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CICE
July 22-24, 2025

Toronto Metropolitan University
International Living and Learning Centre
240 Jarvis Street
Toronto, Ontario
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Canada

Message from the Steering Committee Chair

Welcome to the Canada International Conference on Education (CICE-2025). The CICE-2025 is a refereed conference dedicated to the advancement of the theory and practices in education.

The CICE-2025 received 375 papers from 96 countries of which 124 papers were accepted after the first review; 37 papers were finally accepted with 53 abstracts, 15 extended abstracts, 7 case studies, 3 workshops and 12 posters. The double-blind paper evaluation method was adopted for each submission. Please note that all authors will be invited to extend their papers for journal publications and to contribute to book chapters.

Many people have worked extremely hard to make CICE-2025 possible. We would like to thank all who have helped in making CICE-2025 a success. The Steering Committee and reviewers each deserve credit for their excellent job. We thank all the authors, speakers and participants who have contributed to CICE-2025. We would also like to acknowledge our appreciation to Toronto Metropolitan University, and the kind support from Desing Thinkers, Inclusiveness, Music Creativity, Young Researchers Think Tank, Inclusive Education and Lifelong Learning, Global Education Freedom, Mental Health Awareness, and Infonomics Society. The long-term goal of CICE-2025 is to build a reputation and respectable conference for the international community.

On behalf of the CICE-2025 Executive members, I would like to thank all the authors, speakers, participants and volunteers for their contributions. Your future participation in CICE will be well-appreciated.

We wish you a pleasant stay in Toronto, Canada.

Professor Charles A. Shoniregun
CICE-2025 Steering Committee Chair

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Workshops

Workshop 1



Dr Monica Wong-Ratcliff, Ed. D., is a Professor and Interim Chair of the Department of Teacher & Bilingual Education at Texas A&M University-Kingsville. A native of Hong Kong, she holds an MBA from the University College of Wales, Aberystwyth, and advanced degrees in education from the University of Louisiana at Monroe. With over 30 years of teaching experience in the U.S. and Hong Kong, she specializes in teacher preparation, special education, and mathematics instruction. Dr. Wong-Ratcliff is an accomplished scholar, presenter, and grant investigator. She was honored as the 2006 Louisiana Teacher of the Year and a 2024–2025 inductee into the Texas A&M University System Chancellor's Academy of Teacher Educators.

Workshop 1: A Step-by-Step Guide to Building a Faculty-Led Study Abroad Program

Scope: High-impact practices have been proven to improve the quality of student learning, experience, retention, and academic success, particularly for underserved students. Extensively tested teaching and learning practices beneficial for college students include study abroad and field-based service-learning projects [3]. Covey [2] stated that to begin with the end in mind means to start with a clear understanding of one's destination. In curriculum planning, Wiggins and McTighe [4] referred to it as a backward design. In such a design, one starts with the desired results in mind, which are student learning outcomes or goals. These learning outcomes incorporate the knowledge, and skills instructors want their students to master at the end of the course. Once the learning outcomes are established, the second stage is to think about assessments. The final stage is to plan the learning activities and instruction [1]. Based on the backward design, the presenter of this workshop, a university faculty member who has successfully developed and led several study-abroad programs and service-learning projects, will provide the audience with a step-by-step guide and practical suggestions on building a faculty-led study-abroad program that will help students grow academically, professionally, and personally.

Objectives and Motivation: The presenter is a teacher education faculty member at a university in the southwestern part of the United States. During the summers of 2019 and 2023, she led groups of pre-service and in-service teachers to Taiwan for a 10-day faculty-led Taiwan Study Abroad Program. One program component was the 2-1/2-day English Camp in an elementary school, a service-learning project. Using these recent experiences as a model, the presenter will share how to start a program with a backward design. The first step is to develop a mission statement. Then, the next step is to visit the office of international studies and programs on the campus to collect information on how to start a study abroad program, budgeting, logistics, and promotion. The presenter will show how to develop the syllabus for academic preparation. The coursework includes pre-travel assignments, on-site assignments, and post-travel assignments. One important on-site assignment is a student daily journal, and one post-travel assignment is a report on the service-learning project. The audience will receive a packet containing the PowerPoint presentation handout, a step-by-step guide, and exercise worksheets. The presenter will guide the audience through planning, share practical suggestions and potential research projects, and answer questions.

References

[1] Bowen, R. S. (2017). Understanding by Design. Vanderbilt University Center for Teaching. <https://cft.vanderbilt.edu/understanding-by-design/>

[2] Covey, S. R. (2020). The 7 habits of highly effective people: The 30th anniversary edition. Simom & Schuster.

[3] Kuh, G. D. (2008). High-impact educational practices: What they are, who has access to them, and why they matter. Washington, DC: Association of American Colleges and Universities.

[4] Wiggins, G., & McTighe, J. (2005). Understanding by design. ASCD.

Organiser: Monica Wong-Ratcliff

Texas A&M University-Kingsville, USA

Workshop 2



Dr Lucas Felstead has more than 20 years of experience as an educator within the Australian education system. Lucas has held positions as a classroom teacher, Head of Department, Year Level Coordinator, Assistant Principal Administration, Assistant Principal Religious Education, Deputy Principal and Principal within both the Primary and Secondary contexts. He is currently the Principal of Holy Spirit College Cooktown and Cairns, a Special Assistance College that provides alternate educational pathways and boarding (Cooktown) for at risk students across 3 campuses. Lucas has just completed writing his thesis for a Doctor of Education degree through the Central Queensland University School of Education and the Arts.

