social and cultural structures to build productive relationships with students.

To understand the student population, it is essential to know the communities the university serves, and the cultures represented (Gallagher, 2021). Defining the population characteristics helps develop cultural awareness. Guzman et al. (2016) report the United States Hispanic population would be 25 percent by 2050 with the United States Census Bureau projecting the United States to be a "majority-minority" country by 2043. Thus, a single group will no longer be the majority even though non-Hispanic whites would be the largest group. Yet, the increased cultural diversity and globalization has not stopped inequality bias or breakdown in intercultural communications. Moreover, institutional policies perpetuate inequalities at both the individual and institutional levels. Numerous bias incidents and persistent inequalities around racial and ethnic lines remain a constant (Guzman et al., 2016).

Increasing diversity presents several challenges related to discrimination, implicit bias, and breakdown in communications. Research demonstrates subtle incidences can have cumulative and serious consequences for socio-emotional well-being (Guzman et al., 2016). Teachers are susceptible to implicit bias resulting in

differentiation in instructional quality that perpetuates achievement gaps. Generally, individuals hold implicit biases that favor one's own ingroup and have real-world effects on behavior. Therefore, training and workshops related to implicit bias are beneficial in developing a personal awareness of individual beliefs and attitudes towards people of other cultures and races (Hanover Research, 2019). Our biases may stem from our backgrounds, experiences, or personal demographics, and these biases exist whether or not we are aware of them (Guzman et al., 2016).

Engaging in ongoing reflection and learning is a key component of becoming a culturally competent teacher. It is valuable for teachers to learn about the history and experiences of other groups to better understand the diverse student population. Farmer (2020) discusses the influence of educator bias on student's development. He notes that actions are seen and felt by the students. Further gaining cultural competence requires planning and knowing the community they serve. Gallagher (2021) discusses the importance of being able to express your identity and its impact relating to others. Further, listening and observing cultures other than our own is important to becoming culturally competent. Active listening, demonstrating empathy, and effective engagement are the three elements of cultural competence (Guzman et al., 2016).

Active listening requires focus and avoidance of mental distractions. For example, listening without thinking about how you are going to respond. This entails thinking about the feeling or emotion behind the content because the emotion expressed gives real intent of the conversation. The second component of cultural competence, demonstrating empathy, is the art of seeing and feeling the situation of someone else. It requires one to see the world from another's perspective or walking in another person's shoes. Engagement focuses on the behaviors and the situation, not the person. This third component of cultural competency could be mutually beneficial for both parties as it provides a reciprocal learning experience (Guzman et al, 2016).

As a result, an understanding of how students of different cultures, races, and ethnicities relate to a broader social, economic, and political context should emerge. Student's education is driven by their individual life histories and experiences, and learning is contextualized in large part through this paradigm. Through this evolution of learning and discovery, teachers should understand the importance of a multicultural curriculum that acknowledges the perspectives and contributions of all groups. Of importance is not referring to underrepresented groups as "the other" instead integrate them into the overall curriculum (Hanover Research, 2019).

Research by Sunds, et al. (2023) discusses the importance of the syllabi to both promote engagement and communicate belonging to the student. If syllabi do give students the first impression of the course, does it affect their outlook before the course? There appears to be a correlation of student opinion if a discussion of pronouns is included or a "get-to-know-you" survey is offered for students to provide their own perspective or background. One variable that was noted to influence a sense of belonging is the quality of the relationship between instructor and student. Further, learning and retention in the classroom is tied to student engagement which subsequently, influences learning outcomes.

Demographic differences are influential in creating impactful social and cultural gaps between the student population and the teacher population. Teachers at all levels should personify ICC. Yet, the teacher licensing agencies or the Council for the Accreditation of Educator Preparedness decree the formative or summative assessments teacher education programs should implement (Sandell & Tupy, 2015). Accreditations in higher education typically focus on ensuring institutions meet certain criteria standards of quality and effectiveness in various aspects of education. Several regional and specialized accrediting bodies emphasize diversity, equity, and inclusion, however, accreditations focused on cultural competency are limited. The National Council for Accreditation of Teacher Education now merged with the Council for the Accreditation of Educator Preparation includes diversity and cultural competency standards for teacher preparation programs (NCATE, n.d.).

The National Center for Cultural Competence offers professional development modules for teachers to develop cultural awareness and culturally responsive teaching practices. Completing self-assessments should raise awareness of cultural differences, biases, and stereotypes (Hanover Research, 2019). Cultural competence in schools can be summarized as educators' ability to integrate their awareness and knowledge of themselves, students' cultures, and structural inequities towards applying educational practices that effectively meet the needs of all students, regardless of background or minority status (Goodwin, 2019). This is critical since graduate schools had the highest share of foreign-born students or 19.8 percent of the total number enrolled. Gender is also important to acknowledge with 2.7 million female graduate students or 59.5 percent of the graduate student body (Fabrina et al., 2023).

Empirical investigation of the relationship between culturally competent educational practice and student outcomes has been lacking based on the literature reviewed. Browers and Ho (2015) point out that graduate students, many who take online courses, felt a disconnect in on-campus communications. Yet, the research demonstrates it is important for teachers working in higher education to possess cultural awareness of all student populations they serve (Goodwin, 2019). Likewise, administrators and staff should be informed of the same as they too impact student experiences. Cultural competency training across campus can positively impact our interactions with others. Thus, higher education institutions should be proactive in addressing such training.

Coleman et al. (2021) points out that college graduates must be equipped with cultural competence to navigate diverse environments and use academic-specific knowledge in creative ways to address major global questions to develop sustainable solutions to our local, national, and world problems. Universities have been emphasizing the importance of including diversity and inclusion instruction in curriculum offerings and campus experiences. Post secondary educational environments present students with a potentially unique opportunity for exposure to diverse peers. Colleagues may influence one another's comfort level around people of different racial backgrounds, as well as their lifestyle choices post college (Jayakumar, 2008).

The research completed by Jayakumar (2008) suggests students who are academically and socially exposed to diverse and inclusive populations while pursuing their university degree are better prepared to handle the complex issues of a global society. Further, her study indicates that the benefits of structural diversity persist

beyond the college experience into the post college year, however, any indirect effects on cross-cultural workforce competencies are dependent on the quality of an institution's racial climate. The relevance of structural diversity is validated when the students' learning outcomes who attended structurally diverse institutions are compared to those attending liberal arts institutions.

Hanover Research (2019) discusses instructional practices that teachers must actively work to embed into the curriculum to facilitate multicultural education. Three broad instructional practices include differentiated instruction, cooperative and collaborative learning, and real-world connections. A key strategy to promote student learning includes asking open-ended questions and high-order questions for which there is no single "right" answer. These questions promote discussion and should stimulate student thinking (Hanover Research, 2019). Moreover, Farmer (2020) points out that it is imperative for educators across the organizations and school districts be active listeners. Failing to listen to parents, students, staff, and peers impacts cultural awareness. Simply stated, "Far too often fail to see because they fail to listen".

External Influences

Discussions on cultural competence or cultural awareness often focus on influences of one's culture or life experiences. Further, implicit bias and its impact on learning outcomes is represented well in the literature. Of note, areas of influence such as the geographic location of higher education institutions, Diversity, Equity and Inclusion movements, the post pandemic world, artificial intelligence or social media are not all represented as influencing factors on the level of cultural competence. Yet, stakeholders' perceptions of culture are most likely impacted by these types of external influences or barriers that may be present.

Research suggests that students' learning at institutions of higher education is an intricate process that is impacted by the totality of their experience, both inside and outside of the classroom. Their attitudes, and the knowledge and skills they acquire, are affected by both their formal and informal education (Bitew, 2015). Therefore, it appears that the external environment impacts how learning occurs. For example, metropolitan colleges and universities have become prime environments for increased cultural sensitivity and perception of culture (Coleman et al., 2021). Further, metropolitan colleges and universities include efforts supported by both academic and student affairs. Metropolitan campus environments provide settings where cultural competence can serve as a foundation for high impact student success practices.

Conclusions

The literature confirms the need for and importance of managing student diversity. Cultural competency plays a significant and multifaceted role in graduate school settings. The culture within an organization communicates strong messages to all stakeholders and impacts the learning environments, student experiences, and the overall educational outcomes. As such colleges and universities must understand the needs, cultural values and

learning styles of their students while simultaneously ensuring the faculty are culturally competent. It is imperative for cultural competence to be understood across college campuses if there is to be a positive impact on student engagement, learning outcomes, and subsequent student success post-graduation.

Cultivating cultural competence among graduate student is essential for preparing them to thrive in diverse academic and professional environments. A variety of strategies and approaches that educators and institutions can use to foster cultural competence in graduate students are available. The expansion of cultural knowledge in conjunction with the dynamics resulting from cultural differences could lead to respect and empathy among all stakeholders. Cultural competence stresses the skill to bridge these differences while respecting and understanding another individual's perspective and needs. Interpersonal and communication skills including active listening, empathy, and cross-cultural communication fostered through people and organizations who are culturally competent.

It is a necessity to adapt to different cultures, perspectives, and groups if the student is to be successful in an increasingly diverse and global workplace. An understanding of other groups such as active-duty military, veterans, disabilities both learning and physical, and the LGBTQ+ community are important for students to understand prior to entering the workforce post-graduation. Learning outcomes are influenced by faculty, and student motivation is impacted by faculty engagement. As such, student success is also influenced by course design. The literature suggests opportunities to promote experiential learning through community service, internship, and study abroad programs. Experiences exposing graduate students to different communities and cultures encourage student cultural awareness. The demographics present on metropolitan campuses appear to offer more opportunities to culturally develop competency than the higher education institutions located in rural areas. Cultural centers more often found on campuses in urban areas do impact student cultural awareness.

Recommendations

A review of the relevant literature demonstrates significant gaps in predicting learning outcomes in graduate school and post-graduation. Further, since training programs related to cultural competency are not mandated in higher education environments, assessing cultural competency across faculty is challenging. Much of the existing research examines outcomes of diversity while students are in college. The literature suggests student exposure to diversity and inclusion impacts their higher education experience, and subsequent understanding of cultural differences. Yet, there are no longitudinal studies available that track students' development over time. Based on gaps in the literature additional studies to evaluate (1) students' cultural differences prior to entering higher education (2) influence of external factors on student perceptions and learning outcomes (3) cultural competency proficiency of faculty and students in graduate schools and (4) post-graduate student experiences in the workplace.

Future research should also seek to learn more about cultural awareness among individuals on campus, the

training required or offered to better understand cultural differences, and if interventions such as study abroad, internships or multicultural centers influence learning outcomes. These types of studies benefit higher education settings in preparing students for the post-graduate world. Of importance would be to follow groups of post-graduate students to assess their personal perspectives on being workforce ready after graduation from both metropolitan and rural graduate school settings.

References

- Bitew, G. (2016). A qualitative study of the academic and social factors affecting Latino students at a Liberal Arts College: Accomplishments and challenges. *International Journal of Educational Research*, 75, 57–66. <https://doi.org/10.1016/j.ijer.2015.11.007>
- Browsers, C.S. & Ho, H.W.L. (2022), Seeing through their eyes: the diversity and inclusion lessons learned from rural university students. *Higher Education Evaluation and Development*, 16 (1), 2-15. <https://doi.org/10.1108/HEED-12-2020-0053>
- Coleman, J., Holloman, D., Turner-Harper, M., & Wan, C. (2021). Cultural competency activities. *Metropolitan Universities*, 33(1), 27–44. <https://doi.org/10.18060/24536>
- Council for the Accreditation of Educator Preparedness. CAEP. (n.d.). <https://caepnet.org/standards/2022-itp/introduction>
- Durden, T. R., de Guzman, M. R. T., Taylor, S. A., Guzman, J. M., & Potthoff, K. L. (2016, June 17). *Cultural competence: An important skill set for the 21st Century (G1375)*. Nebraska Extension Publications. <https://extensionpubs.unl.edu/publication/9000017519635/cultural-competence-an-important-skill-set-for-the-21st-century-g1375/>
- Fabina, J., Hernandez, E. L., & McElrath, K. (2023, June). *School enrollment in the United States: 2021 - Census.gov*. School Enrollment in the United States: 2021. <https://www.census.gov/content/dam/Census/library/publications/2023/acs/acs-55.pdf>
- Farmer, G. (2020, August). *How schools and teachers can get better at Cultural Competence*. How Schools and Teachers Can Get Better at Cultural Competence. <https://www.educationnext.org/how-schools-teachers-can-get-better-cultural-competence/>
- Fostering Culturally Inclusive Classrooms. (2023). <https://fosteringculturallyinclusiveclassrooms.wordpress.ncsu.edu/cultural-competence/>
- Gallagher, K. (2021, June). Addressing Issues of Cultural Competence. <https://www.graduateprogram.org/2021/06/addressing-issues-of-cultural-competence/>
- Gilbert, J., Goode, T. D., & Dunne, C. (2007). Cultural awareness. From the Curricula Enhancement Module Series. Washington, DC: National Center for Cultural Competence, Georgetown University Center for Child and Human Development.
- Goodwin, A. K., & Long, A. C. (2022). Parents' perceptions of culturally responsive teacher practices and elementary children's mental health and well-being. *Journal of Child and Family Studies*, 32(3), 781–795. <https://doi.org/10.1007/s10826-022-02454-3>

- Guzman, M., Durden, T., Taylor, S., Guzman, J., & Potthoff, K. (2016). Cultural Competence. An Important Skill Set for the 21st Century. *Nebraska Extension*.
<https://culturalcompetence.unl.edu/documents/g1375.pdf>
- Hanover Research. (2019, May). Cultural Awareness and Cultural Competence Toolkit - WPMU dev.
<https://cpb-us-e1.wpmucdn.com/blogs.gwu.edu/dist/a/3589/files/2021/03/Cultural-Awareness-and-Competence-Toolkit.pdf>
- Jayakumar, U. (2008). Can higher education meet the needs of an increasingly diverse and global society? campus diversity and cross-cultural workforce competencies. *Harvard Educational Review*, 78(4), 615–651. <https://doi.org/10.17763/haer.78.4.b60031p350276699>
- Kellogg Insight. (2021, Mar. 1). There's an Education Gap Between Rural and Urban Communities. Can Technology Bridge It? <https://insight.kellogg.northwestern.edu/article/education-gap-distance-learning>
- McFarland, M. R., & Wehbe-Alamah, H. B. (2019). Leininger's theory of Culture Care Diversity and universality: An overview with a historical retrospective and a view toward the future. *Journal of Transcultural Nursing*, 30(6), 540–557. <https://doi.org/10.1177/1043659619867134>
- Morrison, T., & Conaway, W. A. (2006). *Kiss, Bow, or shake hands: Asia: How to do business in 12 Asian countries*. Adams Media.
- National Academics of Sciences, Engineering, and Medicine. (2004). *Measuring Racial Discrimination*. <https://doi.org/10.17226/10887>
- National Council for Accreditation of Teacher education - (NCATE). CHEA. (n.d.). <https://www.chea.org/national-council-accreditation-teacher-education>
- National Quality Forum (NQF). (2009). *A Comprehensive Framework and Preferred Practices for Measuring and Reporting Cultural Competency: A Consensus Report*. Washington, DC
- Purnell, L. (2014). *A Guide to Culturally Competent Healthcare*. Third edition. F. A Davis Company. Philadelphia, PA.
- Sandell, E. & Tupy, S. (2015). Where Cultural Competency Begins: Changes in Undergraduate Students' Intercultural Competency. *International Journal of Teaching and Learning in Higher Education*, 27 (3), 364-381.
- Sunds, J. Rohrbach, S., & Drais-Parrillo, A. (2023). What do students perceive from the syllabus? The importance of syllabi to communicate belonging and promote engagement. *International Journal on Studies in Education (IJonSE)*, 5(4), 568-584. <https://doi.org/10.46328/ijonse.174>
- Szoke, J. (2023) The effects of internationalization on cultural sensitivity: A research among higher education students. *International Journal of Education (IJonSE)*, 5(3), 245-256. <https://doi.org/10.46328/ijonse.131>
- The United States Census Bureau (2023a, June 8). *Census Bureau Release School Enrollment Report*. Census.gov. <https://www.census.gov/newsroom/press-releases/2023/school-enrollment-report.html>
- The United States Census Bureau. (2021b, August 12). *2020 census: Racial and ethnic diversity index by State*. Census.gov. <https://www.census.gov/library/visualizations/2021/dec/racial-and-ethnic-diversity-index.html>

Opinions of Prospective Social Studies Teachers on Distance Education during the Pandemic Process

Özkan Akman

Süleyman Demirel University, Turkey,  <https://orcid.org/0000-0002-8264-3178>

Abstract: The main purpose of this study is to identify the views and experiences of pre-service social studies teachers towards distance education during the Covid-19 pandemic. The research is important for understanding the effects of the pandemic on the field of education, evaluating the advantages and challenges of distance education, and drawing lessons from these experiences for future educational practices. This research was conducted by preparing a semi-structured interview form from qualitative research methods. The data were analyzed using descriptive analysis technique. According to the findings, the difficulties experienced by some pre-service social studies teachers in accessing technology were emphasized. It was stated that these problems were more evident especially in schools in rural areas. Some pre-service teachers had inadequacies in using technology effectively and stated that distance education could affect student motivation. They stated that distance education increased pre-service teachers' access to various teaching materials and resources. Pre-service social studies teachers observed that in-class interaction decreased in distance education. Preservice teachers' access to technology and their skills are important factors to consider in terms of student motivation, instructional materials and student interaction. University authorities can make improvements in these areas to make distance education processes more effective.

Keywords: Pandemic, Covid-19, Prospective Teacher.

Citation: Akman, Ö. (2023). Opinions of Prospective Social Studies Teachers on Distance Education during the Pandemic Process. In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023-- International Conference on Social and Education Sciences* (pp. 691-694), Las Vegas, NV, USA. ISTES Organization.

Introduction

The COVID-19 pandemic has caused drastic changes in the field of education, and distance education has become the new reality for students and educators. Pre-service social studies teachers also had to complete their education during this period (Kanuka Collett, & Caswell, 2002). In this process, distance education has played a key role for students and teachers to continue their education process (Huang, 2000). Pre-service social studies teachers had to adapt to this changing educational environment and maintain their teaching practice (Dron, 2007). In this article, a research design will be proposed to examine pre-service social studies teachers' views on distance education during the pandemic (Keegan, 2003).

Distance Education: Challenges and Opportunities for Prospective Social Studies Teachers

During the pandemic, distance education has faced a number of challenges and opportunities. In evaluating this new educational model, pre-service social studies teachers addressed the following issues:

Teachers' Technology Skills: Research has shown that some teachers lack the ability to use technology effectively. Educators may need to improve these skills (Bates, 2005).

Student Motivation: Social studies teachers indicated that distance education can affect student motivation. Teachers developed new strategies to encourage students' participation in distance education (Bayır & Mahiroglu, 2017; Cakir, Ozturk, Unal, 2019; Onat & Bertiz, 2023; Ozturk & Susuz, 2023; Ozturk, 2023).

Teaching Materials and Resources: Distance education has increased teachers' access to a variety of teaching materials and resources. However, it is important to use these resources effectively (Wikeley & Muschamp, 2004).

Student Interaction: Social studies teachers observed that classroom interaction decreased in distance education. Therefore, they developed new strategies to encourage collaboration and discussion among students (Beck, McKeown, Sandora, Kucan & Worthy, 1996).

Method

This research was prepared using content analysis technique, one of the qualitative research methods. The study group of the research was carried out with 12 pre-service social studies teachers studying at Süleyman Demirel University Faculty of Education. The data were collected through a structured interview form. The collected data were subjected to content analysis.

Results

Technological Infrastructure and Access: During the pandemic, pre-service teachers, especially those without technological infrastructure and internet access, experienced difficulties in accessing distance education.