Workshop 2: Education Leader Wellbeing - Have we been studying the wrong people?
What we can learn from experienced high performing principals

Scope: This workshop aims to open a conversation around the potential transferability of findings from recent research into how high performing experienced principals within the Diocese of Cairns, Australia, remain healthy whilst meeting the complexity and demands of their role. A thorough understanding of how they utilise their personal and organisational resources to manage their role is presented within The Wise Principal Model. This model explores the impact of a leader's upbringing, supportive partners, the development of a Wise Mindset and the impact this Wise Mindset has on their capacity to optimise personal and organisational resources within their role, not just to meet the demands of the role, but to thrive within it.

Objectives and Motivation: As an experienced education leader who has witnessed the personal cost education leadership can have on those who dare to lead, Lucas is determined to find an effective way help those brave and selfless leaders who constantly put others before themselves. With an abundance of research identifying the pathogenic factors that make making us unhealthy within our roles, this deficit focus has continually failed to inform effective strategies for improving education leader health and wellbeing. Through sharing this unique research into understanding how high performing experienced principals manage to stay healthy within the role despite their workload, this session seeks to start a new salutogenic conversation amongst education leaders. It is hoped that the dialogue stimulated within this session, testing the research findings against the lived experiences of leaders within other contexts, may illuminate the potential of this new approach for informing system specific strategies to improve the health and wellbeing of their education leaders.

Organiser: Lucas Felstead
Holy Spirit College, Australia

Workshop 3



Shari Collins is a leading consultant and speaker specializing in creating thriving workplace cultures. With experience spanning education, training, HR, and organizational development, Shari empowers workplaces across the globe to foster positive change. Recognized as "The Most Admired Leader to Watch in 2024" by Insights Success Magazine, Shari serves on the Advisory Board for Harvard Business Review, the Editorial Board for Infonomics Society, and as

Diversity Director for HR-Nebraska State SHRM Council.

Workshop 3: Ageism - Unlocking Our Bias and Taking Action Steps

Ageism can cause harm to workplace relationships. We must create a future that is inclusive and supportive for all ages of employees. Join this interactive workshop to learn more about how we can combat ageism and foster a more inclusive workplace culture, with higher educator retention rates. This workshop addresses one aspect of DEI that is often forgotten – ageism. Global research states that only 8% of worldwide DEI strategy includes any training or strategy on ageism. It doesn't matter what age you are or your job title. You could be experiencing ageism discrimination in the workplace. By looking at photographs and AI, we will talk about how we think and feel about ageism. Don't be fooled, ageism doesn't only affect the older population; it's also relevant for young professionals under age 30. We will analyze the data and statistics in an engaging format. How does ageism show up in the university/workplace? We will discuss coded language and bias that is embedded in language and in our actions. Finally, we will aim to leave the workshop by changing the negative misconceptions about aging with immediate actionable items for all, which include inter-generational relationships, Reverse Mentoring, Shadow Boards, ERGs and speaking up. Come to this session to become an advocate against ageism!

- Four primary learning outcomes/objectives of this session are:
- Attendees will learn the definition of ageism and basic laws of protection
- Attendees will discuss statistics and data points around ageism
- Attendees will analyze Coded Language and its hidden bias messages
- Attendees will discuss 6 ideas for action steps

Organisers: Shari Collins

Shari Collins Consulting, USA

Speakers

Speaker 1

Speaker 1: Seth Rotman



Seth, RN, is a Board Certified Nurse Coach. This means he's a nurse AND a trained and board certified coach! He is also a ADHD certified clinical service provider. He works with professionals who have new or recent ADHD diagnoses or ADHD-like symptoms that negatively impact their lives. Seth knows what it's like to struggle with ADHD. He also knows firsthand that having the right resources and support makes all the difference. He has spoken at companies, to students, and on podcasts to help be that support. Inspired by his own struggles and experiences with managing ADHD, Seth has developed a unique, evidence-based approach to holistically managing ADHD and ADHD-like symptoms called the 8DHD method. His methods and shared experience allow clients to manage their symptoms, thrive with their strengths, and amplify their growth and build community.

Breaking the Box: Embracing Neurodiversity

Seth Rotman
Board Certified Nurse Coach
United States

Abstract

Breaking The Box will transform how you approach work, life, and relationships. By sharing his personal journey overcoming ADHD challenges, Nurse Coach Seth will inspire you to embrace neurodiversity using a model that goes beyond the individual and impacts intersectionality. You'll Learn how to remove the obstacles that impact the invisible battles that so many people face. You will be able to recognize the words that have shaped the landscape of the lives of those who live with the invisible struggles of neurodiversity. Understand how small shifts have immense impacts. Learn practical strategies created from evidence-based practice to create inclusive, high-performing environments where everyone thrives. Seth's real-world experience, humor, and passion will leave a lasting impact.

Through these shifts, participants will understand the invisible battles that anyone may be dealing with. Develop the tools to create a strong and supportive work environment. And recognize the strengths of a neurodiversity in academics and the workforce.

Break the boxes that have been created and learn how the changes that embrace neurodiversity help everyone thrive!

Speaker 2

The Value of Poetic Representation in Teacher Wellness

Linnea Leist
University of Victoria
Canada

Abstract

A description of poetic representation, hermeneutical phenomenology, and found poetry. This talk will provide insight to my research, exploring teacher wellness of educators in their first five years using poetic representation. The talk will include examples of found poetry based on my research process. There will be a chance for audience members to craft their own found poem.