Lack of Interaction with Students: Pre-service social studies teachers had fewer opportunities to connect with students due to the lack of in-class interaction. Classroom interaction can help students understand the topics better.

Motivation Issues: Distance education can create a lack of motivation for students and the pre-service teachers faced this challenge. Interaction and group work in the classroom can increase students' motivation.

Assessment and Exams: There was uncertainty about how assessment and exams would be conducted in distance education. Student teachers may be concerned that this may not prevent student failure.

Social Justice: Distance learning can increase social injustice. Economically disadvantaged students may become disadvantaged due to technological inequality.

Conclusion

During the pandemic, pre-service social studies teachers' views on distance education reflect new realities and challenges in education. Educational institutions should provide support for pre-service teachers to cope with these challenges and find solutions to implement distance education more effectively. This process can encourage future teachers to be more flexible and adaptable and contribute to the transformation of education systems. The pandemic process has shown that transformation in education is inevitable. Examining pre-service social studies teachers' views on distance education can help us understand the effects of this change process in education. The research design proposed in this article can contribute to a better understanding of pre-service social studies teachers' distance education experiences and the effects of these experiences on their future teaching practice.

This research has helped us to better understand the distance education experiences of social studies teachers during the Covid-19 pandemic. Teachers' access to technology and their skills are important factors to consider in terms of student motivation, instructional material and student interaction. Educators can make improvements in these areas to make distance education processes more effective.

Recommendations

Technological Infrastructure and Access: Educational institutions should provide technological infrastructure and facilitate internet access to prospective teachers and students.

Educational Materials: Pre-service teachers should prepare original and interesting educational materials in order to be more effective in distance education.

Interaction and Communication: Preservice teachers should frequently interact with students and create interactive learning opportunities such as discussions and group work on online platforms.

Motivational Strategies: Student teachers should develop different strategies to motivate students. It is important to provide feedback and encouragement to students.

Social Justice: Educational institutions should provide support to economically disadvantaged students to

maintain social justice. Student teachers can offer extra help to these students.

References

- Bates, A. T. (2005). *Technology, e-learning and distance education*. Oxford: Routledge.
- Bayır, E. A., & Mahiroğlu, A. (2017). Çevrimiçi öğrenmede bireysel farklılıklar ve iletişim ortamlarının işlemsel uzaklık algısına etkisi. *Ege Eğitim Dergisi*, 18(1), 430–447.
- Beck, H. P., McKeown, M. G., Sandora, C., Kucan, L., & Worthy, J. (1996). Questioning the author: A year long classroom implementation to engage students in text. *Elementary School Journal*, 96, 385–414.
- Cakir, E., Ozturk, M.S., Unal, M. (2019). Interpainting as a Creating Method in Digital Illustration: Reinterpretations from Movie Scenes. *Science, Education, Art and Technology Journal (SEAT Journal)*, 3(2), 78-88.
- Dron, J. (2007). Designing the undesignable: Social software and control. *Educational Technology & Society*, 10(3), 60–71.
- Huang, H. M. (2000). *Moore's theory of transactional distance in an online mediated environment: Student perceptions on the online courses*. Unpublished doctoral dissertation, Seattle Pacific University, Washington, DC, USA.
- Kanuka, H., Collett, D., & Caswell, C. (2002). University instructor perceptions of the use of asynchronous text-based discussion in distance courses. *The American Journal of Distance Education*, 16(3), 151–167.
- Keegan, D. (2003). *Foundations of distance education*. New York, NY: Routledge.
- Onat, O., & Bertiz, Y. (2023). The Effects of Instant Messages on Distance Education Students' Perception of Transactional Distance. *International Journal of Technology in Education*, 6(1), 69-83.
- Ozturk, M.S. & Susuz, M. (2023). The Investigation of Creativity Levels of Fine Arts Faculty Students. *International Journal on Social and Education Sciences (IJonSES)*, 5(4), 929-944. <https://doi.org/10.46328/ijonSES.596>
- Ozturk, O.T. (2023). Examination of 21st Century Skills and Technological Competences of Students of Fine Arts Faculty. *International Journal of Education in Mathematics, Science, and Technology (IJEMST)*, 11(1), 115-132. <https://doi.org/10.46328/ijemst.2931>
- Wikeley, F., & Muschamp, Y. (2004). Pedagogical implications of working with doctoral students at a distance. *Distance Education*, 25(1), 125–142.

The Concept of “Identity” and the Formation of “National Identity”: Turkish Identity

Harun Er

Bartın Universitesi, Turkey,  <https://orcid.org/0000-0002-0454-6807>

Abstract: In today's world, the concept of identity is emphasized and has an interesting meaning. In a broad sense, identity represents an understanding that covers all the characteristics of a person and reveals how they are seen by society. Individuals adapt to society, the environment and their position through their understanding of identity. Individuals are distinguished from other people with their identity characteristics and find the opportunity to express themselves in a unique way. Identity covers a process that starts from the birth of the person and continues until death by developing depending on the location and social structure understanding. Individuals exist with their individual identities and then continue their lives with the social identities they have acquired. The formation of national identity refers to a situation related to the language, religion, cultural values and spiritual elements that societies have in the process of becoming a nation. With the concept of nationalism that developed after the French Revolution (1789), the understanding of the nation state has strengthened and the process of establishing national states has accelerated. In this context, the concept of nation came to the fore and this situation strengthened the formation of national identity. The formation of national identity positively affected the development processes of states based on nationalism and strengthened their establishment to a great extent. The construction process of Turkish identity is a situation that should be evaluated in this context. With the proclamation of the republic in Turkey, the understanding of Turkish identity came to the fore and gained great importance in this sense. In this study, the concept of identity in general terms will be emphasized and the process of constructing Turkish identity in the context of national identity understanding will be tried to be explained.

Keywords: Identity, National Identity, Turkish Identity.

Citation: Er, H., (2023). The Concept of "Identity" and the Formation of "National Identity": Turkish Identity. In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023-- International Conference on Social and Education Sciences* (pp. 695-705), Las Vegas, NV, USA. ISTES Organization.

Introduction

The Subject and Concept of Identity

"Identity" is one of the most important concepts in today's world, which is increasingly important, debated and occupies the agenda in political and cultural contexts. This concept is one of the bridge concepts used in social sciences. It has assumed the role of a fundamental concept that concerns many social sciences such as

philosophy, literature, sociology, social psychology, anthropology, politics and history and has become the subject of these sciences. Each discipline has tried to explain this concept from its own perspective and has made significant contributions to the literature in this sense. In this context, the concept of identity has gained a multidimensional character and a great diversity in definitional terms. From this point of view, it is quite difficult to make a complete, clear and inclusive definition of the concept of "identity". In its dictionary meaning, the term "identity" is derived from the Latin root "idem", which includes sameness and continuity. This concept, which has a long historical adventure, started to be used more popularly in the twentieth century and has maintained its importance until today (Marshall, 2000). When we look at it in Turkish, this concept is derived from the question root "who", and with this, it expresses a compulsory affiliation (belonging), being which person, being the same, being one. (Aydođdu, 2004, p.116). The concept of identity is in general terms the answers given by individuals and social groups of different sizes and qualities to the question "who are you, who are you from?" (Güvenç, 1993, p.3). The source of the question "who am I?" asked by those who are faced with this question is either a way of problematising life (philosophical) or being confronted with influences that make them ask this question (social). The recognition and definition of "I", which is the basis of the question "Who am I?", also points to the social psychological basis of identity (Güleç 1992, p.14). This situation is important in terms of explaining the way the concept of identity is handled by different disciplines.

Another issue in defining identity is the prominence of two elements centred on "difference" at the point of differentiating the individual from others and "similarity" at the point of making the individual belong to a whole. In similarity-centred definitions, a method of making "I" belong to "We" is followed, while in definitions emphasising difference, it can be stated that the method of distinguishing "We/me" from "They/others" is followed (Özdil, 2017). Identity is also related to what we are and how we are known, rather than what we prefer or consent to. In this sense, identity needs difference in order to exist and transforms difference into otherness in order to secure its own certainty (Connolly, 1995, p.92). Sarup discusses two approaches to identity at the definitional point and describes it as follows: Firstly, the traditional approach is the understanding that accepts the existence of a holistic and consistent structure in the context of gender, race and class. This is regarded as a formationist situation based on a static, stationary foundation. Here, the individual's intervention in the existing situation is limited or minimal. In the second one, it is accepted that identity is a phenomenon related to a dynamic and constructed process. Here, the process is mobile and the individual is in an active structure that takes an active role in the process (Sarup, 1996). In this context, it is accepted that identity can be constructed especially in political powers in states. Because as the powers change, the discourses formed as a result of power conflict also change. This situation shows that identity can change depending on the change of discourse with the fact that it is not a final end at the national point (Sütçüođlu, 2009). The main premise here is that as long as the power relationship between discourses continues, the understanding of national identity will also vary (Dalbay, 2018).

According to Aka's quotation from Dobry (1986), identity is used by referring to the individuality of a person, his/her sense of self, feelings and ideas about himself/herself. The special qualities that people are born with, which make them different from other people, and the characteristics that they acquire later and acquire through

cultural and environmental experiences constitute their identity. Here, the individual's hereditary ways and life experience and acquisitions enable the formation of a unique feeling. This situation enables the individual to leave a stamp on life in a sense like a personal seal. Thus, the individual can easily distinguish himself/herself from other people in a social sense and draw a boundary against others at the point of marginalisation. This process mostly expresses a static and non-interactive situation. According to Subaşı (2005), identity structures formed by the mutual interactions of individuals also reflect a continuous formation process. Here, too, the process is dynamic and mobile. In this period, identity is in a continuous formation function. Individuals' identity structures can show continuous development and change. The changing conditions and circumstances of the world and the dynamics of the society are in constant interaction. This situation is a factor that directly affects the identity structure of the person.

If we analyse identity in a conceptual context, it can be stated that two types of understanding have emerged. The first one is social identity and the second one is cultural identity. If we look at social identity, it refers to the state of personality at the interpersonal level in a sense. It can be seen as the part of our self that is based on our knowledge or consciousness of belonging to a certain social environment. This consciousness and knowledge are accompanied by some feelings and value attributions related to belonging to the group in question (Bilgin, 2007, p.13). In other words, it refers to the common points where the person interacts with the group. Here, the person gains the ability to express himself/herself by displaying a role in terms of adaptation and belonging to the group. The individual symbolises his/her individual characteristics based on the harmony of the group. The person shows behaviours depending on his/her role and social status and is accepted in the group as such. This situation conceptualises the person in the group to some extent and enables him/her to gain a place in the group. In the first approach in social identity, the psychological motivations that lead to membership of a group's leadership to approve or reject an existing group membership are emphasised (Aka, 2010). Groups see social identity as a need among group members in order to distinguish the difference of their group from the social identity of other groups. On the contrary, in the second approach, it can be said that there is a concentration on the support and elements that social identity reveals in the cognitive sense. This explains how individuals acquire identity and how and in what way they will act as a group (Huddy, 2001, p.132). This state expresses more of a functional state.

When cultural identity is considered, it is based on the fact that identity can be formed through culture as well as the individual. There is a mutual relationality here. The discoveries that emerge based on the relational process are accepted as a part of this process. Basically, two aspects can be mentioned in cultural identity. In the first one, identity is recognised as a defined phenomenon and a discovery-formed promise. Here there is a limitation, a final end. In the other, cultural identity is considered as a phenomenon that is in the process of continuous production and cannot be completely completed. Here there is a continuous construction process. This process expresses an open-ended situation with no boundaries. Change, development and production are recognised as the main actors of this process. Cultural identity is a structure that has historical roots and evolves from one point to another in the process. This identity is not something that normally exists, it goes beyond history, space and time. It is also recognised as the stories of the past that are waiting to be discovered and found, and when

these happen, they add strength to the individual's sense of self. In other words, cultural identity is the names we give to different situations that position us and position ourselves (Subaşı, 2005, p.301). It is very difficult to completely separate the concepts of social and cultural identity. These concepts present a spiral structure intertwined with each other. However, it can be stated that they create differences according to their formation and the field in which they are used and that they differ from each other in this way (Aka, 2010).

Individual Identity

Identity varies as singular and plural in terms of origin in the formative context. In this context, it can be stated that it contains different dimensions in terms of both scope, permanence and power of influence. One of the identities that can be evaluated in this sense is individual identity. Individual identities are based on personal characteristics that distinguish the individual from other people. When we look at these features in a quantitative context, they can be listed as name, surname, place and year of birth, parents and family tree information, occupational information and basic physiological qualities (Yıldız, 2007). These characteristics are unique and unique in every human being due to creation and nature. Due to the nature of creation, each person has different characteristics from each other, from fingerprints to the anatomical structure of the skull. When we look at individual identity in a qualitative sense, we see that many features of different dimensions emerge. Depending on the changing and developing world conditions from past to present, it can be stated that this understanding of identity has also changed in every period. Especially the change of needs, acceleration of discoveries, development of communication tools and improvement of living conditions have greatly affected the qualitative content of individual identity. In this context, it is very difficult to explain the formation of individual identity independently from the society in which the individual was born and the environment in which he/she lives. In a relational sense, the individual is influenced by the society in which he/she lives and influences the society, and at the same time his/her identity takes shape according to the conditions of the age he/she lives in. This effort of the individual in the interactional sense can be characterised as a search for identity in order to build or gain individual identity (Göka & Beyazyüz, 2005, p.17).

In modern societies, the traditional structure chain from the past is broken and lifestyles presented in the form of ready-made forms that emerge depending on the conditions of the age are presented to people as a choice. In a sense, people are forced to choose one of the choices presented to them rather than revealing their own preferences. In the fast passing time, people are confronted with the opportunities of the modern age presented to them in the form of package programmes without having the opportunity to think and evaluate them. This situation directly affects the development of individual identity. The individual recognises himself/herself in the context of the environment and society he/she lives in and at the same time redesigns himself/herself with the innovations brought by the age (Giddens, 2010, p.16). The point to be considered here is the process of constructing oneself in a unique and special way thanks to the different characteristics one has in the search for personal identity. The person will differentiate himself/herself from other people thanks to his/her different characteristics and at the same time will continue his/her personal development by adapting to the social

structure. In this sense, it can be said that it would be correct that a person should not attempt to form an individual identity that is neither independent from society nor unaware of himself/herself. Here, it is obvious that it will constitute a healthy structure for individuals to continue their personality formation in a synchronised and coordinated manner (Saribay, 1997, p.239). As a result, we can say that individual identities are more prominent in today's modern age and are built on differences rather than similarities between individuals (Özdil, 2017).

Social Identity

The concept of social identity has a broader meaning than individual identity. The individual is born alone but needs a community or society to survive. This situation constitutes a necessity for the individual to meet his basic needs and to continue his spiritual development. In this sense, human being is a unique private being in terms of birth but a social being in terms of life. So much so that the physical and spiritual development of the person is in parallel with being a social being. The person gains self-awareness in social and social environments rather than individuality and provides personal development to a great extent in this way. As long as the person interacts socially in the society, he/she gains gains and at the same time can realise himself/herself in a healthy way. Social environments within the society can also be described as the most favourable and suitable places for self-realisation. It can be said that social identity is shaped according to the individual's nationality, religion, political, etc. relationship with groups. In this sense, while revealing his/her social identity, the individual inevitably emphasises his/her group belonging depending on his/her social identifications. Social identity means the identity gained through the adoption and internalisation of the norms, values, social relations, etc. unique characteristics of societies. (Tural, 1988, p.62). Social identity is the identity that is constructed on the basis of similarity and consciousness of this by individuals within the same group with common feelings of belonging and shared similar positions (Yapıcı: 2004, p.55). While being similar within the group is a distinguishing feature of social identity, difference in intergroup relations, as in individual identity, constitutes a functional function in the identity of the group.

In social identity, groups often build their sense of belonging on the past. This protectionist understanding that preserves the past is actually the most important source of motivation that keeps group members together. Individuals forming the group express their individual identities by keeping the common past and cultural values of the group alive and at the same time protect social values. In this sense, individuals keep their identity alive in line with group belonging and ensure the continuity of social identity. This situation also requires the individual and society to be in a dynamic process interactively. It seems very difficult to maintain this situation with a static understanding. In fact, rather than the uniformity of social identity, the sense of continuity and commitment to the elements of the common culture that it carries in its background is more dominant (Smith, 2009, p.48). The dynamic structure of social identity requires being in relation with other social structures and continuous renewal and change. Just as the construction of individual identities is possible through interpersonal relations, the formation of social identities is realised through inter-societal relations (Bilgin, 1999). In general,

it can be said that the individual participates in life practices through social identity. Subsequently, it can be stated that social identity often assumes a function beyond consciousness and comes to dominate the entire existence of the individual (Özdemir, 2001).

National Identity and Its Formation

In the historical process, with the French Revolution of 1789, concepts such as homeland, nation, freedom and liberty gained importance. Among these concepts, especially the concept of nationalism came to the fore and became a driving force in the construction of nation states. As the great empires began to lose their political power, the concept of nation state emerged and the main basis of the states established with this understanding was the idea of nationalism. The nationalism movement brought along the formation of a national identity based on national principles and this formation led to the establishment of national nation states. The emergence and spread of nationalism as an idea followed a very rapid process in Europe in the 19th century and subsequently took on a theoretical character as a doctrine. Later, the idea of nationalism gave birth to the understanding of "national identity" and this accelerated the processes of nation state formation. Modern identity, which shaped the world after the French Revolution and caused many upheavals in the 19th and 20th centuries, is closely linked to the ethnic structure and culture of the nation. If we accept that the issue of political identity exists with the nation-nation, the importance of the ideology of nationalism in the self-definition of nations emerges. However, it should not be forgotten that although the concept of nation has existed in the political vocabulary of almost every nation for a long time, the ideology of nationalism is a product of the modern world (Kara & Çatma, 2017).

The term nationalism is used in several ways to mean the following;

- The whole process of the establishment and self-sustainability of nations and nation-states as a whole,
- To have a sense of belonging to a nation and to have aspirations and feelings for the security and welfare of the nation,
- A language and symbolism of the 'nation' and its role,
- A cultural doctrine about nations and national will and an ideology that includes prescriptions for the realisation of national aspirations and national will,
- A social and political movement that will achieve the aims of the nation and realise the national will" (Smith, 2004).

In general, we can say that the factors that play a role in the formation of national identities are diverse. The emergence of strong central powers, transportation systems and travel security, unity of law, trade and the use of money, and the convergence of people whose relations have expanded and diversified by creating common characters can be given as examples of this situation. Although there are differences according to the socio-economic structures of countries and societies, it can be stated that "us" positive and "them" negative elements are effective in the formation of national identity. This situation is a common source of motivation for

individuals, but it also brings along the sense of common action and the phenomenon of self-sufficiency. In other words, it provides individuals with the ability to draw their own destiny without the need for others. If the common elements such as language, religion, history, ideals, etc. are strong, i.e. "us", the need for the negative element "them" decreases. There is an inverse proportion here. The fact that nations are strong and in a good position as a whole is a factor that reduces their dependence on other nations and reduces their intervention power. For example, it can be said that this strong socio-economic structure was effective in the formation of British and French national identities in Western Europe. The themes of independence and political unity are effective in the formation of German and Italian national identities. In the case of Hungarians, nobility and landed aristocracy, and in the case of Serbs and Romanians, chauvinistic and assimilation-based social identity formation processes were experienced due to the partially mixed population and underdeveloped middle class. The Gandhi factor and anti-British sentiment in India, economic and intellectual integrity in Japan, religion in the Jewish nation, and language unity in the Georgian nation have been the most effective factors in defining social identity. Since the concept of "us" was not sufficiently developed in African societies, national identities were built on the element of "them" (Oran, 1977). In general, it is seen that national identity formations differ for each nation. The reason for this can be said to be the experiences of nations in the historical process, characteristic features, cultural and religious values, physiological structure and so on. Another issue that should not be forgotten is that the different internal dynamics of each nation also have an important effect in this situation.