Speaker 3

Speaker 3: Nur Garriga



Nur Garriga is a lecturer, communication coach and author with over 25 years of experience in education, self-leadership, and personal development. Nur has taught General, Technical, and Business English across primary, secondary, pre-university, and higher education levels. As the founder of Amazing English Center® and NLP EcoCoaching® — for Work, for School, for Life — she empowers individuals and organizations through transformative training, coaching, public speaking, and the strategic use of storytelling. With a career spanning more than 10 countries, she brings a global and intercultural perspective to her work. She holds a degree in Translation and Interpreting, a Postgraduate Certificate in Education (CAP/MEd), and is a certified Master Trainer in NeuroLinguistic Programming (NLP), with additional certifications in Yoga, Meditation, and Shamanic Healing from India and Canada. She has collaborated with university institutions such as ICE at the Autonomous University of Barcelona and English teachers of Catalonia (APAC) to enhance multilingual learning with creativity. Her innovative approach to Educational EcoCoaching, or EduCoaching, integrates education, cognitive and somatic communication, well-being, and holistic growth — tools she passionately applies to transform individuals and educational environments. Her mission is to promote transformative education by equipping academic institutions — including her own — with tools that enable them to cultivate resilient, reflective communities with global competence. Her most recent book, *Curiosity Saved the Cat. How can Communication save Education?*, offers an insightful perspective for communicators and educators worldwide, which challenges conventional paradigms and provides practical strategies to boost both teaching and interpersonal communication in diverse and highly complex learning environments.

Successful Belief Change in the Classroom with Eco-Coaching

Nur Garriga
Amazing English Center® and Coaching
Spain

Abstract

Being a teacher does not mean that we must lead all the time, we ought to delegate that leadership by, first, welcoming new ideas, doubts, opinions, anecdotes, experiences, and second, cultivating a safe space for trial and error, and even meditation techniques.

The famous phrase of the American president Benjamin Franklin, in my view, sums it up perfectly:

“Tell me, and I forget, Teach me, and I remember, Involve me, and I learn.”

Helping our learners getting involved in their own educational journey needs clear paths like Eco-Coaching.

What’s Eco-Coaching?

ECOLOGY:

According to Merriam-Webster, “It is a branch of science concerned with the relationships between living things and their environment.”

COACHING:

According to Merriam-Webster, “It is a person who instructs or trains a performer or team.”

According to Neurolinguistic Programming, it means using NLP techniques to identify someone’s limiting beliefs, to boost sensory awareness, and to rephrase and reimprint thinking and behavioral patterns.

Using both approaches is essential for me, as it aims to nurture our internal and external well-being, and it fosters our development as individuals. By understanding the environment, measuring our learning diversity skills, and distancing ourselves from technological overload, we can find the balance that provides serenity and a deeper understanding of our human learning potential.

Eco-coaching, therefore, emerges as a powerful tool for personal & professional development and for enhancing effective communication skills. Integrating eco-coaching practices in Education may help us become successful teachers and learners with a calmer and a more empathetic outlook in and out of the classroom.

Well-trained educators have the golden opportunity to make this world a better place. Societies and politicians should bear that in mind and start joining efforts to respect them and be by their side.

“One child, one teacher, one book and one pen can change the world. Education is the only solution.” – Malala Yousafzai

Speaker 4

Speaker 4: Rodney Chu



Dr Rodney Chu is a Senior Lecturer in the Department of Applied Social Sciences (APSS) at the Hong Kong Polytechnic University (PolyU). He has served as the Chairperson of the Department's Learning and Teaching Committee since 2013. He is now at his 7th term of an elected Council Member since 2012 and has held the positions of Chairman and Vice-Chairman of the PolyU Staff Association since 2013. In August 2023, he was appointed to the University's Learning & Teaching Committee as a staff member and is currently an appointed member by the President in the Strategic Task Force for PolyU Strategic Plan 2025/26-2030/31. In recent years, Dr Chu has been involved in several educational research projects, focusing on pedagogy design for blended learning and flipped classroom approaches. His latest work includes integrating immersive learning experiences into the curriculum design of various social science subjects using VR/AR technology and employing CAVE (Cave Automatic Virtual Environment) for teaching and learning purposes. Under his leadership, his team won the QS-Reimagine Silver Award (Asia Region) in December 2023.

What can be a Possible EdTech Learning and Teaching Approach for the Tertiary Institutions of 21st Century? A Case Illustration for Reflection

Rodney Wai-chi Chu
Hong Kong Polytechnic University
Hong Kong, China

Scope

Tertiary education of nowadays finds itself at a crossroads between a rapidly changing learner profile and rapid technological advancement. Today's students, true digital natives, engage effortlessly with instantaneous information, while many educators, transitioning from earlier pedagogical paradigms, steadily acclimate to digital tools. This dichotomy necessitates an adaptable learning and teaching framework that leverages the strengths of both groups.

Our approach champions a model that is innovative, interactive, and always open to iteration—the 3Is framework—supported by the pillars of communication, collaboration, and connection (the 3Cs). This model reconceptualizes the educational experience, empowering students to participate actively in curriculum creation, while educators serve not only as instructors but also as facilitators and co-creators of knowledge.

This concept is vividly brought to life through the TIMS framework, which establishes a structured approach built on the pillars of Technology integration, Interdisciplinary collaboration, Multifaceted assessment, and a robust Student-staff partnership. Drawing insights from diverse disciplines like social sciences, design, building construction, and computing, TIMS sets a solid foundation for next-generation curriculum development. Building on this, our VAT (Virtual Assistant TIMS) platform—a sophisticated, AI-driven chatbot deployed via WhatsApp (or any other communication platform to choose such as DISCORD, POE) — facilitates accessible Q&A, instant lecture summaries, and accessing via multimedia formats such as podcasts, photo/audio searches, and video presentations. Simply put, it provides students and educators with a round-the-clock engagement and enables a continuous process of feedback

and reflection, enabling a seamless, ubiquitous, and responsive interaction process between students and staff. The continuous engagement enabled by VAT creates a sustainable loop of feedback and reflection, ensuring that learning remains dynamic and responsive. This integrated, iterative system is poised to meet the evolving demands of contemporary education, and recognized as a future educational model by achieving the 2024 QS-Reimagine 'Global Education Award'.

Objectives and Motivation

The course “From Gloom to Bloom: Global New Urbanism”, a free-elective General Education subject at PolyU, has provided a live case study in modern curriculum innovation. With 90 students drawn from diverse academic backgrounds across three cohorts from 22/23 to 24/25 Academic Year, this subject has evolved into a dynamic laboratory where traditional pedagogy meets cutting-edge EdTech. The intentional inclusion of student helpers and peer mentors has transformed the classroom, encouraging a co-created learning process where responsibilities are shared between educators and learners.

Digital instruments such as PADLET have become pivotal in transitioning to an interactive e-learning and space-earning (ESE) model. This transition has empowered students to share ideas transparently, receive swift feedback, and collaborate in constructing shared knowledge. Immersive technologies further

enhance the engagement and comprehension of intricate topics, demystifying content through experiential learning approaches. The subsequent introduction of the VAT chatbot further enriches this process, offering real-time support, comprehensive lecture summaries, and diverse accessing methodologies ranging from podcasts and interactive videos to multimedia-based queries.

This living case study demonstrates the potential of digital innovation intermixed with a collaborative pedagogical model. It prepares both teachers and learners to meet the challenges of an ever-evolving academic landscape, ensuring that education remains flexible, engaging, and forward-thinking.

Speaker 5

Speaker 5: Jen Uschold



Jen Uschold is an expert in the treatment of chronic pain, combining over 30 years of experience as a physical therapist with cutting-edge practices in mental fitness and lifestyle medicine. A Fellow of Pain Science, National Board Certified Health and Wellness Coach and Certified Positive Intelligence Coach, Jen empowers individuals to release the grip of chronic pain by addressing the entirety of each unique human. As Program Director for Certification in Lifestyle Medicine at Evidence In Motion and a private practice owner, Jen has transformed countless lives through her innovative, evidence-based approach. Her passion for compassionate care, coaching, and education makes her an in-demand speaker for healthcare and education professionals and wellness events. Her other passion is being a mom.

Pain is NOT a Life Sentence: The Role of Pain Science and Mental Fitness

Jen Uschold
iRise For Me
USA

Abstract

Breaking Pain is a universal human experience, yet it is largely misunderstood despite the strong science. It is a gift that CICE-2025 brings together visionary academics and industry leaders to explore transformative educational advancements. As we seek to equip educators and learners with the tools necessary for development of our youth, integrating pain science and mental fitness for our students is imperative.

Understanding that "Pain is NOT a Life Sentence" can redefine our approach to education. Pain Neuroscience Education (PNE) adopts a biopsychosocial model-encompassing the entire student- that emphasizes the roles of education, exercise, sleep, and goal-setting in overcoming pain that is non-pharmacological. Pain is a prevalent issue affecting 46% of the pediatric population and 54% of college students. By reframing pain as a "normal" human experience that can be addressed and understood, we empower students with strategies to abate pain and create safety in their nervous systems. Studies show a knowledge increase of over 31% in children educated about pain, especially when introduced early, leading to healthier perceptions and responses.

Merging this with Positive Intelligence (PQ) and shifting mental pathways from survival brain to thriving brain, students learn to manage stress and overcome challenges thus promoting better academic and personal outcomes. PQ integrates principles from positive psychology, neuroscience, and cognitive behavioral therapy and performance science to foster environments of empathy, focus, leadership and productivity.

Presenting these topics at CICE-2025 provides attendees the opportunity to engage with current best science and strategies that have the potential to reshape educational practices. The integration of PNE and PQ not only addresses that all pain is both physical and emotional, it also cultivates self efficacy, resilience and adaptability among students.

This initiative underscores the importance of equipping educators with knowledge and strategies to support themselves and their students in recognizing and mitigating stressors that heighten nervous system sensitivity. By doing so, we lay the groundwork for a healthier, more adaptive generation.

Emphasizing that "Pain is NOT a Life Sentence" at the conference will inspire intellectual dialogue and ensure that personal growth and well-being are prioritized in learning environments worldwide.

References

[1] Chronic Pain and High Impact Chronic Pain in Children and Adolescents: A Cross-Sectional Study, *The Journal of Pain*, Volume 24, Issue 5, 2023, Pages 812-823, ISSN 1526-5900, DOI: 10.1016/j.jpain.2022.12.007.