Turkish Identity

Basically, the nation-building process of the states that emerged as a result of the French Revolution (1789) and the understanding of national identity that emerged accordingly had an impact on the Ottoman Empire. The separatist intellectual movements and political orientations of the nations under the auspices of the Ottoman Empire led to the emergence of different intellectual currents within the state. In a sense, the Ottoman Empire, considering its own future, implemented different policies in order to prevent the collapse of the state in the period we will refer to as the Turkish modernisation process. Especially the lost wars and rapid territorial losses brought about social disintegration. This situation made it necessary to produce a solution and made it obligatory for the intellectuals and state administrators of the country to take measures. In a sense, all these developments paved the way for the development of the Turkism movement. The idea of Turkism gradually turned into a widespread opinion within the state and the Turkish identity based on common culture, language and common purpose, which was also advocated by Ziya Gökalp, constituted the basic philosophy of the establishment of the Republic of Turkey.

When we look at the historical process, the understanding of Turkish identity is an intellectual movement that has existed at the basis of every established Turkish State, but has remained in the background from time to time depending on the political ambitions of the state. From the beginning of the 19th century, which is considered as the modernisation process of the Ottoman Empire, until the collapse of the state and the establishment of the

Republic of Turkey, the formation of Turkish national identity was based on different dynamics. One of the most important factors underlying this formation is the desire to maintain the existence of an independent Turkish state in the Anatolian geography. Starting with the 1071 Malazgirt War, the homelandisation process of the Turks in Anatolia has never been interrupted in any period. Subsequently, during the collapse of the Ottoman Empire, Turkish identity has been a great source of motivation and an intellectual movement that has been the source of the establishment of the Republic of Turkey. Especially during the period of the National Struggle (1919-1923), the unification of the Turkish people in Anatolia around a national identity based on the principle of nationalism was both the source of the establishment of the new Turkish State and enabled the Turkish nation to return to its essence and regain its Turkish identity (Erdal, 2020).

In the new Turkish state that started with the proclamation of the Republic after the national struggle, it was seen that steps were taken on the foundations of Turkishness and Turkish nationalism. In this context, in the 1924 constitution, Turkish identity was defined in the context of citizenship; in Article 69, it was emphasised that all kinds of group, class, family and individual privileges were abolished and in Article 88, it was emphasised that everyone in Turkey is a Turk in terms of citizenship without distinction of religion or race. In a lecture he gave in 1923, Ziya Gökalp stated that the definition of Turkish race and nationality was not based on race and blood, but on ideology and upbringing, and Hamdullah Suphi Tanrıöver linked this definition to the unity of language, religion and wishes (Sarıay, 2008). Turkish identity has an inclusive and holistic philosophy that represents an understanding based on a common ideal and culture rather than an understanding based on ethnicity or race. Turkish identity is basically the product of an understanding based on cultural integrity with deep roots carrying the codes of ancient Turkish culture. The understanding of nationalism held by Mustafa Kemal Atatürk, the founder of the Republic of Turkey, is built on a foundation based on the unity of language, culture and ideals and based on contemporary civilisation and civilisation. It can be stated that the Turkish identity based on this philosophy represents an understanding that coincides with the ideal of both Atatürk and the Republic of Turkey.

Conclusion

We can say that every human being has a unique, unique and unique structure due to the nature of creation. Although people rarely resemble each other physically and spiritually, they have characteristics that are completely different from each other. Each person carries a unique structure and is different from other people in this respect. At this point where people are differentiated, all of these qualities that people have at this point reveal the concept that we define as "identity". The concept of identity is a very important element that affects the personality, character, understanding of life and philosophy of life throughout life from birth to death. People define themselves individually with their identities and prove their existence in a social sense.

Identity is also a reflection of one's self-awareness. People form a whole by combining the hereditary characteristics they bring from birth and the qualities they have acquired in life on a common ground. This

integrity shows different reflections by being subjected to some kind of processing in physical, mental and emotional terms. In other words, it causes reactions that allow different behaviours in each person. This whole process creates this complex structure that we call identity in individuals. Identities can be evaluated in two different categories as individual and social. While individual identity represents a singular structure specific to the individual, social identity represents a pluralistic structure belonging to groups. While individual identities are embodied and expressed within the social structure, social identities form a structure that changes from society to society and continues to exist in different characters. We can say that these two conceptions of identity have different reflections depending on the changing world conditions by maintaining continuity in interaction with each other. One of the most important of these reflections is the understanding of national identity.

When we look at the historical process, we see that the world consists of human communities belonging to different nations. These nations live in different geographies and have different characteristics and cultures. These differences distinguish nations from each other and allow each nation to position itself differently. In a sense, these differences can be characterised as qualities that make nations unique and at the same time seen as a source of wealth. In this context, these characteristics, which represent the common understanding, philosophy of life and characteristic structures of each society or nation, reveal the concept we define as national identity. National identities are common social accumulations formed by the combination of values that individuals have. These accumulations are very valuable treasures that are transferred from past to future from generation to generation and shape the vital prospects of nations. National identities represent an understanding formed over a very long period of time in the historical process. The human communities who lived in every period of the history of that nation have contributed to this understanding to some extent. It can be said that national identities, which emerged as a result of an understanding of an ancient tradition, are a very important source of motivation as well as a driving force in the continuation of the existence of nations.

Suggestions

This study, which is formed under the headings of identity concept, national identity formation and Turkish identity, is basically tried to be explained through the context of identity. The importance of identity in human life and the value it adds to the life of the individual and its association with social identity are emphasised. Subsequently, the concept of national identity, which acts as a building block for nations, has been tried to be stated in detail. Here, the issue that the formation of national identity is possible with the achievements of nations in the historical process and that it is provided by the cultural accumulations they have acquired has been analysed in a broad way. Finally, by focusing on Turkish identity as an example of national identity formation, it has been tried to explain in detail how, how and on what basis the identity of a nation is shaped. As a result, it can be stated that the concept of identity preserves its importance as an element that greatly affects, shapes and directs the lives of people, societies and nations from past to present.

References

- Aka, A. (2010). Kimliğe Teorik Yaklaşımlar. *C.Ü. Sosyal Bilimler Dergisi*, Cilt: 34, Sayı: 1, 17-24.
- Aydoğdu, H. (2004). "Modern Kimlikte Öznenin Ölümü", *Kazım Karabekir Eğitim Fakültesi Dergisi*, S.10, s.116-117.
- Bilgin, N. (1999). *Kolektif Kimlik*, Sistem Yayıncılık, İstanbul, s.59.
- Bilgin, N. (2007). *Kimlik İnşası*. İzmir: Aşına Kitaplar-Turmaks.
- Connolly, William E. (1995). *Kimlik ve Farklılık -Siyasetin Açmazlarına Dair Demokratik Çözüm Önerileri*, çev. Fermâ Lekesizalın, Ayrıntı Yayınları, İstanbul, s.92-93
- Dalbay, R. S. (2018). "Kimlik" ve "Toplumsal Kimlik" Kavramı. *Süleyman Demirel Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, Cilt:2, Sayı:31, s.161-176.
- Erdal, İ. (2020). MHP'nin Türk Kimliği ve Türk Milliyetçiliği Anlayışı ve Türk Dünyası'na Bakışı. *Genel Türk Tarihi Araştırmaları Dergisi*. Cilt/Volume 2, Sayı/Issue 3, ss. 185-200.
- Giddens, A. (2010). *Modernite ve Bireysel-Kimlik Geç Modern Çağda Benlik ve Toplum*, Çev. Ümit Tatlıcan, İstanbul: Say Yayınları.
- Göka E., & Beyazyüz, M. (2005). "Yeni Dünya Düzeninin 'Kimlik Siyaseti': Psikolojik Bir Bakış Denemesi", *Türkiye Günlüğü*, S: 83, ss. 17-26.
- Güleç, C. (1992). *Türkiye'de Kültürel Kimlik Krizi*, V Yayınları, Ankara.
- Güvenç, B. (1993). *Türk Kimliği*, Kültür Bakanlığı Yayınları.
- Huddy, L. (2001). From social to political identity: A critical examination of social identity theory. *Political Psychology*, 22(1), 127-156.
- Kara, H., & Çatma, B. (2017). Modern Türk Kimliğinin Oluşumunda "Türk Kimdir" Tartışmaları ve Türk Ocağı Kurultayı (1924). *Anemon Muş Alparslan Üniversitesi Sosyal Bilimler Dergisi*, 5(2): 339-360.
- Marshall, G. (2000). *Sosyoloji Sözlüğü*. Ankara: Bilim Sanat Yayınları.
- Oran, B. (1977). *Az Gelişmiş Ülke Milliyetçiliği*, Ankara, s. 29.
- Özdemir C. (2001). "Kimlik ve Söylem", *Osman Gazi Üniversitesi Sosyal Bilimler Dergisi*, Sayı, 2, s.108.
- Özdil, M. (2017). Kolektif ve Bireysel Kimlikler Bağlamında Sosyal Bütünleşme. *Süleyman Demirel Üniversitesi Sosyal Bilimler Enstitüsü Dergisi Cilt:3, Sayı:28, s. 383-400.*
- Sarıbay, A. Y. (1997). "Cinsellik, Kutsallık ve Kimlik: Toplumsal Düzenin Bedensel İnşası", Cumhuriyet, Demokrasi ve Kimlik, Yay. Haz. Nuri Bilgin, İstanbul: Bağlam Yayıncılık, ss. 231-242.
- Sarınay, Y. (2008). *Türk Milliyetçiliğinin Tarihi Gelişimi ve Türk Ocakları*, Ötüken Yayınları.
- Sarup, M. (1996). "Identity and Narrative". *Identity, Culture and the Post-modern World*. Editör: R. Tasneem; G. Athens, The University of Georgia Press, s.14.
- Smith, D. Anthony, (2004). *Milli Kimlik*, Çeviren: Bahadır Sina Şener, 3. Baskı, İletişim Yayınları, İstanbul.
- Subaşı, N. (2005). *Kültürel Kimliğin Melezleşmesi ve Alevi Modernleşmesi*. Türkiye Kültürleri. Ankara: Tetragon.
- Sütçüoğlu, B. (2009). "Türkiye'de Ulusal Kimliğin Tanımını Değiştirme Çabası: Devlet Katında Nâzım Hikmet'in Değişen İmgesi", Gönül Pultar (Ed.), *Kimlikler Lütfen* (s.273-288), ODTÜ Geliştirme Vakfı

Yay., Ankara, s.275.

Tural, S. K. (1988). *Kültürel Kimlik Üzerine Düşünceler*, Ankara: Kültür ve Turizm Bakanlığı Yayınları.

Yapıcı, A. (2004). *Din Kimlik ve Ön Yargı Biz ve Onlar*, Adana: Karahan Kitabevi.

Yıldız, S. (2007). Kimlik ve Ulusal Kimlik Kavramlarının Toplumsal Niteliği. *Millî Folklor*, Yıl:19, Sayı:74.

Impact of COVID-19 Pandemic on International Research Collaboration: A Pilot Interview Results

Fatemeh Pariafsai

Bowling Green State University, USA,  <https://orcid.org/0000-0002-1984-7004>

Manish K. Dixit

Texas A&M University, USA

Sherecce Fields

Texas A&M University, USA

Abstract: While the COVID-19 pandemic had a significant negative impact on the world economy, international research collaborations were disrupted by problems like hiring freezes, stopped lab and fieldwork, delayed research infrastructure, health effects, and restricted travel. This study aims to identify the most critical indicators with the highest relevance to explain the overall impact of the pandemic on international research collaboration. For this purpose, it uses a pilot interview conducted through the Zoom platform at a public research university in the U.S. The interview included six questions designed to reveal the impact of the pandemic on international research collaboration and its indicators. Thirty participants from different departments were interviewed. The findings of this study reveal the most important indicators for the overall impact of the pandemic on international research collaboration. The results can help design research programs, particularly those involving international collaboration, to reduce the adverse impacts of such adverse conditions.

Keywords: International research collaboration, Covid-19 pandemic, Critical indicators

Citation: Pariafsai, F., Dixit, M. K., & Fields, S. (2023). Impact of COVID-19 Pandemic on International Research Collaboration: A Pilot Interview Results. In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023-- International Conference on Social and Education Sciences* (pp. 706-726), Las Vegas, NV, USA. ISTES Organization.

Introduction

The COVID-19 pandemic, a major global health crisis in the past century, has led to severe disruptions at socio-economic levels. Analyzing the impact of this pandemic on international collaboration is crucial for designing effective interventions and promoting a more interconnected and resilient global research community (Bogle, 2020; Lee & Haupt, 2021). While the entire world economy faced significant challenges due to the pandemic, issues such as hiring freezes, halted lab and fieldwork, delayed research infrastructure, socio-cognitive health

effects, disruptions in the flow of international students, and restricted travel have especially hindered international research collaborations (Gewin, 2020; Radecki & Schonfeld, 2020; Recio & Colella, 2020).

Since the early 1990s, both developed and developing nations have witnessed a substantial increase, around 10- and 20-times respectively, in scientific publications produced through international collaboration (Gewin, 2020). Approximately 25% of the total global scientific publications are the result of international partnerships, contributing to higher citation rates and more significant societal impacts worldwide (Gewin, 2020; Lee & Haupt, 2021; Miroudot, 2020). However, the momentum of this collaborative trend was significantly impeded by the COVID-19 pandemic, (Liu et al., 2020; Miroudot, 2020) which disrupted travel, face-to-face interactions, lab work, fieldwork, hiring, and the flow of international students, as noted by various sources (Bogle, 2020; Brandon-Jones et al., 2014; Gewin, 2020; Radecki & Schonfeld, 2020; Recio & Colella, 2020). This disruption not only hampered the progress of shared scientific discoveries, especially in the context of international research, but also posed challenges to the national capacity to continue providing a skilled workforce (Bogle, 2020; Boroughani et al., 2023a; Brandon-Jones et al., 2014; Gewin, 2020).

Figure 1 illustrates data from the United Nations World Tourism Organization regarding the percentage of destinations worldwide reporting various travel restrictions in 2020 (Buitendijk et al., 2020; Fry et al., 2020; ICC, 2020; NSB, 2020; Sy et al., 2020; UNWTO, 2020c). The comparison of international student enrollment in 2020 and 2019 is depicted in Figure 2 (UNWTO, 2020e). The adverse effects on international research collaborations encompassed cost overruns, limitations in human resources, and the closure of research facilities, leading to reduced opportunities for research and training for underrepresented minorities (Bogle, 2020; Boroughani et al., 2023b; Radecki & Schonfeld, 2020; Recio & Colella, 2020; Xodabande et al., 2023).

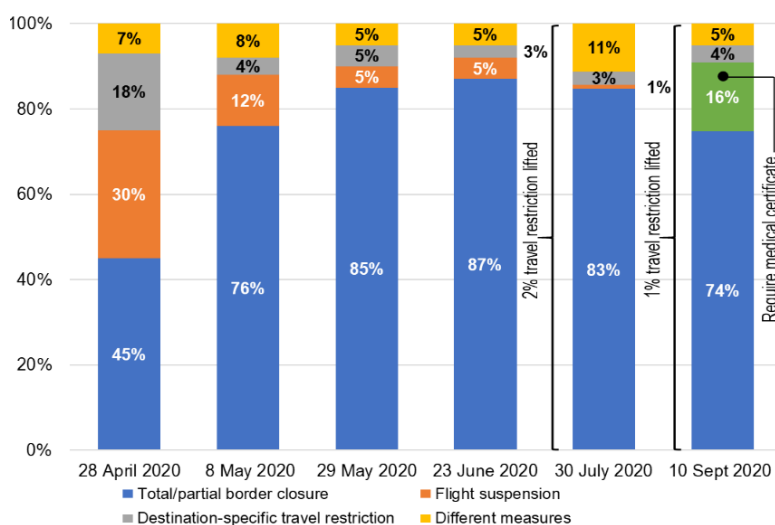


Figure 1. Global travel limitations (percentage of destinations)

While international collaborations in developed nations were significantly impacted, developing countries experienced the most severe consequences (Bogle, 2020). Global research partnerships play a crucial role in

addressing skill shortages in advanced economies like the United States and the United Kingdom, fostering shared scientific progress with developing nations (Lee & Haupt, 2021). However, there is a lack of understanding on how to enhance the resilience of international collaborations, particularly in the face of global crises such as the COVID-19 pandemic (Bogle, 2020; Gewin, 2020). Lee and Haupt (2021) caution that very few studies have examined international collaborations during a global crisis, emphasizing the need for more research dedicated to comprehending how catastrophic disruptions impact research partnerships.

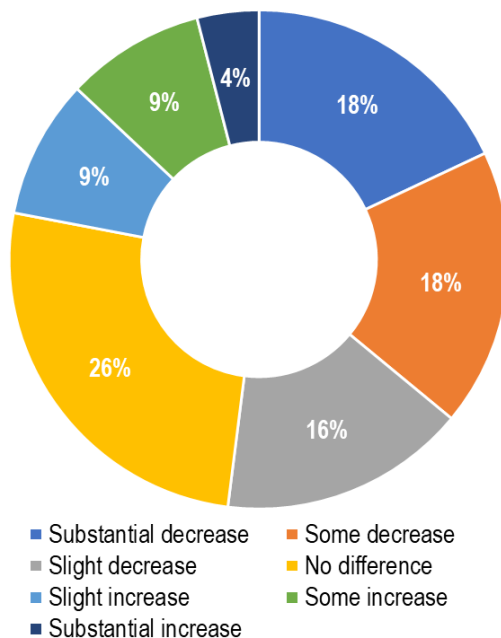


Figure 2. The enrollment of international students in 2020 compared to 2019

It is crucial to adapt the way scholars engage in global research to effectively address similar potential situations in the future (Liu et al., 2020). A comprehensive comprehension of how the pandemic has impacted ongoing global research collaborations is essential for identifying gaps in research and infrastructure. This knowledge will inform present and future international research programs. The present study serves as the initial phase of a larger project that involves collecting and synthesizing time-sensitive qualitative and quantitative data from ongoing international research projects. The aim is to elucidate significant gaps, propose interventions, and highlight opportunities for international collaboration. To be specific, the findings presented in this paper are derived from a pilot interview conducted as part of the initial stages of the broader research endeavor. The objective of this paper is to investigate the key indicators that reflect the overall influence of the pandemic on international research collaboration.

Methodology

This paper represents the results of a pilot interview conducted at a public land-, sea-, and space-grant research university in the U.S. The Zoom interview included six questions (see Table 1). The websites of several

departments were searched for multilingual/multicultural professors, post-docs, and research assistant Ph.D. students. The potential participants were invited for the online interview, among which 30 participants completed the interview. First, Cronbach’s alpha was applied to check the reliability of the indicators. Next, quantitative and qualitative analyses were used to describe the basic features of the collected data.

Table 1. Pilot interview questions

Q ₁	Which challenges, conflicts, and limitations caused by COVID-19 has the research team faced?
Q ₂	How have these issues caused by COVID-19 impacted the research process and outcomes of this project?
Q ₃	Which changes and interventions have you explored because of COVID-19 in this project to address these issues?
Q ₄	How have these changes and interventions explored because of COVID-19 impacted the overall research quality?
Q ₅	How has the pandemic affected the project budget, schedule, and health and safety of your team?
Q ₆	Which opportunities could be exploited to enhance sustainability of global research during the pandemic?

Results

The first question asked participants about challenges, conflicts, and limitations caused by COVID-19 that their research team faced. The most frequently mentioned issues were under the following categories, respectively: conflicts (N=35), challenges (N=24), and limitations (N=8). In addition, under each category, the responses could be classified in 11 different subcategories. Among challenges, the issues regarding data collection were the most frequently mentioned ones. The participants addressed conflicts related to communication, interaction, collaboration, and connection more than other conflicts. In addition, limitations regarding lab work were the most frequently mentioned issues under limitation category. Additionally, issues related to data collection, lab work, and education/training were the most frequently addressed issues in total (see Table 2).

Table 2. Challenges, Conflicts, and Limitations Caused by COVID-19

Issues	Challenge	Conflict	limitation	Total
Travel ban	3	5	0	8
Data collection	10	3	1	14
Field work	1	1	0	2
Lab work	7	2	4	13
Equipment provision, personnel recruitment	2	5	0	7

Issues	Challenge	Conflict	limitation	Total
Funding, expense	0	2	0	2
Educational, training	0	3	0	3
Communication, interaction, collaboration, connection	0	8	2	10
Remote work	0	3	1	4
Political/administrative response	1	2	0	3
Emotional	0	1	0	1
Total	24	35	8	67

The second question asked participants how the issues caused by COVID-19 impacted the research process and outcomes of their project. More than half of the participants (56.67%) believed that their research was negatively affected but continued. 30% of mentioned that their research was adapted to the new conditions and continued. The rest of participants said their research were completely stopped or postponed (Table 3).

Table 3. Impact of the issues Caused by COVID-19 on research process.

Participant	Researched completely stopped/postponed	Researched was negatively affected/slowed down, but continued	Research was adapted and continued
P ₁			✓
P ₂			✓
P ₃			✓
P ₄		✓	
P ₅		✓	
P ₆			✓
P ₇	✓		
P ₈		✓	
P ₉	✓		

Participant	Researched completely stopped/postponed	Researched was negatively affected/slowed down, but continued	Research was adapted and continued
P ₁₀			✓
P ₁₁		✓	
P ₁₂		✓	
P ₁₃		✓	
P ₁₄		✓	
P ₁₅		✓	
P ₁₆		✓	
P ₁₇		✓	
P ₁₈		✓	
P ₁₉			✓
P ₂₀		✓	
P ₂₁		✓	
P ₂₂		✓	
P ₂₃		✓	
P ₂₄			✓
P ₂₅		✓	
P ₂₆	✓		
P ₂₇			✓
P ₂₈	✓		
P ₂₉		✓	

Participant	Researched completely stopped/postponed	Researched was negatively affected/slowed down, but continued	Research was adapted and continued
P ₃₀			✓
Total	4	17	9

On the other hand, more than half of the participants (56.67%) believed that the issues caused by COVID-19 did not impact the outcomes of their projects. 30% of the participants believed that the issues had negative impact on their project outcomes and 10% of them mentioned that the impact of the issues caused by COVID-19 on their project outcomes was unclear. Only one of the 30 participants believed that the issues caused by COVID-19 had a positive impact on their project outcomes, and they got better outcomes (Table 4).

Table 4. Impact of the issues Caused by COVID-19 on project outcomes

Participant	Unclear	Not affected	Negative	Positive
P ₁		✓		
P ₂		✓		
P ₃			✓	
P ₄		✓		
P ₅			✓	
P ₆				✓
P ₇			✓	
P ₈		✓		
P ₉	✓			
P ₁₀		✓		
P ₁₁			✓	
P ₁₂		✓		
P ₁₃			✓	

Participant	Unclear	Not affected	Negative	Positive
P ₁₄		✓		
P ₁₅		✓		
P ₁₆		✓		
P ₁₇			✓	
P ₁₈		✓		
P ₁₉		✓		
P ₂₀		✓		
P ₂₁			✓	
P ₂₂		✓		
P ₂₃			✓	
P ₂₄			✓	
P ₂₅	✓			
P ₂₆	✓			
P ₂₇		✓		
P ₂₈		✓		
P ₂₉		✓		
P ₃₀		✓		
Total	3	17	9	1

The third question asked participants about changes and interventions they explored in their projects to address the issues caused by COVID-19. Most participants (83.33%) mentioned that they explored some changes and/or interventions and only 3.33% said that they did not explore any changes or interventions. In addition, 10% of them talked about changes/ interventions that they would or might explore in the near future in their projects to address the issues caused by COVID-19 (Table 5).

Table 5. Changes and interventions explored to address the issues caused by COVID-19

Participant	Explored	Would be explored	Might be explored	No changes/interventions
P ₁			✓	
P ₂		✓		
P ₃	✓			
P ₄				✓
P ₅	✓			
P ₆	✓			
P ₇	✓			
P ₈	✓			
P ₉	✓			
P ₁₀	✓			
P ₁₁	✓			
P ₁₂				✓
P ₁₃	✓			
P ₁₄	✓			
P ₁₅	✓			
P ₁₆	✓			
P ₁₇	✓			
P ₁₈	✓			
P ₁₉	✓			
P ₂₀	✓			

Participant	Explored	Would be explored	Might be explored	No changes/interventions
P ₂₁	✓			
P ₂₂				
P ₂₃		✓		
P ₂₄	✓			
P ₂₅	✓			
P ₂₆	✓			
P ₂₇	✓			
P ₂₈	✓			
P ₂₉	✓			
P ₃₀	✓			
Total	25	2	1	2

The changes and interventions explored by the participants could be divided into 9 major categories including:

1. Change in experiment, such as, changing experiment location, simplifying experiment, making experiment online, changing the sample size, and replacing experimental work with simulation work.
2. Using different methods/ tools, such as, using online tools/ platforms, software simulations, and online behavioral testing
3. Online interaction, such as, using google drive and online meeting platforms
4. Remote work
5. Change in materials procurement, such as, using alternative sources, and overpaying for materials
6. Change in recruitment, such as, recruiting post-docs instead of doctoral students
7. Following new regulations/ rules, such as, wearing masks, and complying social distance
8. Working harder to achieve efficiency
9. Change in results, for instance, preparing hypothetical papers instead of experimental ones

The fourth question asked participants how the explored changes and interventions impacted their overall research quality. One-third of the participants considered the impact on their research quality as negative. For instance, they mentioned that the changes and interventions impacted their research quality, efficiency, data and personnel quantity, budget, original plan, timeline, and mental health negatively, or the research became less

enjoyable. 30%, one-sixed, 10%, and 10% of them addressed the impact as either negative or neutral, neutral, unclear, and positive, respectively (Table 6). The positive impacts included improved quality as a result of working harder due to uncertainty, creative thinking, and spending more time on research methods.

Table 6. Impact of the explored changes and interventions on

Participant	Unclear	Negative	Neutral	Positive
P ₁		✓		
P ₂		✓	✓	
P ₃		✓		
P ₄		✓		
P ₅		✓	✓	
P ₆		✓		
P ₇		✓		
P ₈		✓	✓	
P ₉	✓			
P ₁₀		✓	✓	
P ₁₁		✓	✓	
P ₁₂			✓	
P ₁₃		✓	✓	
P ₁₄		✓	✓	
P ₁₅		✓		
P ₁₆			✓	
P ₁₇		✓	✓	
P ₁₈				✓

Participant	Unclear	Negative	Neutral	Positive
P ₁₉		✓		
P ₂₀			✓	
P ₂₁		✓		
P ₂₂				✓
P ₂₃	✓			
P ₂₄		✓		
P ₂₅	✓			
P ₂₆		✓		
P ₂₇			✓	
P ₂₈		✓	✓	
P ₂₉				✓
P ₃₀			✓	
Total	3	19	14	3

The fifth question asked the participants how the pandemic affected their project budget, schedule, and health and safety of their team. 43.33% of the participants mentioned that their project budget was not affected or they were unaware of the affect. 23.33% and 20% believed that their project budget decreased, and increased, respectively. The rest mentioned that the impact of the pandemic on their project budget was still unclear (Table 7). In addition, most participants (73.33%) believed that the pandemic made their schedule longer (Table 8). Unsurprisingly, two-third of the participants reported that the pandemic affected the mental health of their team (see Table 9).

Table 7. Impact of the pandemic on project budget

Participant	Unclear	Increase	Decrease	Other
P ₁				✓

Participant	Unclear	Increase	Decrease	Other
P ₂		✓		
P ₃			✓	
P ₄		✓		
P ₅				✓
P ₆				✓
P ₇	✓			
P ₈		✓		
P ₉				✓
P ₁₀		✓		
P ₁₁				✓
P ₁₂				✓
P ₁₃				✓
P ₁₄				✓
P ₁₅			✓	
P ₁₆		✓		
P ₁₇		✓		
P ₁₈				✓
P ₁₉			✓	
P ₂₀	✓			
P ₂₁	✓			
P ₂₂			✓	

Participant	Unclear	Increase	Decrease	Other
P ₂₃			✓	
P ₂₄				✓
P ₂₅				✓
P ₂₆				✓
P ₂₇	✓			
P ₂₈			✓	
P ₂₉				✓
P ₃₀			✓	
Total	4	6	7	13

Table 8. Impact of the pandemic on project schedule

Participant	No change	Unclear	Longer	Shorter	Other
P ₁	✓				
P ₂			✓		
P ₃			✓		
P ₄			✓		
P ₅			✓		
P ₆			✓		
P ₇	✓				
P ₈			✓		
P ₉			✓		
P ₁₀					✓

Participant	No change	Unclear	Longer	Shorter	Other
P ₁₁			✓		
P ₁₂					✓
P ₁₃			✓		
P ₁₄			✓		
P ₁₅			✓		
P ₁₆			✓		
P ₁₇			✓		
P ₁₈			✓		
P ₁₉			✓		
P ₂₀			✓		
P ₂₁		✓			
P ₂₂			✓		
P ₂₃			✓		
P ₂₄			✓		
P ₂₅			✓		
P ₂₆					✓
P ₂₇			✓		
P ₂₈			✓		
P ₂₉	✓				
P ₃₀				✓	
Total	3	1	22	1	3

Table 9. Impact of the pandemic on the health and safety of team

Participant	Positive COVID test results	Mental health issues	Other
P ₁			✓
P ₂			
P ₃			✓
P ₄			
P ₅			✓
P ₆			✓
P ₇		✓	✓
P ₈		✓	✓
P ₉		✓	✓
P ₁₀		✓	✓
P ₁₁	✓	✓	
P ₁₂			✓
P ₁₃		✓	✓
P ₁₄	✓	✓	✓
P ₁₅		✓	✓
P ₁₆			✓
P ₁₇		✓	✓
P ₁₈		✓	✓
P ₁₉	✓	✓	
P ₂₀		✓	✓

Participant	Positive COVID test results	Mental health issues	Other
P ₂₁		✓	
P ₂₂			✓
P ₂₃		✓	
P ₂₄		✓	✓
P ₂₅	✓	✓	
P ₂₆		✓	✓
P ₂₇		✓	✓
P ₂₈		✓	✓
P ₂₉		✓	✓
P ₃₀			✓
Total	4	20	23

The sixth question asked the participants about the opportunities to be exploited to enhance sustainability of global research. The responses grouped into three main categories: technological opportunities, modifying research solicitations/ RFPs, and modifying methodologies/methods. Technological opportunities addressed data collection, communication, conferences and networking, and tools, while modifying research solicitations/ RFPs included IRB, health, technology, and standard. On the other hand, modifying methods/methodologies addressed conferences and networking, communication, planning, data, training, technology, flexibility, and humanity. The category with the highest frequency was modifying methodologies/methods followed by technological opportunities (see Table 10).

Table 10. Opportunities to enhance sustainability of global research

Participant	Technological opportunities	Modifying research solicitations/RFPs	Modifying methodologies/methods
P ₁	✓		
P ₂			✓

Participant	Technological opportunities	Modifying research solicitations/RFPs	Modifying methodologies/methods
P ₃		✓	
P ₄	✓		
P ₅	✓		
P ₆			✓
P ₇	✓		
P ₈	✓		
P ₉			
P ₁₀			✓
P ₁₁		✓	
P ₁₂	✓	✓	
P ₁₃		✓	
P ₁₄		✓	✓
P ₁₅	✓		
P ₁₆			✓
P ₁₇			✓
P ₁₈		✓	✓
P ₁₉			✓
P ₂₀			✓
P ₂₁			✓
P ₂₂			✓

Participant	Technological opportunities	Modifying research solicitations/RFPs	Modifying methodologies/methods
P ₂₃			✓
P ₂₄	✓		
P ₂₅		✓	✓
P ₂₆	✓	✓	
P ₂₇			✓
P ₂₈	✓		✓
P ₂₉			✓
P ₃₀	✓		
Total	11	8	16

Conclusions

According to the findings, the predominant issues stemming from COVID-19 fell under the conflicts category. Issues related to data collection, laboratory work, and education/training emerged as the most critical issues overall. Although the issues caused by COVID-19 had a predominantly negative impact on research, they did not directly influence the research outcomes. In many instances, efforts were made to address these issues through various changes and interventions. These changes and interventions encompassed nine major categories: altering experiments, utilizing different methods/tools, adopting online interactions, implementing remote work, modifying materials procurement, adjusting recruitment processes, adhering to new regulations/rules, intensifying efforts for efficiency, and change in results. Notably, these explored changes and interventions had a detrimental effect on the quality of one-third of research projects. Additionally, the pandemic led to increased budgetary requirements for one-fifth of the projects and predictably extended timelines in most cases. The pandemic also had a negative impact on individuals' mental health. To enhance the sustainability of global research, potential opportunities fall into three main categories: technological advancements, adjustments to research solicitations/requests for proposals, and modifications to methodologies/methods, with the latter being the most promising category.

The results uncover the primary factors indicating the comprehensive effects of the pandemic on international research collaboration. Nevertheless, it is essential to acknowledge certain limitations. The participation in the

pilot interview was not restricted to individuals engaged in active international projects during the pandemic. The study focused on specific departments within a U.S. public land-grant research university, and involvement was confined to members of multilingual/multicultural teams. Consequently, the findings are constrained to the particular sample employed in the pilot study.

Acknowledgements

The presented work has been supported by the U.S. National Science Foundation (NSF) through grant OISE 2111424. The authors gratefully acknowledge the support from the NSF. Any opinions, findings, conclusions, and recommendations expressed in this paper are those of the authors and do not necessarily represent those of the NSF.


References

- Bogle, D. (2020). *How will COVID-19 affect research collaboration?* University World News. <https://www.universityworldnews.com/post.php?story=2020090413393595>
- Brandon-Jones, E., Squire, B., Autry, C. W., & Petersen, K. J. (2014). A contingent resource-based perspective of supply chain resilience and robustness. *Journal of Supply Chain Management*, 50(3), 55-73.
- Boroughani, T., Behshad, N., & Xodabande, I. (2023). Mobile-assisted academic vocabulary learning with digital flashcards: Exploring the impacts on university students' self-regulatory capacity. *Frontiers in Psychology*, 14, 1112429.
- Boroughani, T., Xodabande, I., & Karimpour, S. (2023). Self-regulated learning with mobile devices for university students: exploring the impacts on academic vocabulary development. *Discover Education*, 2(1), 5.
- Buitendijk, S., Ward, H., Shimshon, G., Sam, A. H., Sharma, D., & Harris, M. (2020). COVID-19: an opportunity to rethink global cooperation in higher education and research. *BMJ Global Health*, 5(7), e002790.
- Fry, C. V., Cai, X., Zhang, Y., & Wagner, C. S. (2020). Consolidation in a crisis: Patterns of international collaboration in early COVID-19 research. *PLoS One*, 15(7), e0236307.
- Gewin, V. (2020). The trials of global research under the coronavirus. *Nature*.
- ICC. (2020). *COVID-19 Pandemic: Lessons for International Research Collaboration and Information Exchange*. I. C. o. C. (ICC). <https://iccwbo.org/content/uploads/sites/3/2020/04/icc-statement-rd-collaboration.pdf>
- Lee, J. J., & Haupt, J. P. (2021). Scientific globalism during a global crisis: research collaboration and open access publications on COVID-19. *Higher Education*, 81(5), 949-966.
- Liu, M., Bu, Y., Chen, C., Xu, J., Li, D., Leng, Y., . . . Sung, M. (2020). Can pandemics transform scientific novelty? Evidence from COVID-19. *arXiv preprint arXiv:2009.12500*.

- Martel, M. (2020). COVID-19 Effects on US Higher Education Campuses. *New Realities for Global Student Mobility in Summer and Fall 2020. IIE Covid-19 Snapshot Survey Series. Report, 3.*
- Miroudot, S. (2020). Resilience versus robustness in global value chains: Some policy implications. *COVID-19 and trade policy: Why turning inward won't work*, 117-130.
- NSB, N. (2020). Publication output: US trends and international comparisons. *Science and Engineering Indicators, 2019.*
- Radecki, J., & Schonfeld, R. (2020). The Impacts of COVID-19 on the Research Enterprise. *Ithaca S+ R.*
- Recio, S., & Colella, C. (2020). The world of higher education after COVID-19. How COVID-19 has affected young universities. *YERUN.*
- Sy, M., O'Leary, N., Nagraj, S., El-Awaisi, A., O'Carroll, V., & Xyrichis, A. (2020). Doing interprofessional research in the COVID-19 era: a discussion paper. *Journal of Interprofessional Care, 34*(5), 600-606.
- UNWTO. (2020a). *COVID – 19 Related Travel Restrictions a Global Review for Tourism. Fifth Report as of 23 June 2020.* United Nations World Tourism Organization. <https://webunwto.s3.eu-west-1.amazonaws.com/s3fs-public/2020-06/200623-Travel-Restrictions.pdf>
- UNWTO. (2020b). *COVID – 19 Related Travel Restrictions a Global Review for Tourism. Fourth Report as of 29 May 2020.* United Nations World Tourism Organization. <https://webunwto.s3.eu-west-1.amazonaws.com/s3fs-public/2020-05/TravelRestrictions%20-%2029%20May.pdf>
- UNWTO. (2020c). *COVID – 19 Related Travel Restrictions a Global Review for Tourism. Second Report as of 28 April 2020.* U. N. W. T. Organization. <https://webunwto.s3.eu-west-1.amazonaws.com/s3fs-public/2020-04/TravelRestrictions%20-%2028%20April.pdf>
- UNWTO. (2020d). *COVID – 19 Related Travel Restrictions a Global Review for Tourism. Seventh Report as of 10 September 2020.* United Nations World Tourism Organization. <https://webunwto.s3.eu-west-1.amazonaws.com/s3fs-public/2020-09/200909-travel-restrictions.pdf>
- UNWTO. (2020e). *COVID – 19 Related Travel Restrictions a Global Review for Tourism. Third Report as of 8 May 2020.* United Nations World Tourism Organization. <https://webunwto.s3.eu-west-1.amazonaws.com/s3fs-public/2020-05/TravelRestrictions-08-Mayo.pdf>
- Ursachi, G., Horodnic, I. A., & Zait, A. (2015). How reliable are measurement scales? External factors with indirect influence on reliability estimators. *Procedia Economics and Finance, 20*, 679-686.
- Xodabande, I., & Boroughani, T. (2023). Mobile-assisted focus on forms in English for academic purposes instruction: Investigating the impacts on learning academic words. *Frontiers in Psychology, 14*, 1071555.

Exploring Social Phenomenon: A Review of Social Capital in the Modern Society

Chang Zhou

University of Illinois Urbana-Champaign Champaign, United States of America,  <https://orcid.org/0009-0001-6877-9554>

Abstract: In the increasingly competitive social environment and market, people seek terms which could influence the personal achievement and desire to find and improve on these perspectives to be more success. In the recent decade, social capital has received more and more attentions and been considered as a significant factor that relates to personal success, as well as a common term that people bring up while explain social phenomenon. As a complex concept imbedded in the modern society and directly or indirectly impact every industry, social capital has been categorized in three common perspectives: bonding, bridging, and linking. They mainly describe the special relationship that people hold which could make effect in term of both micro and macro level, horizontally or vertically. The study also specifies the potential benefits and weakness for people when social capital has applied, as well as its impact to other capitals. Better conceptualizing and understanding social capital could not only benefit society to better address the social issue (e.g., equality), but also could help governments to improve economics or for industries to build a more efficient system in order to obtain more benefits and further development. Therefore, it is important for society to understand the use of social capital and worth for sociologists to investigate and discuss relevant topics of it.