[2] Grasdalsmoen M, Engdahl B, Fjeld MK, Steingrimsdóttir ÓA, Nielsen CS, Eriksen HR, Lønning KJ, Sivertsen B. Physical exercise and chronic pain in university students. *PLoS One*. 2020 Jun 26;15(6):e0235419. DOI: 10.1371/journal.pone.0235419. PMID: 32589694; PMCID: PMC7319292.

[3] Pain Education in Middle Schools. (n.d.). Therapeutic Neuroscience Research Group. Retrieved January 3, 2025, from <https://neuroscienceresearch.org/middle-school-program/>.

Speaker 6

Speaker 6: Brett Holt



Dr Brett J. Holt is a tenured faculty member in the College of Education and Social Services at the University of Vermont. Although a native Georgian, he taught grade school students in rural Wyoming and urban Tennessee where he was honored with a teaching award; taught college students in Utah and Mississippi; and, studied under Education faculties at the University of Alabama (BSE), the University of Wyoming (MS), and Florida State University (EdD). His prior scholarly pursuits have focused on "affective learning," "development of expertise," and "figurative language as a teaching/learning tool." His scholarship has been published in multiple languages. After 22 years as a member of the faculty, he has found that he is passionate about championing Academic Freedom tenets both nationally and internationally.

Pugilism: A Hostile Challenge to Academic Freedom

Brett Holt
University of Vermont, USA

Abstract

The speaker will begin this presentation by establishing a contextual framework in which to view academic freedom. Dea (2018) while adopting the definition of the American Association of University Professors (AAUP) depicts academic freedom as the as the freedoms of 1) teaching, 2) learning, 3) inquiry, and 4) expression. For the purpose of this presentation, this speaker will also include the freedom to serve. Commager (1963) asserts that academic freedoms exist for the faculty referred to as *lehrfreiheit* and freedoms that exist for the student known as *lernfreiheit*. Next, the speaker will introduce Mellon's (2018) five fear generators that can negatively affect the academic freedoms of both students and faculty: 1) Hierarchism, 2) Anti/Intellectualism, 3) Perfectionism, 4) Short-termism, and 5) Pugilism. This presentation will focus on "pugilism" as a fear generator that negatively affects *lehrfreiheit* and *lernfreiheit*. Pugilism is operationalized as sustained fighting and competition amongst faculty and students in the academic context (Holt, 2023). Examples of pugilism amongst faculty will be provided. Adversarial behavior amongst faculty can lead to fears that prevent faculty from freely engaging in teaching, service, and/or research. For example, Holt (2022) explains how faculty relations are strained during class lectures, meetings, and data reporting due to in-fighting to earn subjective merit awards, grants, and recognition. Likewise, Kaufmann (2021) depicts a culture of self-suppression of freedoms that occur amongst faculty due to fear generated from ideologies and sociopolitical discourses that have created pugilism and are unrelated to the academic content. Student pugilism manifesting from class rank, for example, has created problems with scholarship awards and admissions that have negative effects on *lernfreiheit* (Murphy, 2020). The speaker will include specific examples provided by Sawchuck (2017) and Schank (2015) of frequent and continued pugilism within the grade-school classroom that inhibits students' academic freedoms. The presentation will conclude with a discussion on how academic freedoms can be preserved and fear from pugilism can be managed or eliminated thereby establish a culture of *lehrfreiheit* and *lernfreiheit*. Finally, the speaker will entertain questions from the audience.

References

- [1] Commager, H. S. (1963). 'The University and Freedom: *Lehrfreiheit* & *Lernfreiheit*', *The Journal of Higher Education* 34(7), pp. 361-370.
- [2] Dea, S. (2018). 'A Brief History of Academic Freedom', *University Affairs*; <https://www.universityaffairs.ca/opinion/dispatches-academic-freedom/a-brief-history-of-academic-freedom/> (Access Date: 9 October, 2018).
- [3] Holt, B. J. (2022). 'Establishing a Fear-Free Culture of *Lehrfreiheit* and *Lernfreiheit*', *Journal of Information Technologies and Lifelong Learning*, 5(1), 222-230.
- [4] Holt, B. J. (2023). 'Establishing *Lernfreiheit* and *Lehrfreiheit* Culture: Challenging Fear and False Expertise.' In C. Shoniregun, V. Argyropoulos, & M. Plummer (Eds.). *Inclusive Education and Lifelong Learning* (2, 2-19). London, EN, UK: Infonomics Society.

[5] Kaufmann, E. (2021). 'Academic Freedom is Withering', *Wall Street Journal*; <https://wsj.com/articles/academic-freedom-is-withering> (Access Date: 28 February, 2021).

[6] Mellon, L. (2018). 'Why Creating a Learning Culture is the Answer to Fear', *Duke Corporate Education*; <http://www.dukrce.com/insights/why-creating-learning-culture-answer-fear/> (Access Date: March, 2018).

[7] Murphy, J. (2020). 'The Confusing State and Uncertain Future of Class Rankings', *The Elective*; <https://elective.collegeboard.org/confusing-state-and-uncertain-future-class-rankings> (Access Date: 24 January, 2020).