Keywords: Social capital, personal achievement, family capital, financial capital.

Citation: Chang, Z. (2023). Exploring Social Phenomenon: A Review of Social Capital in the Modern Society. In M. Shelley, V. Akerson, & M. Unal (Eds.), Proceedings of IConSES 2023-- International Conference on Social and Education Sciences (pp. 727-733), Las Vegas, NV, USA. ISTES Organization.

Introduction

In the complex modern society, sociologists are always looking for concepts which could address the occurrence of every social phenomenon. Social capital, a concept which plays an important role in the society, has been raised and used to explains these phenomena. As a concept which mainly address the association between people, social capital has become one of the most useful capitals that people hold during both of people daily and professional life. Therefore, as a social factor that affects every individual at anytime, anywhere, social capital is able to have impact to every industries and even the entire society. This paper explores the topic of the impact of Social Capital in the United States and its connection to family and financial capital. Why could some people find opportunity earlier than others? Why could some people obtain support trust easier than others?

Why could some people adapt to a new environment easier than others? These questions have been raised from every individual who just enter the society and attract more and more attention. Other than personal skill level, many visible factors also could account for these phenomenon, such as your background, experience, network , or even luckiness. However, these phenomena are not only caused by their personal skills, but also because of some social factors. Therefore, this paper would introduce these social factors including social capital and its impact to other capitals.

Definition

Social capital refers to the overall network that individuals have in society. Just like what described by Coleman (1990) , social capital is a human relationship that mainly about obligation and expectation which build up based on trustworthiness. It relates to not only association, but also trust one received from the surrounding. While social capital is invisible and could not be evaluated standardly like financial capital, it could benefit individuals from several perspectives, such as education, career, daily life, and economics. Just like what Bourdieu (1986) says about economics benefits which could be converted based on social capital, social capital could be convert to immediate cash, rights of properties, or even to educational qualifications and resources. A person with a higher social capital enables him/her to access resources, information and opportunities more easily than one without it. Further, social capital signifies the level of influence in society. However, within different network that each individuals have, social capital could cause inequality, especially in education inequality. Therefore, reviewing, understanding, and analysing social capital in the modern world is valuable and important for forming a better society.

Classification:

Social capital was typically classified into three kinds of forms: bonding, bridging, and linking. As described by Claridge (2018) in his research paper about the function of social capital (2018), based on the network that each kind of social capital offer, bonding capital has been described as horizontal network, while bridging and linking social capital can be describe as vertical relationship. In simple words, bonding social capital only exist among people who have similarity. Bonding social capital features on relationships, shared norms, and trust between groups or individuals. People with similar characteristics, religions, ethics, or background are more likely to be bonded. Meanwhile, they form trust, close relationship during interactions. Bonding social capital connects people with similar background and bind them as a group or community. People involved in same group or community are more familiar, trust, and support each other mutually, such as immigrants from the same regions and ethnic are more likely to bond and help each other. However, just like what describe by Leonard (2004) , bonding social capital could cause series of disadvantages even for members that are getting benefits from it. The special bond that ties people from same background together could also limit the member into a certain environment, thereby blocking their potential. Within research about social capital in low-income neighbourhood, Brisson and Usher (2005) find that the negative associations between neighbourhood stability and social capital. One explanation that Brisson and Usher provided is that families learn distrusts form stable

neighbourhood and gradually separate themselves from it, thereby lowering social capital. This can further prove that the bonding social capital are more likely to bind individuals who have similar identity or network horizontally, such as inside a family, instead of a community that is geographically close but with different identity.

In contrast, bridging and linking social capital have been described as networks that are in the vertical form. Bridging social capital refers to connection between individual or group with different background. As described by Agnitsch et. al (2006) , bridging social capital is the connection between heterogenous groups and community forms which signifies a border network compared to single groups or community. Within great tolerance and diversity, bridging groups and communities are likely to generate more innovations and ideas, and at the same time, more effective resilience when the group is facing crisis. For example, while some extreme climates happen locally, local organization is able to get fund and instruction in short time from government if they have collaborated with government previously.

Linking social capital specifies the relationship between individuals or groups within different level of power. For example, a local community may build a linking connection with the local government, which are able to manage and apply policies to the area that local community locate. Within this linking relationship, individuals or groups within less authority are more easily to access information and resources.

Pros and Cons of Social Capital

While social capital is invisible which could not be standardly evaluate, it could effectively benefit individuals or groups who hold this relationship. Jackman and Miller (1998) describe social capital as a public good which could benefit for both individuals and organizations. While organization continue to give feedback to social capital by giving trust, the organization build up reputation. Within border network and trust, individuals or groups are able to access more information and resources. By forming association with people who have same background, different background, or high authority, individuals or groups are able to observe the newest information or updated news in the early time, gaining more insight for future and more time for preparation. Just like what Franzen and Hangartner's (2006) research revealed, social capital could effectively be used to improve the non-pecuniary characteristics on job searching, giving employees wider range of opportunities on job seeking and helping them to find jobs that the best fit for them. Furthermore, holding social capital signifies equivalent potential social support that could be receive in both daily life and career. Bonding social capital enable one to receive practical and emotional support from surrounding with similar background. For example, immigrants move to another nation may assist by earlier immigrants who from the same country. In addition, comparing a single person, a group or communities with similar background are more likely to have common goals and achieving them. Furthermore, while social capital directly indicates the trust, a significant factor in collaboration, companies, groups, or communities with high social capital are naturally have advantages on collaborative work in goal setting, problem solving, business negotiating, etc.

However, the existence of social capital could also cause the unfairness in the modern society. While social capital bounds people together with trust and familiarity and creates enormous advantages for both sides in the network, people will gradually become unwilling to make changes. They might only communicate, trade, or provide people with opportunities that they already trust or collaborated before, undermining people outside their network. What this could cause is that people who have talents and special skills but without social capital will have much less opportunities to achieve their goal, while competing with people who are less skillful and with social capital. Therefore, people may believe that it is impossible to change their status by make effort, losing motivation for life. Eventually, social capital could leads to the deactivation of society and the solidification of classes.

Family capital and social capital

Family capital refers to the support and resources that individuals receive from family relationships. This capital involves both tangible and intangible family-derived benefits that individuals hold. Family capital focuses on the human resources that family members could obtain through family networks and influence. Based on the resources provided by other family members or the accumulated trust and reputation of the family, family members are able to have more information, resources, social support, and opportunities. Further, Danes et al. (2009) also regards family capital as a comprehensive capital that includes human, social, financial capital, and even further forms of tangible and intangible benefit. Therefore, within several similarities between social capital and family capital, Bubolz (2001) described family capital as a form of social capital. Individuals are not the only role which benefits from the family capital. Family-based organization companies also get an advantage from sharing family capital. Increasing family capital allows workers in a family firm to communicate more efficiently, increasing individual productivity and eventually overall performance of the entire company (Dollahite & Rommel, 1993; Hoelscher, 2002).

Financial capital and social capital

Financial capital refers to the wealth and economic recourses that an individual has, such as income, property, and exclusive stock information. Financial capital could also be categorized as tangible and intangible capital. The tangible financial capital suggests that wealth and direct benefits come along with wealth. For example, children who were born into rich families usually enjoy better education, learning equipment, environment, and opportunities. The intangible perspective of financial capital also has an impact on family members, such as stability and a sense of security. The financial capital of a family could also influence human capital, social capital, and cultural capital. Specifically, having enough money could get individuals not only more resources for development but also unique experiences that require enough debts. For example, a rich person who live in an Asian country could afford flight expense which allow him to travel to another country such as France. Therefore, in a future event that involves a potential business partner, his experience will allow him to follow what other people say about France, increasing the chance of finding a new partner and network. However, if the person is poor and lacking in money to afford tickets for traveling, he is likely to lose this kind of

opportunity. In other words, the boundary that exists between each class that is caused by financial capital could have an impact on social capital. As described by Pichler and Wallace (2009) [3] who investigate the connection between social class and social capital, people in higher social classes have more opportunities and are more likely to explore their network on occasions, such as formal events.

Discussion and Conclusion

In the complex modern society, social capital helps sociologists to explain both micro and macro phenomenon that looks unreasonable but within its logic. Even though the concept of social capital is comprehensive and addressed by many sociologists with different or similar perspectives, social capital is mainly about the level of trust between people based on social connection. This connection has been categorized into roughly two ways: horizontal and vertical. Horizontal social capital addresses the network that an individual has among people who are at the same level: age, position, social status, or education received. Since it is a social capital that builds up between people who are in similar status, the determinacies of this kind of social capital could largely be based on similar backgrounds and interests, in other words, similarity. For example, students who take the same class. Horizontal social capital is considered with more benefits than drawbacks, while peers are more likely to have collaborative work which points out the importance of trust. Like finding partners who help mutually, a horizontal network benefits people on both sides with mental support and positive motivation.

In addition, even though horizontal social capital cannot completely be determined by an individual while many influential factors are certain while one is born, horizontal social capital is still considered a resource that could be relatively easier to obtain and expand by self-effort. Horizontal social capital has several similar impact factors to a horizontal one. They are both based on background and communication which strengthen the trust on both sides of the network. However, the drawback of horizontal social to the society is obvious. Within a network with people who are within a higher level of authority, a vertical network is more likely to cause corruption, equality, or class solidification in society. While it is hard to say that all kinds of vertical social networks are more likely to be obtained based on background and personal features, in society, accessing higher-level networks is very hard for individuals without special characteristics or strong backgrounds. Therefore, vertical social capital is considered more complex and harder to improve than horizontal social networks by effort.

The study also analyzes the interaction of social capital with family and financial capital. Family capital has a positive impact on social capital. While family itself could not only provide resources, unique background, and association, family capital is considered to have a positive correlation with individual social capital. Children from a family could access high-level networks and knowledge based on the network that their parents construct. Family capital, in society, is therefore seen as one of the premier with to approach vertical social capital. The use of family capital is also one of the reasons for the drawbacks of social capital. Financial capital impact social capital mainly based on differentiating level of opportunities, resources, experience, and knowledge.

While financial factor does not directly impact social capital, people who are well-finance are potentially getting more opportunities to explore their network, both horizontally and vertically.

Social capital is a highly controversy concept in both history and modern society. This article extends the existing literature about the role that social capital plays and its impact on modern society, which can raise people's awareness about these social factors that might affect people's achievements.

Social capital is a highly controversy concept in both history and modern society. It could not be standardly evaluated or easily taken into consideration for social events. However, what cannot be doubted is that it plays a crucial role in our society. This paper addresses the impact of social capital on personal achievement and relative capital including family and financial capital. For sociologists, social capital is a great approach while other theories are not able to explain or address social phenomena. Addressing social capital and taking social capital into consideration could effectively promote equality in policymaking. Therefore, social capital is a valuable concept that is worth discussing and exploring in the future study.

References

- Coleman, J. S. (1990). *Foundations of social theory*. Harvard university press.
- Bourdieu, P. (1986) 'The Forms of Capital', in J. Richardson (ed.) *Handbook of Theory and Research for the Sociology of Education*, pp. 241–58. New York: Greenwood Press.
- Claridge, T. (2018). Functions of social capital—bonding, bridging, linking. *Social capital research*, 20(1), 1-7.
- Leonard, M. (2004). Bonding and bridging social capital: Reflections from Belfast. *Sociology*, 38(5), 927-944.
- Brisson, D. S., & Usher, C. L. (2005). Bonding social capital in low-income neighborhoods. *Family Relations*, 54(5), 644-653.
- Agnitsch, K., Flora, J., & Ryan, V. (2006). Bonding and bridging social capital: The interactive effects on community action. *Community Development*, 37(1), 36-51.
- Franzen, A., & Hangartner, D. (2006). Social networks and labour market outcomes: The non-monetary benefits of social capital. *European sociological review*, 22(4), 353-368.
- Jackman, R. W., & Miller, R. A. (1998). Social capital and politics. *Annual review of political science*, 1(1), 47-73.
- Danes, S. M., Stafford, K., Haynes, G., & Amarapurkar, S. S. (2009). Family capital of family firms: Bridging human, social, and financial capital. *Family business review*, 22(3), 199-215.
- Bubolz, M. M. (2001). Family as source, user, and builder of social capital. *The Journal of socio-economics*, 30(2), 129-131.
- Dollahite, D. C., & Rommel, J. I. (1993). Individual and relationship capital: Implications for theory and research on families. *Journal of Family and Economic Issues*, 14, 27-48.
- Hoelscher, M. L. (2002). *The relationship between family capital and family business performance: Collaboration and conflict as moderators*. Texas Tech University.

Pichler, F., & Wallace, C. (2009). Social capital and social class in Europe: The role of social networks in social stratification. *European Sociological Review*, 25(3), 319-332.

GPTZero vs. Text Tampering: The Battle that GPTZero Wins

David W. Brown

Elmhurst University, USA

Dean Jensen

Elmhurst University, USA

Abstract: The growth of Artificial Intelligence (AI) chatbots has created a great deal of discussion in the education community. While many have gravitated towards the ability of these bots to make learning more interactive, others have grave concerns that student created essays, long used as a means of assessing the subject comprehension of students, may be at risk. The bot's ability to quickly create high quality papers, sometimes complete with reference material, has led to concern that these programs will make students too reliant on their ability and not develop the critical thinking skills necessary to succeed. The rise in these applications has led to the need for the development of detection programs that are able to read the students submitted work and return an accurate estimation of if the paper is human or computer created. These detection programs use natural language processing's (NLP) ideas of perplexity, or randomness of the text, and burstiness, or the tendency for certain words and phrases to appear together, plus sophisticated algorithms to compare the essays to preexisting literature to generate an accurate estimation on the likely author of the paper. The use of these systems has been found to be highly effective in reducing plagiarism among students, however concerns have been raised about the limitations of these systems. False positives, false negatives, and cross language identification are three areas of concern amongst faculty and have led to reduced usage of the detection engines. Despite the limitations however, these systems are a valuable tool for educational institutions to maintain academic integrity and ensure that students are submitting original work.

Keywords: Natural Language Processing, Language Translation, Chatbot, Plagiarism

Citation: Brown, D.W. & Jensen, D. (2023). GPTZero vs. Text Tampering: The Battle that GPTZero Wins. In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023-- International Conference on Social and Education Sciences* (pp. 734-744), Las Vegas, NV, USA. ISTES Organization.

Introduction

Artificial Intelligence (AI) tools called chatbots, such as ChatGPT and Cactus AI, have been in the news since the release of ChatGPT by OpenAI in 2022. As faculty explored how these tools might be used by their students, plagiarism and academic integrity became an immediate concern. Academic integrity is a fundamental principle and is crucial for a functioning institution of higher learning. It is based on the values of honesty, trust, and respect requiring students and faculty to adhere to a set of ethical standards (International Center for

Academic Integrity, 2021). Plagiarism, or the intentional or unintentional act of using someone else's work or ideas without proper citation, is a serious ethical offense, as it undermines the integrity of academic work and learning (Chowdhury & Bhattacharyya, 2018). The effects of the emergence of generative AI are currently unknown, but many educators fear it may spell the end of essays as educational assignment (Eke, 2023).

The history of AI and chatbots can be traced back to the 1950's when scientists like Alan Turing began exploring the concept of intelligent machines and whether a computer program could communicate with people without the person realizing their partner was artificial. This question formed the basis for the Turing test, which is considered by many to be the generative idea of chatbots (Copeland, 2000). The first AI program called ELIZA was developed in 1966 to simulate a psychotherapist and while its ability to communicate was limited, it has been the source of inspiration for subsequent development. In the ensuing decades AI technology has continued to advance, leading to the creation of more sophisticated chatbots with the ability to understand and respond to complex requests. These include Siri developed by Apple in 2010, Watson developed by IBM in 2011, Cortana developed by Microsoft and Alexa by Amazon in 2014, and now ChatGPT and Cactus AI.

Chat Generative Pretrained Transformer (ChatGPT) is an AI chatbot that is specifically designed to generate human-like text in a conversational style (Cotton, Cotton, & Shipway, 2023). It is freely accessible, allowing the platform to attract millions of interactions and is based on a large language model (LLM) with over 175 billion parameters that was trained using Reinforcement Learning from Human Feedback (RLHF) based on a model in the GPT-3.5 series using Microsoft Azure AI supercomputing infrastructure (ChatGPT, 2023). This training was performed using over 40 terabytes of text, or close to 40 million books in an Amazon Kindle format (Khalil & Er, 2023). This allows it to use deep learning to perform a range of Natural Language Processing (NLP) tasks, such as translation, summarization, question answering, and text generation, with little to no task-specific training needed (Cotton, Cotton, & Shipway, 2023).

In contrast to ChatGPT, which was intended for generalized usage, Cactus AI was created by a group of AI educators, and designed to be a resource for students to clean up their own essays. Their process involved combining machine learning, natural language processing, and the processing power possible through cloud-based computing infrastructures. (Ju, et al., 2014).

Tools of this type are designed to create content from the data they are trained on when presented with a prompt. Using thousands of sources from the internet it will generate a response, often without further input from the user, that appears realistic. This ability has allowed them to become a popular choice among college and university students to generate academic essays for homework, which has increased the concerns of plagiarism (Khalil & Er, 2023). The coherent nature of this generated text makes it difficult to distinguish between the computer generated and the student's own writing, thus undermining the purpose of higher education, which is to challenge and educate students. When students use ChatGPT or Cactus AI to generate essays or other forms of written text and then pass them off as original works, they violate the core principles of academic integrity (Eke, 2023).

Background

Plagiarism Types

Plagiarism is the presentation of another's work or ideas as one's own without acknowledgement. Although it can appear in different forms, there are generally two types of plagiarism (1) textual plagiarism and (2) source code plagiarism. Textual plagiarism is more commonly seen in academic settings, and thus is the focus of this paper. The authors in (Chowdhury & Bhattacharyya, 2018) divide it into seven categories based on its form and application:

1. **Clone Plagiarism:** also known as deliberate copy/paste or identical copying and designates the situation where someone copies another work and presents it as their own with, or without, acknowledging the original source.
2. **Paraphrasing Plagiarism:** also known as hybrid or remix and refers to the use of another work presented in different ways simply by switching words, changing sentence constructs, and altering grammatical styles without citing the original source.
3. **Metaphor Plagiarism:** refers to someone using metaphors to present other ideas in better ways.
4. **Idea Plagiarism:** refers to someone borrowing an entire idea from other sources and claiming them as their own.
5. **Recycle Plagiarism:** also known as self-plagiarism, this occurs when someone borrows from their own previous documents without a proper citation.
6. **Illegal Source Plagiarism:** refers to someone citing references that are invalid.
7. **Retweet Plagiarism:** refers to someone citing the reference of proper sources; however, their presentation is very similar to the original contents wording, sentence structure, and/or grammatical usage.

Regardless of which form of plagiarism we are dealing with, it is a complicated and ethically difficult subject as it refers to the act of stealing and publishing another author's work under one's own name without crediting the original source (Mansoor & Al-Tamimi, 2022). Further complicating the issue, in this era of generative AI, the topic becomes more complicated and potentially morally ambiguous, as the originality of the content can be questioned. Machine generated content is the result of a computational process and not a deliberate act of copying or paraphrasing someone else's work. While it could be argued that this falls outside of these established categories of plagiarism, as the content was not stolen from another author, yet without proper attribution of the source it can still be defined as plagiarism as authors, even machines, must adequately be credited. No matter how it is defined, plagiarism is a type of academic deception that must be detected.

Plagiarism Detection

To counteract this issue, plagiarism detection tools have been developed to assist educators in identifying instances of plagiarism. These tools work by using advanced algorithms to scan and compare submitted written works against a database of existing texts, identifying similarities, and generating a report that illustrates potentially problematic areas. In this way, plagiarism detection has become an essential tool for maintaining

academic honesty and ensuring the credibility of academic work. Textual plagiarism detection can occur between two same or two different natural languages. Based on the language homogeneity or heterogeneity of the documents being compared, the detection can be classified as either monolingual or cross-lingual plagiarism detection (Chowdhury & Bhattacharyya, 2018).

In the case of cross-lingual plagiarism, detection methods are limited due to the difficulty in finding proximity between two text segments from different languages, e.g., English-to-Spanish or English-to-Japanese (Danilova, 2013). Conversely, monolingual plagiarism detection, which is the most common type, the detection deals with similar languages, e.g., English-to-English, and can be further subdivided based on the use of external references used during the detection process as either intrinsic or extrinsic plagiarism detection. Intrinsic detection analyzes the written style or uniqueness of the author and attempts to detect plagiarism based on own-conformity or deviation between the text segments requiring no external sources for detection. Extrinsic detection compares the submitted work against many other available relevant digital resources in databases or on the internet for its detection (Mansoor & Al Tamimi, 2022).

Extrinsic detection can be further divided into Source Retrieval where given a suspect document, a search engine is used to identify all plagiarized sources. Text Alignment instead seeks to identify all contiguous, possibly reused text passages between a given pair of documents (Ali & Taqa, 2022). The development of software detection systems has taken decades of research and has focused on developing sophisticated text-matching algorithms to identify plagiarism. Such systems include, but are not limited to: Turnitin, iThenticate, PlagAware, PlagScan, CheckForPlagiarism.net, and PlagiarismDetection.org.

These tools detect plagiarism from various perspectives, including Character Based, Vector Based, Syntax Based, Semantic Based, Fuzzy Based, Structural Based, Stylometric Based, Grammar Based, Classification and Cluster Based, and Citation Based. Many studies have tested their effectiveness in plagiarism detection; however, with the release of ChatGPT more sophisticated methods are required to detect the machine generated work, as its originality would not be represented within existing online repositories (Ali & Taqa, 2022), (Ali, Abdulla, & Snasel, 2011), (Mansoor & Al-Tamimi, 2022).

GPTZero

GPTZero is a relatively new classification model released in the wake of ChatGPT that attempts to predict whether a document was written by a LLM or a human. It provides predictions on a sentence, paragraph, or document, and was initially trained on a large and diverse corpus of human-written and AI-generated text with a focus on English prose (GPTZero, 2023). Its classifier returns a score that specifies the probability of the entire document being AI-generated.

The classifier has achieved an AUC, or Area Under the Curve, score of 0.98. The higher the AUC score, the better the AI program is at distinguishing between the two extremes, in our case, student created or plagiarized

(Bhandari, 2020). At a threshold of 0.65, 85% of AI documents are classified as being AI-generated and 99% of human documents are classified as human. At a threshold of 0.16, 96% of AI documents are classified as AI and 96% of human documents are classified as human. It is recommended that a threshold of 0.65 or higher is used to minimize the number of false positives.

GPTZero further utilizes perplexity and burstiness as indicators (Bowman, 2023). Perplexity is a measure of how well a statistical language model can predict a sequence of words given the preceding context and is a way to measure the quality of these predictions. The score is calculated as the inverse probability of the test set normalized by the number of words in the test set. The lower the perplexity score, the better the language model is at predicting the test set. Burstiness is a measure used to describe the distribution of words or phrases in text. It refers to the phenomenon of certain words or phrases occurring in clusters, or bursts, within a particular context, rather than being evenly distributed throughout the text (He, Shen, Chen, Backes, & Zhang, 2023).

If GPTZero is perplexed by the text, then it has a high complexity and it is considered more likely to be human written. However, if the text is more familiar to GPTZero, because it has been trained on such data, then it will have a low complexity and therefore is more than likely to be AI-generated. Similarly, humans tend to write with greater burstiness, for example, with longer or more complex sentences alongside shorter ones, whereas AI sentences tend to be more uniform (Bowman, 2023).

Cross Language Translation

Language switching plagiarism is a type of source code plagiarism where the developer changes the programming language, or a program is written in one language and rewritten in another language and declared to be their own work (Chowdhury & Bhattacharyya, 2018). One way students might attempt to plagiarize work, or submit work created using a chatbot is through the use of Google Translate. Translate is a multilingual neural machine developed by Google to translate text and documents from one language into another (Google Translate, 2023). By changing the language of the generated text to a foreign language and then back into English, the student may hope to confuse detection methods being employed by the school. While GPTZero was not trained to identify AI-generated text that has been heavily modified after generation, this paper will examine whether GPTZero can detect generative AI content slightly modified through obfuscation using Google Translate.

Methodology

This is a descriptive study that presents the results of cross-lingual plagiarism detection analysis on AI-generated content and cross-language translated by Google Translate. This study follows a quantitative analysis, where the outputs generated are analyzed and evaluated numerically based on the scores produced by the

plagiarism detection tool GPTZero. Below we explain in more detail the process for data collection, plagiarism detection, and further analysis.

Data Generation and Collection

To gather a representative sample of data, the authors suggested 6 topics dealing with ethical issues in computer science for scoring by GPTZero. For each topic, 5 anonymized human versions were combined with ChatGPT and Cactus AI generated example essays. In addition, a cross language translation version of the ChatGPT and Cactus AI version of the paper was converted back into English and left in a foreign language, and versions of the ChatGPT essay were fed back into Cactus' AI's "Improve" functionality (Table 5). This led to a total of 84 essays to be evaluated. The different versions of AI generated text were created as a means of showing the minimum many students would do to try and disguise the work being created mechanically, rather than from their own work.

Cross Language Translation

Essays generated by both ChatGPT and Cactus AI were input into Google Translate and converted from English to French to German to Danish to Māori to Russian and finally back to English. In addition, a copy of the essay was left converted into French to test the Cross Language capabilities of the GPTZero engine.

Analysis

The results of the plagiarism detection were analyzed to determine the originality and uniqueness of the AI-generated essays. The analysis is descriptive following quantitative measures of perplexity and burstiness scores.

Table 5. Input Essay Distribution

Paper Source	Quantity
Anonymized essays from students	5
Anonymized essay improved by Cactus AI	1
ChatGPT Generator	1
ChatGPT Improved by Cactus AI	1
ChatGPT Foreign Language	1
ChatGPT converted to English	1
Cactus AI's standard essay generator	1
Cactus AI's guided essay generator	1
Cactus AI Foreign Language	1
Cactus AI converted to English	1

Results

Initial Findings

After uploading the essays to GPTZero, the perplexity and burstiness scores (Figure 27) were recorded along with the engine’s interpretation of the scores. GPTZero uses a six-point Likert scale to provide an easily understandable result to its computations ranging from “Likely to be entirely written by a human” to “Likely to be entirely written by an AI”.

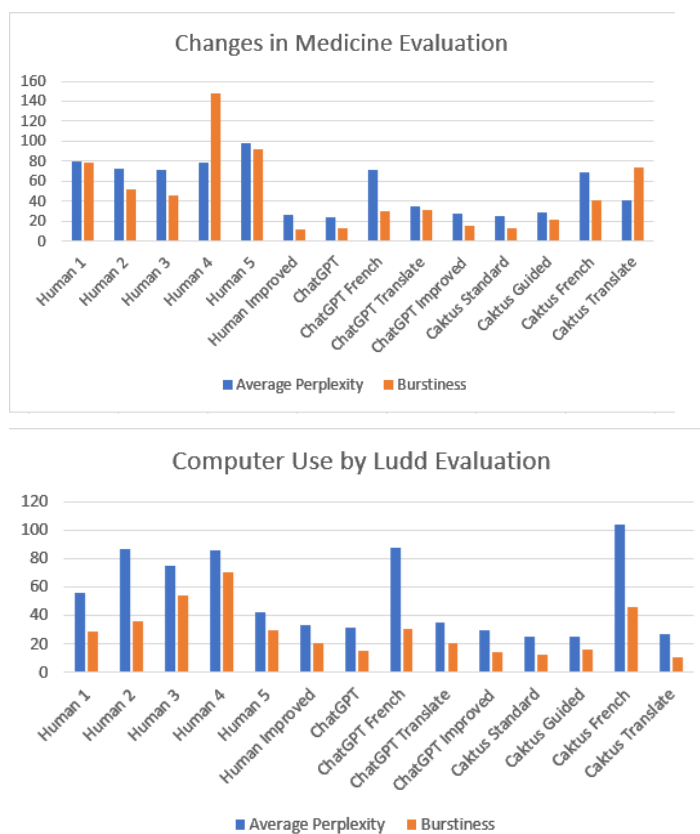


Figure 27. Comparison results for individual essays

False Positive Check

As shown in Figure 27 of the 30 essays we considered, 87% were found to be “Likely w to be written entirely by a human”, however 3% of the papers were misidentified as being “Likely written entirely by AI”. This non-zero result means that conclusions by the engine should not be considered in a vacuum, but instead as part of a rigorous methodology. It is important to consider the expected level of writing for the student based on observations of in class assignments and the level of coursework the essay is assigned. GPTZero and other detection programs do not consider the quality of the work and if the student submits work that does not reach a certain threshold of perplexity, the engine assumes that the essay is machine generated. Therefore, GPTZero should not be the only means you use to check for plagiarism.

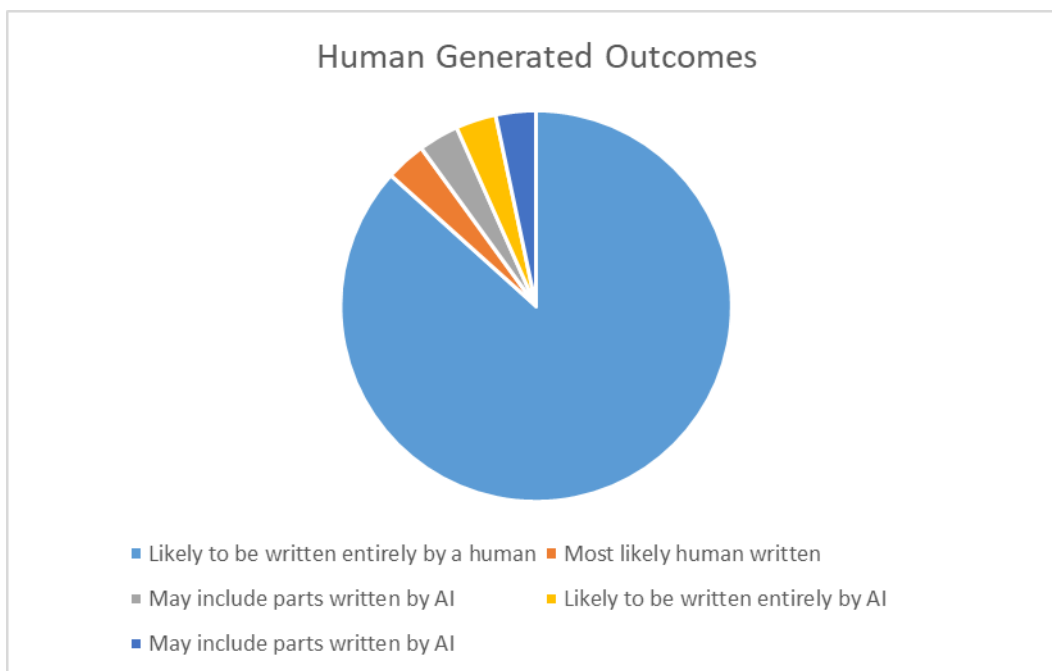


Figure 28. Paper outcomes for human generated essays

False Negative Check

Combining all papers that were created or improved by use of one of the two AI chatbots shows that 91% of the time, GPTZero correctly identified the paper as being “Likely to be written entirely by AI” (Figure 29). Discounting the papers in a foreign language which are discussed in Section 4.4, GPTZero created a false negative 7% of the time. There was no single ‘point of failure’ on any of the papers that were able to escape detection. However, all of these false negatives were modified in some way before being run through the GPTZero application. This could take the form of either using the ‘Improve’ essay option in Cactus AI or being run through our translation sequence. As with the false positives, the non-zero outcome of our search indicates that the instructor of the course will still need to consider the known writing style and ability of the student as part of the grading process rather than simply depending on the engine.

Cross Language Translation Check

It was assumed that GPTZero would have difficulties with cross-language checks, and this proved to be the case as all papers submitted in our foreign language selection, French, were scored as being “Likely to be written entirely by a human”. Considering the difficulties in cross-language translation, it should be considered normal and indicates that until issues with the process are improved, through advancements in technology or development of more language specific testing engines, the concerns of AI generated papers will continue to be an issue in those disciplines. One important note to consider though is that when we translated those papers back to English, 92% of the time, GPTZero correctly identified them as AI generated, which means cases where the faculty have a reason to question the origin of a paper, they may simply translate it to the language of the

detection program and run the analysis. When we had a colleague look over the documents created by translating the original papers into French, they were amazed at how good the papers were. They commented that the only way an instructor would know the papers were computer generated was from the fact that grammatically speaking, the essays were too perfect.

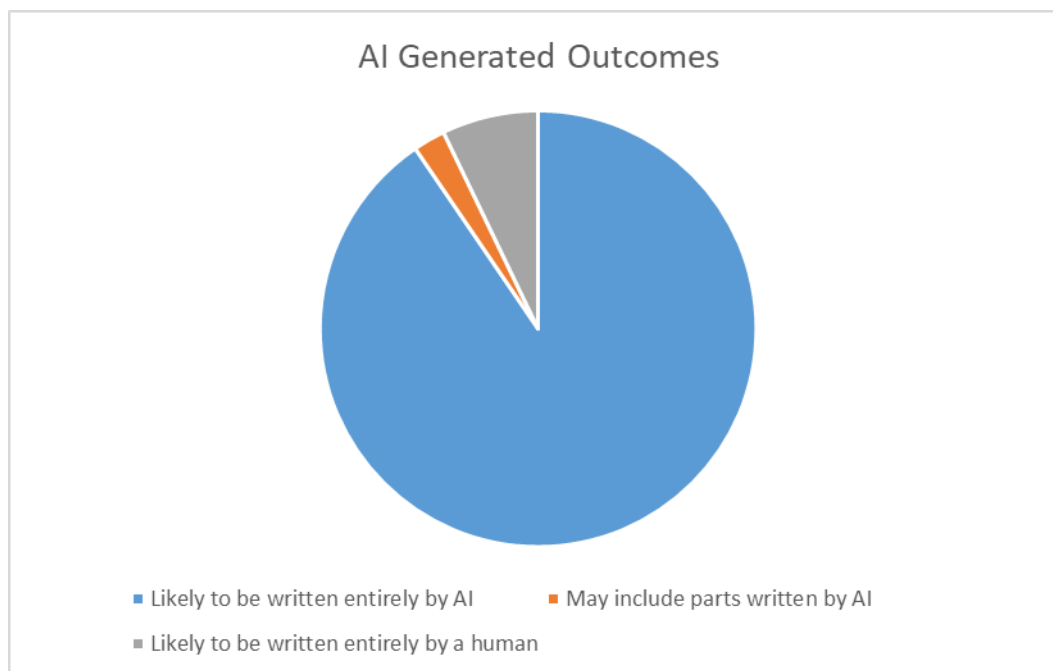


Figure 29: Paper outcomes for AI generated essays

Future Work and Discussion

Even though our numbers of false positives and negatives were higher than anticipated, we do not find that this invalidates the claim of a .98 AUC with the GPTZero engine. Several papers authored by students show as being partially written by an AI, but except for one instance, the scores did not rise to the level of passing into being more likely than not to be AI generated. Our false negatives, withholding the cross-language checks, fall directly into the anticipated range.

In addition, GPTZero has so far managed to stay ahead of common means of students to obfuscate the AI generated text through language conversion. Would paraphrasing of the supplied text allow the student to pass the checks provided by detection algorithms like GPTZero? Our initial research says that it would, but at this point it becomes difficult to control and becomes no different from other forms of plagiarism. As with the false positives, being an observant instructor and knowing the writing ability of students is truly the only way to eliminate all forms of cheating. In the future, the creation of a larger pool of human and AI generated material is the next step in this process, as it will allow us to see if our numbers of false positives and negatives improve. In addition, the modification of the GPTZero engine to accept papers in foreign languages to eliminate those false negatives will be explored.

Study Limitations

The methodology incurred several limitations. First, the study is limited to 500 word essays, as that appears to be the maximum capability of the free version of ChatGPT. The length of essay assignments in undergraduate college and university courses vary depending on the institution, department, and course level but typically range between 1500-5000 words (McCombes, 2019). The relatively short length of the AI-generated essays could have an impact on their perplexity and burstiness. Second, the results of our study are dependent on the accuracy of GPTZero in its classification and plagiarism detection. Third, the sample size of 84 human and AI-generated essays used in this study may not be sufficient to generalize for further implications. A larger sample size, e.g., >1000 essays, may be necessary to increase the reliability of the results.

Conclusions

AI improvements and the growth of chatbots have had a chilling effect on the use of essays as a means of judging comprehension and understanding among students around the world. Apprehension from some faculty arose that they would be unable to distinguish between original work performed by their students from that created by entering the topic of the paper into a chatbot and hitting a button, especially with faculty who do not see themselves as technically proficient. As we have seen in this study, however, these concerns seem to, for now at least, be overblown. Limitations to the length of an essay generated and the ability of engines such as GPTZero to correctly distinguish the source of the provided text means that essays can still be part of the educational experience.