[8] Sawchuck, S. (2017). 'Are Science Fairs Worth All That Trouble? Study Seeks Some Answers', *Education Week*; <https://edweek.org/teaching-learning/are-science-fairs-worth-all-that-trouble-study-seeks-some-an>

Speaker 7

Speaker 7: Enoka Makulloluwa



Dr Enoka Makulloluwa is an ESL professor at Sheridan College in Ontario, Canada. Prior to this, she was affiliated to the Department of English Language Teaching, University of Colombo, Sri Lanka. Enoka has a PhD in Educational Studies from Brock University, Canada and her research interests are in the use of culturally relevant knowledge in second language learning. She has a special interest in the use of culturally relevant imagery and the use of First Language in Second Language learning. She has conducted presentations and published articles on a variety of topics including code switching, academic vocabulary learning and corrective feedback.

Utilizing ESL Learners' Socio-Cognitive Resources to Enhance Learning

Enoka Makulloluwa
Sheridan College, Canada

Abstract

This presentation, based on my PhD research study, explores the extent to which English as a Second Language (ESL) graduate students' socio-cognitive resources—specifically the combination of culturally relevant imagery and first language (L1)—facilitate their acquisition of general academic vocabulary in a social learning setting. ESL students new to the Anglophone educational context often find general academic vocabulary crucial, as it is widely used across various academic disciplines. However, they also find it challenging to learn because it is not explicitly taught by ESL instructors or subject teachers, requiring students to acquire it independently.

Given the importance of this skill, the study investigated whether using imagery culturally relevant to students, along with L1 translation equivalents, enhances the acquisition and retrieval of new general academic vocabulary.

The study was informed by the following theories:

- Levels of Processing Theory (Craik & Lockhart, 1972)*
- Vocabulary Learning Strategy Taxonomy (Gu & Johnson, 1996)*
- Social Constructivist Theory (Vygotsky, 1978)*
- Bilingual Dual Coding Theory (Paivio & Desrochers, 1980)—which assumes that bilinguals' cognitive activity is mediated by their two verbal systems and an image system representing their knowledge of the world.*

Using a sequential explanatory mixed-method strategy, the study first surveyed 41 ESL graduate students to explore their general vocabulary learning strategy (VLS) preferences. Subsequently, a case study approach was conducted with a sub-sample of nine ESL graduate students in a collaborative setting. The study aimed to determine whether a VLS that leverages bilingual socio-cognitive resources could activate connections in the verbal and image systems, leading to deeper processing and better retrieval of new vocabulary.

The findings indicate that ESL learners' socio-cognitive resources positively impact their vocabulary acquisition. In this presentation, I will share the study's outcomes to inform educators on how vocabulary learning strategies that honor ESL learners' socio-cognitive resources can enhance learning. Most importantly, integrating such practices fosters the creation of more inclusive learning environments.

Speaker 8

Speaker 8: Irene Vrbik



Dr Irene Vrbik is an Assistant Professor of Statistics and Data Science at UBC Okanagan. Her educational leadership focuses on applying data-driven techniques to understand and continually enhance academic programs. Her scholarship includes integrating statistical methods and machine learning into curriculum design, developing open and interactive assessment tools to promote learning, and advancing equitable undergraduate education in data science.

Data-Driven Insights for Curriculum Development in Data Science Education

Irene Vrbik

*University of British Columbia Okanagan
Canada*

Abstract

Designing an effective curriculum requires balancing foundational knowledge with evolving disciplinary needs. This study employs Latent Dirichlet Allocation (LDA), a topic modelling technique, to analyze and compare data science curricula across North American universities. By applying LDA to course descriptions and program structures, we uncover common themes shared across institutions while also highlighting unique curricular emphases.

Our analysis reveals how different programs structure key areas such as statistical modelling, programming, and machine learning, as well as variations in coverage of emerging topics like ethics, data engineering, and visualization. These findings provide valuable insights into curriculum design choices and offer a data-driven approach to assessing alignment, gaps, and opportunities for innovation in academic programs.

Beyond data science, this research presents a generalizable framework for data-driven curriculum development, applicable to other disciplines seeking to evaluate and refine their educational structures. By leveraging topic modelling techniques, institutions can take a more quantitative, scalable approach to curriculum assessment, ensuring programs remain both comprehensive and adaptable to future needs.

Speaker 9

Speaker 9: Michael Elonge

Michael Elonge is a Senior Extension Agent (Associate Professor), Financial Educator at the College of Agriculture and Natural Resources, and a tenured faculty member at the University of Maryland, College Park, Maryland USA. Michael is a graduate from State University of New York (BA-Psychology; BA, MA – Economics) and Loyola (Advanced Graduate Study - Education Administration and Supervision). His teaching and research interests is in Financial and Economics Education with a current focus in Public and Transitional Housing, Family Investment Programs, Correctional Centers, and Schools (K-12).

A Financial Education Model: Low-income Housing Eviction and Foreclosure Prevention

Michael Elonge
University of Maryland College Park, Extension
USA

Abstract

Affordable housing continues to be a problem in Maryland. In 2023 – 2024, landlords filed almost 1,115,000 eviction cases in Maryland. Baltimore City had approximately 140,000 eviction cases and Baltimore 10,000 eviction filings. The rationale of the Housing Financial Education program is to empower tenants and homeowners to increase the financial skills of individuals and families to prevent evictions and foreclosures.

Partner with various county housing directors regionally to be keynote speakers at seminars, invite financial institutions to exhibit tools for banking, saving, basic investments, and debt management, and teach basic financial education classes (earning income, budgeting, spending, saving, and debt).