References

- Adamopoulou, E., & Moussiades, L. (2020, December 15). Chatbots: History, technology, and applications. *Machine Learning with Applications, 2*.
- Ali, A., & Taqa, A. Y. (2022). Analytical Study of Traditional and Intelligent Textual Plagiarism Detection Approaches. *Journal of Education and Science, 8*-25.
- Ali, A., Abdulla, H., & Snasel, V. (2011). Overview and comparison of plagiarism detection tools. *Dateso, 161*-172.
- Bhandari, A. (2020, June 16). *Guide to AUC ROC Curve in Machine Learning: What is Specificity*. Retrieved from Analytics Vidhya: <https://www.analyticsvidhya.com/blog/2020/06/auc-roc-curve-machine-learning/>
- Bowman, E. (2023, January 9). *A college student created an app that can tell whether AI wrote an essay*. Retrieved from NPR: <https://www.npr.org/2023/01/09/1147549845/gptzero-ai-chatgpt-edward-tian-plagiarism>
- Cactus AIAI*. (2023). Retrieved from Cactus AI: <https://www.Cactus.AI>
- ChatGPT*. (2023). Retrieved from ChatGPT: <https://help.openai.com/en/collections/3742473-chatgpt>

- Chowdhury, H. A., & Bhattacharyya, D. K. (2018). Plagiarism: Taxonomy, tools, and detection techniques. *arXiv preprint arXiv:1801.06323*.
- Copeland, B. J. (2000). The Turing test. *Minds and Machines*, 519-539.
- Cotton, D. R., Cotton, P. A., & Shipway, J. R. (2023). Chatting and cheating: Ensuring academic integrity in the era of ChatGPT. *Innovations in Education and Teaching International*, 1-12.
- Danilova, V. (2013). Cross-language plagiarism detection methods. *Proceedings of the Student Research Workshop associated with RANLP*, (pp. 51-57).
- Dwivedi, Y. K., Kshetri, N., Hughes, L., Slade, E. L., Jeyaraj, A., Kar, A. K., . . . Wright, R. (2023). So what if ChatGPT wrote it?" Multidisciplinary perspectives on opportunities, challenges and implications of generative conversational AI for research, practice and policy. *International Journal of Information Management*.
- Eke, D. O. (2023). ChatGPT and the Rise of Generative AI: Threat to Academic Integrity? *Journal of Responsible Technology*.
- Ferrero, J., Besacier, L., Schwab, D., & Agnes, F. (2017). Deep investigation of cross-language plagiarism detection methods. *arXiv preprint arXiv:1705.08828*.
- Google Translate. (2023). Retrieved from Google Translate: <https://translate.google.com>
- GPTZero. (2023). Retrieved from GPTZero: <https://gptzero.me>
- He, X., Shen, X., Chen, Z., Backes, M., & Zhang, Y. (2023). MGTBench: Benchmarking Machine-Generated Text Detection. *arXiv preprint arXiv:2303.14822*.
- International Center for Academic Integrity. (2021). *Fundamental values of academic integrity*. Albany, NY: International Center for Academic Integrity.
- Ju, J., Yao, X., Yang, S., Wang, L., Sun, R., & Chen, E. (2014). An Intelligent Personal Assistant for Task Management and Recommendation. *Advanced Functional Materials*, 301-309.
- Khalil, M., & Er, E. (2023). Will ChatGPT get you caught? Rethinking of plagiarism detection. *arXiv preprint arXiv:2302.04335*.
- Mansoor, M. N., & Al Tamimi, M. (2022). Plagiarism Detection System in Scientific Publication Using LSTM Networks. *International Journal on Technical and Physical Problems of Engineering (IJTPE)*, 17-24.
- Mansoor, M. N., & Al-Tamimi, M. S. (2022). Computer-based plagiarism detection techniques: A comparative study. *International Journal of Nonlinear Analysis and Applications*, 3599-3611.
- McCombes, S. (2019, January 28). *How Long is an Essay? Guidelines for Different Types of Essay*. Retrieved from Scribbr: <https://www.scribbr.com/academic-essay/length>

Quantitative Research on China's Pension Policy from the Perspective of Policy Tools

Zhixian Zhang

Chongqing University of Technology, China,  <https://orcid.org/0009-0000-0274-8862>

Abstract: China has actively addressed the global issue of population aging since the start of the 21st century. Extensive theoretical and policy research has been conducted to develop a comprehensive pension policy framework characterized by high standards and broad coverage across various domains. Our research focuses on analyzing 539 selected policies out of a collection of 1641 obtained from relevant Chinese government websites. By utilizing an X-Y two-dimensional analysis framework based on a policy tool model, we examine how different policy tools relate to pension service providers. Through content analysis and other methodologies, we identify preferences in selecting appropriate policy tools for central pension policies by studying both the external features and internal themes present in China's pension policy texts. Our findings reveal that China's choice of pension policy tools is influenced by environmental factors and an uneven distribution of participation subject policies within different retirement schemes. These insights can be valuable for other countries when formulating and improving their own pension policies.

Keywords: Policy tools, Elderly care services, Policy text, Content analysis method

Citation: Zhang, Z.. (2023). Quantitative Research on China's Pension Policy From the Perspective of Policy Tools. In M. Shelley, V. Akerson, & M. Unal (Eds.), *Proceedings of IConSES 2023-- International Conference on Social and Education Sciences* (pp. 745-765), Las Vegas, NV, USA. ISTES Organization.

Introduction

"The elderly have some support" is a concept derived from the Book of Rites, reflecting China's longstanding aspiration for adequate elderly care. China, as a populous country, faces a growing challenge of population aging due to declining fertility rates and advancements in medical technology. It is projected that China's population aged 65 and above will reach 400 million, constituting nearly one third of the total population. Consequently, the pension problem has emerged as a significant issue to address. To tackle this pressing concern, the Chinese government has intensified its support for elderly care services and implemented policies to promote their development.

In 2022, The State Council issued the "14th Five-Year Plan for the Development of the National Cause for Aging and the Elderly Service System," which outlines strategic measures to enhance the basic elderly service system and expedite the growth of the elderly service industry. This plan includes specific quantitative

indicators to support the industry's high-quality development. These policy documents demonstrate the Chinese government's strong commitment to elderly care and provide guidance for the reform and healthy development of the sector.

Contemporary Chinese pension policy encompasses various institutional measures, attracting interdisciplinary research mainly from domestic scholars. Previous studies on China's pension policies have primarily relied on qualitative analysis to evaluate policy effectiveness or draw general conclusions, lacking detailed policy sorting, interpretation, and quantitative analysis of specific measures. Moreover, existing research often focuses on discussing and studying policy development stages from a singular perspective, such as the economy, intelligence, or health. Overall, academic research on China's pension policy is fragmented, lacking systematic sorting and comprehensive understanding of the overall development trajectory. Therefore, this study employs the policy tool theory and quantitative text mining methods to sort and analyze China's pension policies from 1949 to 2023, categorizing them into stages, describing the types of policy tools and preferences used, and systematically analyzing the development trends in China's pension policies over the years.

Method

Analytical Method

This study uses "pension", "old age" and "pension service" as keywords to conduct a retrieval, with the retrieval time from 1949 to present. Data source: the official websites of the General Office of the State Council, the Ministry of Civil Affairs and other websites. Scope: documents issued by the central government of China, and local policies are not included in the scope of the study.

By using Nvivo12.0 software, content analysis method and frequency statistics method, the relevant policy documents of China's elderly care service were sorted out, and analyzed from X dimension (policy tool dimension) and Y dimension (elderly care service providers dimension).

Theoretical Framework

The theory of policy tools emerged in the 1980s as a response to criticisms of the welfare state's failure and government inefficiency in Western societies. It gained significant attention from both government departments and the academic community, coinciding with the rise of the new public management movement. Scholars such as Needham (1982), Hood (1983), and Hughes (2001) have provided various perspectives on policy tools. While there is no consensus on the definition, policy tools generally refer to the means employed by the government to achieve policy objectives and address social issues.

This study defines policy tools as the means and measures employed by government departments or administrative organizations to achieve policy goals and solve public problems. In particular, this study focuses

on the practical measures and application of policy tools in pension security policies. It aims to comprehensively evaluate the government's policy formulation over the years from a multidimensional perspective. The analysis draws on relevant concepts and analytical models from the theory of policy tools.

A comprehensive literature reveals that policy instruments can be classified in different ways. For instance, Howlett and Ramesh (2002) categorized them into voluntary, mandatory, and mixed instruments based on government intervention in the market and social affairs (referred to as the H-R classification framework) (Howlett & Ramesh, 2002). Rothwell and Zegveld (1985) divided policy instruments into supply-oriented, environmental, and demand-oriented categories based on their influence on fields or objects of action (referred to as the R-Z classification framework) (Rothwell & Zegveld, 1985). Woolttuis (2005) classified policy instruments into four types: information-oriented, authoritative-oriented, financial-oriented, and organization-oriented, based on the types of resources employed by the government (Woolthuis, Lankhuizen, & Gilsing, 2005). Hoppmann (2013) distinguished policy instruments into strategic, comprehensive, and basic levels according to their functional levels. Indeed, different classification frameworks for policy instruments are applicable to different policy areas (Hoppmann et al., 2013). For example, the H-R classification framework is commonly used to analyze policy texts in fields like environment and health, while the R-Z model is often applied to analyze technology industry policies, pension policies, and social security policies.

This study focuses on the pension policies in China, which involves the adoption of policy tools in the social security field. To analyze China's pension policies quantitatively, the R-Z classification framework is adopted as the basis. China's pension industrial policies are classified as follows: (1) Supply-type policy tools involve direct government support in terms of capital, technology, talent, and infrastructure to promote the development of the senior care industry and ensure resource availability. (2) Environmental policy tools aim to create a favorable policy environment for the elderly care industry, achieved through indirect means such as tax policies, target planning, legal system control, and more. While supply-type policy tools directly facilitate industry development, environmental policy tools exert a more nuanced and indirect influence. (3) Demand-based policy tools are the government's initiative to cultivate the senior care market and expand the space for the development of the senior care industry in order to reduce uncertainties in the process of the development of the industry.

Particularly, supply-based policy tools in this study are further categorized into seven categories: education and training, infrastructure development, capital investment, scientific and technological information support, social security, health care integration, and public services (as shown in Table 1). Likewise, the environmental policy tools are categorized into eight types: target planning, financial taxation, legal control, strategic measures, insurance system, financial support, assessment and evaluation, and organizational construction (as detailed in Table 2). Demand-based policy tools include seven categories: government procurement, service outsourcing, institutional regulation, exchange and cooperation, enterprise subsidies, pilot demonstration, and consumer market (as shown in Table 3).

Table 1. Supply-side policy instruments

Tool Type	Tool Name	Tool Meaning
Supply-oriented policy tools	Education and training	The government has improved the education and training system for the senior care industry according to the needs of the industry's development, and established a talent development plan. For example, it encourages universities and colleges to set up more senior care faculties and offer related courses.
	Infrastructure development	The government establishes and improves relevant public service measures to promote the development of the senior care industry.
	Capital Investment	The government increases capital investment for the development of the senior care industry, such as the construction of special funds for the cultural industry.
	Scientific and technological information support	The Government encourages and facilitates the introduction of new technologies into the elderly care industry to promote the development of the industry
	Social security	The Government aims to provide assistance in terms of financial support, medical care and elderly services to ensure that the elderly can enjoy basic livelihood protection and welfare in their old age
	Integration of medical and nursing care	The government provides comprehensive and integrated health and retirement protection for the elderly. The government has formulated policies related to the integration of healthcare and elderly care with the aim of promoting the integration of medical resources with those of elderly care, so as to improve the standard of healthcare and the quality of life of the elderly.
	Public services	The government's policy measures to provide public services and social support to meet the needs of the elderly in their old age. These policies aim to safeguard the quality of life, dignity and rights and interests of the elderly, and to help them enjoy a healthy and happy life in their old age.

Table 2. Environmental policy instruments

Tool Type	Tool Name	Tool Meaning
	Tools targeted planning	Government planning policies to promote the development of the senior care industry, to solve the

	problem of "what needs to be done", such as promoting the development of China's senior care industry global planning
Finance and Taxation	The government provides tax exemptions and reductions for senior citizens in order to promote the development of the senior citizens industry, and how to recognize the tax exemptions and reductions for senior citizens.
Legal control	Laws and regulations set up by the government to regulate the order of the senior care industry and the behavior of related entities, such as the protection of intellectual property rights of senior care works.
Strategic measures	Strategic guiding policies formulated by the government to promote the development of the senior care industry, i.e. solving the problem of "how to do", such as specific policy measures for the development of China's senior care industry.
Insurance system	A series of policy measures implemented by the Government to protect the financial security and welfare benefits of the elderly. These policies aim to establish and improve the pension insurance system to ensure that the elderly can receive a certain amount of pension and related benefits after retirement
Financial support	Policies and measures implemented by the Government to provide financial support and security for the elderly through financial means. These policies aim to help the elderly maintain a basic standard of living after retirement, guarantee their pension income and medical care, and provide other forms of welfare and services
Environmental policy	
Evaluation and assessment	A mechanism for the Government to evaluate and assess the effectiveness of the implementation of the old-age policy. This mechanism aims to monitor and evaluate the implementation of the elderly policy to ensure that the policy can achieve the expected goals and make timely adjustments and improvements.
Organizational construction	Policies and measures adopted by the government for the construction and development of the elderly service system. These policies aim at establishing a

	comprehensive system of elderly service organizations and community elderly service, and providing comprehensive and quality elderly services to meet the needs of the elderly and improve their quality of life.
Publicity and promotion	Publicity and promotion measures taken by the Government to enhance awareness of and participation in elderly policies. The aim is to convey to the public the contents, objectives and advantages of the elderly policy and to encourage people to participate in and enjoy the benefits and services provided by the elderly policy.
Award Incentives	Through the establishment of awards and incentives, the Government encourages individuals or organizations to make outstanding contributions in the field of elderly care services, so as to promote the development of elderly care and improve the quality of elderly care services. The aim is to motivate and recognize those individuals, organizations or teams with innovation, professionalism and social responsibility in the field of elderly services, so as to promote the improvement and innovation of elderly services

Table 3. Demand-based policy instruments

Tool Type	Tool Name	Tool Meaning
	Government procurement	The government procures products for the senior care industry to provide a stable market for the development of the industry
	Outsourcing of services	The government outsources a portion of its elderly services to private or non-profit organizations for the provision of elderly services and care. Such policies aim to improve the quality and efficiency of elderly services through the introduction of market mechanisms and the participation of professional organizations
	Institutional regulation	A series of policies and regulations introduced by the Government in the field of elderly care, as well as the supervision and management of elderly care institutions and services by regulatory bodies. These policies aim to protect the rights and interests of the elderly and to provide quality

Demand-based policy instruments		and safety guarantees for elderly care services.
	Exchanges and cooperation	The Government's policies to promote the development of the elderly and improve the living conditions of the elderly through cooperation with other countries, regions or international organizations
	Enterprise Subsidies	A policy measure by which the government provides certain financial subsidies or preferential policies to encourage and support enterprises to provide pension insurance and benefits for their employees. The aim is to promote enterprises to fulfill their social responsibilities, protect employees' pension rights and interests, and improve the quality of life of the elderly
	Pilot demonstration	The government conducts pilot demonstrations in specific regions or specific institutions to explore, through a series of policy measures and practical experience, elderly care models and service modes adapted to the development needs of China's aging society. These pilot demonstration policies aim to provide better elderly care services and protection for the elderly, improve the quality of life of the elderly, and provide experiences and references for nationwide elderly care policy formulation
	Consumer market	The government promotes the development of the senior care service industry, improves the quality of life of the elderly and protects their rights and interests through financial support and market regulation, etc.

This study argues that the three policy tools mentioned above collectively contribute to the advancement of the senior care industry. They enhance the industry through direct supply, improve social demand, and create a favorable social environment. By directly stimulating the growth of the pension industry and establishing a conducive environment for production, circulation, and consumption within the industry, these policy tools work in synergy to foster the development of China's pension sector. Figure 1 illustrates the framework for analyzing the dimensions of pension tools.

This study also notices that analyzing China's elderly care service policy solely from the perspective of policy tools may not capture all its characteristics comprehensively. It is evident in policy documents that different types of elderly care services in China are managed by different types of institutions. In recent years, numerous policy documents have been issued to regulate the reform and transformation of public elderly care and promote the development of the private elderly care market. Therefore, it is valuable to consider the policy text and

categorize pension units based on their property rights, distinguishing between public and private pension service providers. This paper also includes a category for pension service providers that do not fall clearly into either of these two types. Thus, the type of institution targeted by the governance policy becomes the second analysis dimension, recorded as the service undertaker type dimension. By incorporating both the policy tools and service undertaker types as analysis dimensions, an analytical model for China's elderly care service policy texts is established, as depicted in Figure 2.

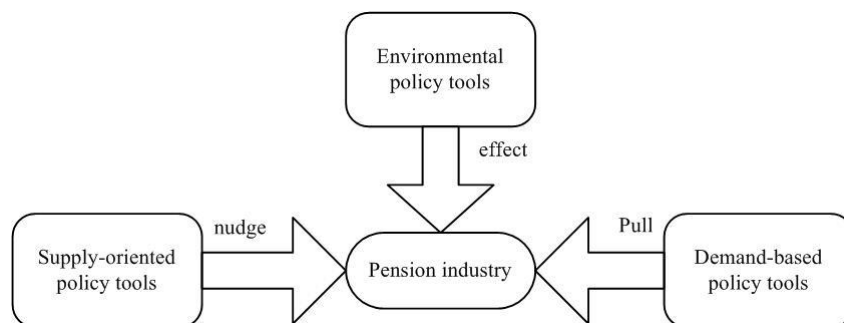


Figure 1. Policy Instrument Dimensions and Industry Relationships

Y-axis The type dimension of pension service undertaker					
Public unit	Private unit	Undistinguished type	Environmental policy	Supply-oriented policy tools	Demand-based policy instruments
			Tools targeted planning Finance and Taxation Legal control Strategic measures Insurance system Financial support Evaluation and assessment Organizational construction Publicity and promotion Award Incentives	Education and training Infrastructure development Capital Investment Scientific and technological information support Social security Integration of medical and nursing care Public services	Government procurement Outsourcing of services Institutional regulation Exchanges and cooperation Enterprise Subsidies Pilot demonstration Consumer market
			X-axis Policy instrument dimension		

Figure 2. The X-Y analysis framework of this paper

Results

Reliability and Validity Tests

The reliability of the research findings refers to the stability of the findings, that is, the degree of consistency of the findings obtained from repeated testing of the research object, the higher the consistency indicates the higher stability and reliability of the findings, and the smaller the research error. In this paper, the four coding results were imported into SPSS 26.0 software for non-parametric test of K relevant samples, and we got the Kendall's harmony coefficient W value of 0.992, the chi-square value of 670.569, and the P value of <0.001, which shows that the consistency of the different raters is high.



Figure 4. Word Frequency Chart 2000-2012



Figure 5. Word Frequency Chart 2013-Present

After excluding invalid words, the top fifteen "3" words in the text of China's old-age industrial policy from 1949 to 1979 are "cooperative", "committee", "people's government", "state council", "labor day", "congress", "means of production", "autonomous region", "labor force", "subsidy", "labor insurance", "socialism", "state organs", "provident fund", "agricultural tax", and relief fee, as shown in Table 5.

Table 5. Word frequency statistics, 1949-1979

Word	Length	Count	Weighted Percentage (%)
Cooperatives	3	475	1.55
Committees	3	194	0.64
People's Government	4	117	0.38
State Council	3	95	0.31

www.iconses.net	October 19-22, 2023	Las Vegas, NV, USA	www.istes.org
Labors' Day	3	62	0.20
Congress	4	54	0.18
Means of Production	4	48	0.16
Autonomous Region	3	43	0.14
Labor Force	3	39	0.13
Subsidies	3	41	0.13
Labor Insurance	4	37	0.12
Socialism	4	34	0.11
State organs	4	26	0.09
Provident Fund	3	24	0.08
Agricultural tax	3	23	0.08

The top fifteen "3" words in the text of China's elderly care industry policy from 1978 to 1999 are as follows "Pensions", "Social insurance", "Elderly people", "State Council", "Retirement", "Ministry of Finance", "Autonomous regions", "Municipalities directly under the Central Government", "Ministry of Labor", "Management fee", "Ministry of Civil Affairs", "Premiums", "Timeliness", "People's Government", "Normative", as shown in Table 6.

Table 6. Word frequency statistics, 1978-1999

Word	Length	Count	Weighted Percentage (%)
Pension	3	780	0.48
Social insurance	4	604	0.38
Elderly people	3	419	0.26
State Council	3	402	0.25
Retirement	3	387	0.24
Ministry of Finance	3	279	0.17
Autonomous regions	3	262	0.16
Municipalities	3	249	0.15
Ministry of Labor	3	242	0.15
Management Fee	3	233	0.14
Ministry of Civil Affairs	3	156	0.10

Insurance fee	3	152	0.09
Timeliness	3	146	0.09
People's Government	4	128	0.08
Normative	3	120	0.07

The top fifteen "3" words in China's elderly care industry policy texts from 2000 to 2012 are as follows“ Older persons", "Pensions", "State Council", "Ministry of Finance", "Autonomous regions", "Retirement", "Disabled persons", "Municipalities directly under the Central Government", "Commissions", "Ministry of Civil Affairs", "Social insurance", "Statute of limitations", "People's Government", "Office of the Insurance Premiums", "Insurance premiums" as shown in Table 7.

Table 7. Word frequency statistics, 2000-2012

Word	Length	Count	Weighted Percentage (%)
Older people	3	621	0.46
Pension	3	476	0.35
State Council	3	281	0.21
Ministry of Finance	3	262	0.19
Autonomous	3	217	0.16
Retired	3	215	0.16
Disabled	3	183	0.13
Region	3	180	0.13
Municipalities	3	177	0.13
Committees	3	177	0.13
Ministry of Civil Affairs	3	147	0.11
Social Insurance	4	130	0.10
Timeliness	3	124	0.09
People's Government	4	116	0.09
Office	3	100	0.07
Insurance	3	85	0.06

The top fifteen "3" words in China's elderly care industry policy texts from 2013 to the present are as follows "Elderly people", "Pensions", "Ministry of Civil Affairs", "Committee", "State Council", "Services", "General Office", "Ministry of Finance", "Civil Affairs", "Aging", "Autonomous regions", "Municipalities directly under the Central Government", "Timeliness", "On budget" as shown in Table 8.

Based on Nvivo's word frequency analysis of the selected Chinese pension industry policy texts, it can be seen that, within the scope of this paper's sample, the national institutions involved in China's pension industry policy

are mainly the administrative departments represented by the State Council, and the objects related to China's pension industry policy are mainly the related industries, related projects, small and medium-sized enterprises, service industries, and the elderly. The high-frequency words related to the description of the policy text are development, management, service, operation, development, and construction. It can be seen that within the scope of this paper's sample, there are more state administrative departments related to China's elderly industry policy, and the objects of policy support and management are closely related to the elderly and SMEs. In addition, within the scope of this paper, there are more non-compulsory terms such as development, management, service, construction, etc. related to China's elderly care industry policy.

Table 8. Word frequency statistics, 2013-present

Word	Length	Count	Weighted Percentage (%)
Older people	3	2879	0.76
Pensions	3	979	0.26
Ministry of Home Affairs Committee	3	670	0.18
State Council	3	479	0.13
Services	3	469	0.12
General Office	3	420	0.11
Ministry of Finance	3	413	0.11
Civil Affairs Department	4	377	0.10
Aging	3	364	0.10
Autonomous regions	3	364	0.10
Municipalities	3	265	0.07
Timeliness	3	252	0.07
Budget	3	237	0.06

From the perspective of policy issuers, in the sample selected for this paper, China's elderly care industry policies are issued by a wide range of departments, involving dozens of departments, including the Ministry of Civil Affairs, the General Office of the Ministry of Finance, the Ministry of Labor, the Ministry of Finance, the Ministry of Industry and Information Technology, and the National Health and Health Commission. Given that the industrial policies studied in this paper were enacted over a large span of time, during which China's State Council underwent several governmental institutional reforms, this paper no longer counts the frequency of

policy-issuing departments.

Overall Frequency Statistics and Analysis

Frequency Analysis of Policy Tool Type Dimension

Under the X dimension, the frequency and frequency of different dimensions of environment-oriented policy tools are shown in Table 9, and the overall distribution is relatively balanced among environment-oriented policy tools. The number of policy texts related to the insurance system is the highest at 64, accounting for 16.12%, and the importance of the insurance system in the pension policy is widely recognized. As the trend of population aging intensifies, the demand of the elderly for old-age insurance increases, so the government pays more attention to the insurance system when formulating old-age policies; followed by financial taxation and legal system control, with the numbers of 56 and 53, accounting for 14.11% and 13.35% respectively. The high frequency of financial taxation in pension policy reflects the government's concern in finance. By adjusting the tax policy, the government can provide financial support and incentives to promote the development of elderly services. The frequency of legal control is also high in the elderly policy, indicating that the government considers the quality and safety of elderly services to a certain extent when formulating the elderly policy, and protects the rights and interests of the elderly. This is followed by strategic measures, appraisal and evaluation, goal planning and organization building, with numbers of 47, 38, 35 and 35, accounting for 11.84%, 9.57%, 8.82% and 8.82% respectively. The fact that the government takes strategic measures to improve elderly care services and monitors and evaluates the performance of elderly care organizations through assessment and evaluation indicates that China pays more attention to the quality and effectiveness of elderly care services in the formulation of elderly care policies.

However, in the sub-dimension of environment-oriented policy tools, the award incentive category has the lowest number of 14, accounting for 3.53%, and the effect of the award incentive category of policies in the field of elderly care is relatively more limited. Elderly policy focuses more on providing economic support and security to meet the basic living needs and medical care of the elderly. Prize incentive policies are usually more applicable to areas that incentivize innovation and promote competition, such as scientific and technological innovation and enterprise development. However, in the field of elderly care, the needs of the elderly are mainly focused on basic life care, medical protection and social support. Therefore, the government prefers to formulate policies such as financial support for pension systems, medical security policies, and the organization and construction of elderly service systems in order to improve the quality of life of the elderly and protect their rights and interests. Introducing award incentive type of policies in the elderly policy, we can consider setting up award incentives for elderly service innovation and quality service providers to encourage the provision of innovative and high quality elderly services; supporting scientific and technological innovations in the elderly and setting up awards for scientific and technological innovations to encourage the development of intelligent and convenient products and services for the elderly; and encouraging the participation of social organizations and volunteers in the elderly services and setting up volunteer awards to motivate more people to participate in

senior care services; establish awards for the development of the senior care industry to encourage enterprises and organizations to play an active role in the senior care industry and promote the development and innovation of senior care services. The award incentive policy should be complemented by other elderly policies to form a complete system of elderly services to meet the diversified needs of the elderly. At the same time, the Government should also strengthen supervision and evaluation to ensure the effectiveness and fairness of the award incentive policy.

Table 9. Frequency and frequency statistics by dimension for environment-oriented policy instruments

Specific sub-dimensional indicators for environment-oriented policies	Frequency of sub-dimensional indicator policies	Percentage
Financial Taxation	56	14.11%
Assessment	38	9.57%
Legal System Control	53	13.35%
Publicity and Promotion	29	7.30%
Strategic Measures	47	11.84%
Insurance System	64	16.12%
Target Planning	35	8.82%
Organization Building	35	8.82%
Financial Support	26	6.55%
Award Incentive	14	3.53%
Subtotal	397	100%

Under the X dimension, the frequency and frequency of different dimensions of environment-based policy tools are shown in Table 10. Among the supply-based policy tools, the distribution of China's elderly policy on different dimensions is relatively balanced, and the government pays some attention and support to education and training, public services, scientific and technological information support, medical care and nursing, infrastructure construction, financial investment and social security, aiming to improve the quality of life of the elderly and safeguard their rights and interests.

The number of policies in the category of public service tools is 42, with a frequency of 20.19%. It shows that the Government is committed to providing a variety of public service programs, including health management for the elderly, community activities, and cultural and recreational activities, in order to meet the various needs of the elderly. The number of policies in the category of social security tools is 34, with a frequency of 16.35%. It shows that the government attaches great importance to social security for the elderly, including the pension system, medical care and social assistance, etc., in order to provide financial support and protection. The number of policies in the category of scientific and technological information tools is 36 with a frequency of 17.31%. This shows that the government attaches importance to the use of science and technology and information

technology tools to provide better services and support for the elderly so that they can better integrate into the digital age. The number of policies in the category of education and training tools is 33, with a frequency of 15.87%. It shows that the government attaches great importance to providing learning and training opportunities for the elderly to enhance their skills and knowledge. The number of policies in the category of financial input tools is 22 with a frequency of 10.58%. It shows that the government provides some financial support for elderly services, including pension system, social insurance and welfare subsidies. The number of policies in the category of medical and nursing care tools is 20, and the frequency is 9.62%. It shows that the government is concerned about combining medical care and senior care services to provide comprehensive health protection and senior care services for the elderly. The number of policies in the infrastructure development tool category is 21, with a frequency of 10.10%. It shows that the Government focuses on the construction of elderly infrastructure, including nursing homes, retirement communities and facilities for the elderly, in order to provide good living and living conditions.

Table 10. Frequency and Frequency Statistics of Supply-Side Policy Instruments by Dimension

Specific sub-dimensional indicators for environment-oriented policies	Frequency of sub-dimensional indicator policies	Percentage
Education and Training	33	15.87%
Public Service	42	20.19%
Scientific and Technological Information Support	36	17.31%
Medical and Nutritional Integration	20	9.62%
Infrastructure Development	21	10.10%
Funding	22	10.58%
Social Security	34	16.35%
Subtotal	208	100.00%

Under the X dimension, the frequency and frequency of different dimensions of demand-based policy tools are shown in Table 11, and the overall distribution of the demand-based policy tools is bifurcated, with the largest number of policies in the types of pilot teacher training and institutional regulatory tools, the number of which is 71 and 40, respectively, accounting for 47.33% and 26.67%, and both of which reach more than 70% of the total number of policies in the total sample. The largest number of policies in the pilot demonstration category shows that the government realizes the changing needs and challenges in the field of elderly care, the need to try and promote new models and mechanisms of elderly care services, and the government's need to find solutions to adapt to the new situation through pilot demonstrations. At the same time, China has a large elderly population and the needs of the elderly are very diverse. Pilot demonstration policies can be customized for different regions and groups to meet the diverse needs of the elderly.²⁰²⁰ The General Office of the Ministry of Civil Affairs and the General Office of the Ministry of Finance issued the "Notice on the Pilot Reform of Elderly

Services in the Home and in the Community Summarizing and Promoting Typical Experiences of Pilot Reforms," which says that each pilot region should base itself on the actual situation of the local community, boldly explore and actively practice the development of elderly care services, with the direction of coordinated development of elderly care services in the home and the community. The pilot areas based on local realities, boldly explore, actively practice, with the direction of coordinated development of home-based community elderly care, with the main line of supply-side structural reform, focusing on solving the difficulty of urban elderly care, adhering to a better combination of a competent government and an effective market, adhering to the dual attributes of the cause of the dual industry, driving the two-wheel drive, and promoting the solution to the development of home and community-based elderly care services in the difficulties, blockages, short boards and other issues, and in the improvement of the institutional mechanism, the innovation of the development model, the service to safeguard people's livelihoods, and to drive the social investment and other aspects of the rich experience and positive results. It has achieved rich experience and positive results in improving institutional mechanisms, innovating development models, serving and protecting people's livelihoods, and driving social investment. The number of policies of the type of institutional regulatory tools is second to the number of policies. Due to the increasingly prominent problem of population aging in China, the issue of elderly care has become a focus of social attention. There are some chaotic phenomena in the elderly service market, such as false publicity and substandard service quality, etc. The government has formulated regulatory policies to regulate the elderly service industry and protect the rights and welfare of the elderly.

Table 11. Frequency and Frequency Statistics of Demand-Based Policy Instruments by Dimension

Specific sub-dimensional indicators for environment-oriented policies	Frequency of sub-dimensional indicator policies	Percentage
Pilot Demonstration	71	47.33%
Institutional Regulation	40	26.67%
Consumer Markets	13	8.67%
Exchange and Cooperation	16	10.67%
Government Procurement	4	2.67%
Service Outsourcing	2	1.33%
Enterprise Subsidies	4	2.67%
Subtotal	150	100.00%

At the same time, pension is an important economic source for the elderly, the government strengthen the supervision of pension to prevent the pension from being misappropriated or abused can effectively protect the safety of pension. However, the number of government policies in the categories of enacting government procurement, service outsourcing, and corporate subsidy tools are all less than 5, accounting for less than 3% of the total. The reason for this is that the development of pension policies started relatively late in China, compared to other developed countries. As a result, more time and experience may be needed for policy design

and implementation in some areas; China faces a large elderly population base and fiscal pressures. The government needs to balance needs in various areas, including education, health care, and social security. In this context, the allocation of resources for old-age policies may be relatively limited; traditional Chinese culture has a strong concept of family responsibility, with children having the obligation to take care of their parents. As a result, some families still prefer to meet their old-age needs through family care rather than relying on government or corporate support. However, with changes in social structure and economic development, this perception is gradually changing.

Analysis on the Frequency of the Types of Elderly Care Service Providers Applicable to Policy Tools

The statistical data (refer to Chart 1) clearly indicate that the majority of pension service providers are unclassified participants, constituting 68.92% of the total. It is evident that while the government has issued a considerable number of management policies for private pension units, accounting for 12.87%, these policies remain insufficient compared to those directed towards public pension service units, which account for 18.21%. Furthermore, an analysis of policy texts reveals that many preferential policies impose qualitative restrictions on private pension units, primarily favoring non-profit pension institutions and failing to encompass most private institutions. However, it should be noted that private pension service units make substantial investments in construction funds but generate low profits. Therefore, there is a need for the government to issue more targeted policies aimed at supporting the development of private pension institutions.

The overall situation of the proportion of various types of elderly care service providers

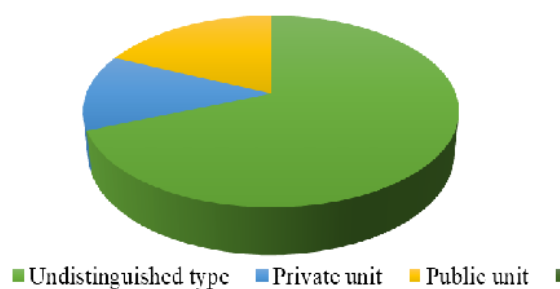


Chart 1. The proportion of the elderly care service providers

Discussion

From the perspective of policy tools, China's old-age security policies are sorted out, and two deficiencies are found in China's old-age governance policies through two-dimensional analysis model:

Firstly, from the choice of policy instruments. First of all, the government too much use of environmental policy tools, through the creation of a good policy environment to promote the development of old-age care is very

necessary and correct. However, it is worth noting that many environmental policies are vague and broad and lack practical guiding significance. Although the total number of policy tools is moderate, the policy structure is unreasonable, and the relevant departments and institutions are easy to get confused about the direction. Secondly, although the total amount of supply tools is moderate, the policy structure is unreasonable, among which the policy support for the combined medical and nursing services and infrastructure construction, especially the combined medical and nursing services, is the most insufficient. Finally, demand-oriented policy tools need to be enriched, especially the support for the elderly care market should be increased, and a scientific multi-level elderly care service system should be further built.

Secondly, from the policy implementation of the subject type. First of all, for Theory does not distinguish between the types of pension service providers and more than half of the policies, but China's pension target groups are wide and there are many types of pension institutions, and relatively broad policies are difficult to be targeted. In addition, although the proportion of policies for public pension institutions and private pension institutions is relatively close, private pension institutions, as market players, have always lacked targeted policies, and the participation of public institutions is often higher than that of private institutions. Therefore, we should increase the policy support for private pension institutions and support their development.

Conclusion

In short, to adapt to China's aging society in the future and the increasing demand for elderly care by the elderly, the quality of elderly care policies should be reviewed and improved through policy tools. When appropriate environmental-oriented policies are refined, the ratio of supply-oriented policies to demand-oriented policies should be increased, their supervision should be enhanced, and the private market for elderly care should be vigorously developed to form a coordinated and complementary elderly care model with public institutions. Improving the effectiveness of policy tools in the area of elder care services.

Recommendations

Increase Demand-oriented Policy Tools

Firstly, we should encourage and support enterprises and other social forces to outsource services to elderly care institutions and introduce them into the market and society. The resources and vitality of the district and the people should be integrated with various resources, and the use of policy tools such as government procurement and service outsourcing should be increased to cultivate the elderly care market.

The second is to adjust the direction of government financial subsidies, on the premise of strengthening subsidies for disabled elderly people, increase policy publicity, guide and encourage the whole society to buy old-age related services, enhance the willingness of the majority of groups to pay, in order to cultivate a larger pension market.

The third is to improve the support for low - and middle-income groups to purchase elderly care related services, and formulate corresponding policies and norms.

Next, it is necessary to continue to deepen the pilot of the combination of medical and nursing care, the pilot of traditional Chinese medicine healthy elderly care services, and the pilot of smart and healthy elderly care, through the pilot demonstration of some provinces and cities, to form a good market effect, enhance the attractiveness of elderly care, and adjust the problems in the operation in a timely manner, so as to improve the elderly care policy.

Finally, we need to strengthen international exchanges and cooperation. Through exchanges and cooperation with countries with severe aging, we can promote the development of China's elderly care, so as to enhance the international influence of China's elderly care field.

Making Pension Policies More Systematic

The pension policy regime is also an aspect that should be considered in the selection of a healthy pension policy instrument.

The first is to strengthen the systematic health pension policy and adjust the direction and construction of the policy so that it is more in line with the actual situation of health pensions in China. At present, the relevant policies issued by the state mainly focus on the physical health of the elderly, and to implement the concept of healthy aging, it is necessary to take into account the mental health of the elderly, integrate the resources of the two aspects, strengthen the systematization and completeness of healthy old-age care, and do a good job in the security work, formulate corresponding evaluation and supervision mechanisms to achieve a virtuous cycle of healthy old-age care.

Second, the choice of policy tools should take into account the development environment of health care for the elderly, from the perspective of talent, funding, science and technology, in line with the development needs of health care for the elderly, and improve the effectiveness of health care policies.

Additionally, There is a need to combine reality, break down rigid opposition among interested parties and form policy consensus. While playing a leading role in government, we should pay attention to the development and bottlenecks of commercial banks and insurance companies, and focus on social organizations.

Incentives to help the development of elder care.

Notes

Over the course of my researching and writing this paper, I would like to express my thanks to all those who

have helped me.

First, I would like express my gratitude to all those who helped me during the writing of this thesis. A special acknowledgement should be shown to Professor Feng Naikang, from whose lectures I benefited greatly, I am particularly indebted to Mr. Liu who gave me kind encouragement and useful instruction all through my writing.

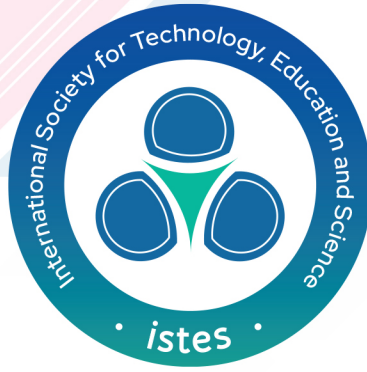
Sincere gratitude should also go to all my leamed Professors and warm-hearted teachers who have greatly helped me in my study as well as in my life.

And my warm gratitude also goes to my friends and family who gave me much encouragement and financial support respectively.

Moreover, I wish to extend my thanks to the library and the electronic reading room for their providing much useful information for my thesis.

References

- Hood, C C. (1983). *The tools of government*. Brain Behav Evol. Needham, B. (1982).
- Hoppmann, J. , Peters, M. , Schneider, M. , & Hoffmann, V. H. (2013). The two faces of market support—how deployment policies affect technological exploration and exploitation in the solar photovoltaic industry. *Research Policy*, 42(4), 989-1003.
- Howlett, M. , & Ramesh, M. . (2002). The policy effects of internationalization: a subsystem adjustment analysis of policy change. *Journal of Comparative Policy Analysis*, 4(1), 31-50.
- Howlett, M. , & Ramesh, M. . (2002). The policy effects of internationalization: a subsystem adjustment analysis of policy change. *Journal of Comparative Policy Analysis*, 4(1), 31-50.
- Hughes, Owen E. (2015). *Public management and administration : an introduction*.
- Needham, B. . (1982). Choosing the right policy instruments: an investigation of two types of instrument, physical and financial, and a study of their application to local problems of unemployment.
- Rothwell R, Zegveld W. M. (1985) Reindustrialization and Technology. *London: Logman Group Limited*, 83-104.
- Woolthuis, R. K. , Lankhuizen, M. , & Gilsing, V. (2005). A system failure framework for innovation policy design. *Technovation*, 25(6), 609-619.
- Zhou Jingyan, Zhang Huina, Huang Yulong, J. et al. (2016). Text quantitative analysis of China's big Data policy from the perspective of policy tools. *Information Exploration*, 230(12):7-10, 1.



www.istes.org



www.ijemst.net



www.ijres.net



www.ijtes.net



www.ijte.net



www.ijonse.net



www.ijonest.net



www.ijones.net

International Conference on Social and Education Sciences



www.iconses.net