Regional Housing Seminars (presentations) and Financial Expo (financial demonstrations) occurred in regions 1, 2, and 3. Region-1 (N=160): Baltimore City (Baltimore Community Seminar on Low-income Housing Eviction and Foreclosure Prevention – Families, Caregivers and Social/Case workers in Baltimore City & County). Region-2 (N=89): Central Maryland (Housing Seminar and Financial Expo – Staff Professional Development, train-the-trainer, by UME and County Housing Directors consisting of Anne Arundel, Baltimore, Carroll, Harford, and Howard counties, and Baltimore City). Region-3 (N=91): The Capital/DC Metro Area (Housing Seminar and Financial Expo – Staff Professional Development, train-the-trainer, by UME and County Housing Directors from Frederick, Montgomery, and Prince George's). Region-4 (Virtual, N=44) Eastern Shore (Caroline, Cecil, Dorchester, Kent, Queen Anne's, Somerset, Talbot, Wicomico, and Worcester). Regional-4 seminar did not occur in person) due to funding. Anticipated to occur in 2025. Total # of staff attended seminars = 384, # of clientele serve per staff = 6, # of % indicated increased in new financial knowledge = 89%, # of % indicated seminar and expo significance in eviction and foreclosure prevention = 91%. 2024 Impact (short term): A basic survey indicated that 102 respondents implemented the training information to work efficiently with their clientele. Serving more than 400 clientele combined.

Speaker 10

Designing a Stackable Certificate Pathway Leading to a BAECE Degree: A Less Intimidating Route for Students to Learn

Jessica Alvarado
National University, USA

Abstract

Authors will present an overview of a certificate pathway to an earned bachelor's degree in early childhood education (BAECE). Developed by two full-time faculty members, the presenters will explain the design process, techniques for student success, and strategies used. The fully online program for working adults is the first of its' kind at the university and offers students some unique credit options, coupled with field experience opportunities. The certificate pathway offers a unique way for students to earn five separate certificates, each aligned to and leading toward earning a BAECE. The program is designed strategically to allow students to mix general education courses with early childhood courses in a complementary way. The courses are condensed yet fully meet accreditation standards for a degree in California. Courses are taught by subject-matter experts and those who have professional expertise in supporting students in this field of study.

Speaker 11

Speaker 11: Jillian Rahim-Parris



Jillian Rahim-Parris is a transformative arts educator and seasoned dance coordinator with over a decade of experience performing and producing dance creations across the Greater Toronto Area. She has performed on major stages including the Calgary Stampede, National Arts Center of Ottawa as well as community festivals including DesiFest, ChutneyFest, and UnveiledTO. An Ontario Certified Secondary Teacher of the Performing Arts for Canada's largest school board, Jillian integrates dance, wellness, and life skills into her pedagogy - both in schools and in the wider community. As part of a Critically Conscious Practitioner Inquiry, Jillian explored the benefits of student voice and representation in the arts leading to an increase in extra-curricular participation and visibility of diverse and underrepresented youth performers. She advocates for space, resources and opportunities for all students while supporting programs and initiatives such as STEM+ and Special Education. Jillian is the founder of Teaching The System, a platform for students, families and educators who need a fresh, empathic approach to supporting their educational journeys.

The Intelligent Body

Jillian Rahim
Performing Arts Teacher
TDSB, Canada

Abstract

This presentation will dive into the power of dance and movement to change lives, inspired by and curated for Black, Brown, Indigenous, Displaced and Underrepresented youth. It's not just about getting up and dancing; it's about how movement can unlock creativity, build confidence, and even help heal emotional wounds. I would like to summarize and reference works such as Sing a Rhythm Dance a Blues (Morris) and Unearthing Joy (Muhammad) to show the audience that dance can be a powerful way to connect the body and mind, teaching kids more than just steps, but also life skills, emotional expression, and a sense of purpose.

By getting children, youth and adults off the streets and into safe dance environments, we're helping them avoid violence and giving them a positive outlet to express themselves. Beyond the mental and emotional benefits, dance opens up real opportunities — not just for creative growth, but for careers in or adjacent to the dance industry, providing a pathway to financial freedom. I hope to share my unconventional journey of maintaining a career in dance while pushing the envelope for cultural visibility, fair monetary compensation and safe treatment of dancers as a performing arts educator.

Sessions

Session 1: Inclusive Education

Title: The Role of Family Engagement in Promoting Inclusive Education for Students with Special Needs: Insights from Primary School Teachers

Author: Halmat Darwsh Mahmood

Title: UDL and Assistive Technologies: Strategies to Promote Equity for Students with Autism in Inclusive Classrooms

Author: Jin-Woo Chung

Title: Transformative Leadership in Catholic Education: Faith in Action for Justice and Inclusion

Author: Cheryl Ricco

The Role of Family Engagement in Promoting Inclusive Education for Students with Special Needs: Insights from Primary School Teachers

Halmat Darwsh Mahmood

Graduate School of Education, Nazarbayev University, Kazakhstan

Abstract

Inclusive education is a key driver of equitable participation for all students, forming the foundation for societal inclusion and equal opportunities. The 1994 Salamanca Conference catalyzed a global shift toward inclusivity, prompting many regions, including the Kurdistan Region of Iraq (KRI), to adopt the Convention on the Rights of Persons with Disabilities and implement inclusive education policies. Despite the integration of these policies into KRI's educational laws in 2009 and 2022, there remains a significant gap in understanding how they are implemented at the primary school level, particularly regarding the role of family engagement in supporting the inclusion of students with special educational needs. This qualitative-phenomenological study seeks to address this gap by exploring the role of family engagement in fostering inclusive education for children with special needs, from the perspective of primary school teachers. Grounded in Bronfenbrenner's Ecological Systems Theory (1979), the study offers a nuanced examination of the multiple layers influencing teachers' experiences within the educational ecosystem. The findings highlight several critical factors related to family involvement. Teachers emphasized that active family support is essential for the successful implementation of inclusive practices and for providing effective support to students with special educational needs. However, resistance from some families, often stemming from cultural beliefs and societal stigma, presents a significant obstacle. Furthermore, communication gaps between schools and families were identified as a major barrier, underscoring the need for clearer, more effective dialogue to help families understand their children's needs and the importance of collaborative support. Cultural attitudes, including a preference for consulting religious leaders over specialists, further limit access to essential resources and support. These findings underscore the pivotal role of family engagement in fostering an inclusive educational environment for children with special needs. The study also identifies critical challenges that must be addressed to improve the implementation of inclusive education in KRI. By highlighting teachers' experiences and the contextual factors influencing educational practices, this research contributes to the academic discourse on inclusive education. It calls for systemic changes in family-school relationships and offers insights for policy reform. Ultimately, the study emphasizes the importance of community engagement and cross-sector collaboration in creating inclusive educational environments, with far reaching implications for long term societal inclusion.

UDL and Assistive Technologies: Strategies to Promote Equity for Students with Autism in Inclusive Classrooms

Jin-Woo Chung
Trinity Western University, Canada

Abstract

As the population of students with autism spectrum disorder (ASD) continues to rise in Canada, creating an inclusive classroom is crucial to ensure their active participation. This session will present an evidence-based strategy: implementation of assistive technologies grounded in the educational framework of Universal Design for Learning (UDL). By definition, an inclusive classroom is an environment with equity—providing equal access, active participation, and individualized support to all students. While UDL is an educational framework aimed at creating inclusive classrooms, assistive technology is a tool that addresses the learning needs of students with ASD. The Common Core State Standards Initiative and multiple studies recommend schools follow the UDL guidelines by offering technologies to ensure accessibility, promote participation, and support the academic development of diverse students. However, the deficiency of training programs related to UDL and assistive technologies hinders educators from integrating appropriate tools for their students. The presentation will provide participants with foundational knowledge of UDL and demonstrate methods for integrating assistive technologies in teaching practices adhering to UDL guidelines. Participants will leave with strategies to promote class engagement of students with ASD, ensuring their classrooms truly support all students' diversity and inclusion.

Transformative Leadership in Catholic Education: Faith in Action for Justice and Inclusion

Cheryl Ricco
English Catholic Central School
Canada

Abstract

Leadership in Catholic schools is a vocation rooted in faith, animated by hope, and directed toward love and justice. In an increasingly diverse and complex world, Catholic educational leaders are called not only to manage institutions but to transform them—to create communities where the Gospel is lived, human dignity is upheld, and every student is supported to flourish. This presentation explores the concept of transformative leadership in Catholic education, highlighting how it differs from the more commonly understood model of transformational leadership and proposing a vision grounded in Catholic Social Teaching and the pastoral vision of *Renewing the Promise* (Assembly of Catholic Bishops of Ontario, 2018).

While transformational leadership focuses on inspiring and motivating individuals to achieve organizational goals through charisma and vision, transformative leadership—as articulated by Shields (2010, 2018)—goes further. It is fundamentally concerned with social justice, equity, and the critical examination of systems and structures that marginalize or exclude. For Catholic school leaders, this model aligns deeply with the prophetic dimension of their vocation: to lead in the way of Jesus, who consistently stood with the poor, the excluded, and the oppressed, and who called his followers to do the same.

This chapter positions transformative leadership as both a spiritual calling and a practical framework for Catholic school leadership today. It draws on *Renewing the Promise*, which emphasizes the role of Catholic schools as “communities of accompaniment, belonging, and engagement,” and integrates key principles of Catholic Social Teaching, including the dignity of the human person, the preferential option for the poor, solidarity, and the common good.

Amid challenges such as systemic racism, economic inequality, colonial legacies, and shifting social norms, Catholic leaders are called to respond with courage, compassion, and conviction. They are called to transform not only their schools, but also the hearts and minds of those within them—so that Catholic education becomes a space where all students encounter Christ through justice, inclusion, and love.

The purpose of this presentation is to explore how Catholic leaders can enact transformative leadership in tangible, faith-rooted ways. It will outline the theological and policy foundations for such leadership, provide concrete examples from Catholic school practice, and offer strategies for moving forward with integrity and hope. In doing so, it aims to support leaders in embracing their vocation not just as administrators or visionaries, but as witnesses to justice in the spirit of the Gospel. The presentation examines transformative leadership in Ontario’s publicly funded Catholic schools, grounded in Catholic Social Teaching and the pastoral vision articulated in *Renewing the Promise* (2018). It explores how Catholic school leaders, particularly principals, are called to enact justice-oriented, inclusive leadership that aligns with both Gospel values and the systemic challenges of contemporary education.

Using a conceptual analysis approach, this presentation draws on theological sources, policy documents, and practitioner literature—including *Renewing the Promise*, the Ontario Catholic School Graduate Expectations, and Catholic Social Teaching. It also integrates general examples of leadership practice in Catholic schools, with particular attention to equity, Indigenous education, and culturally responsive leadership.

Transformative leadership in Catholic education is distinct in its moral and spiritual foundation. Catholic school leaders are uniquely positioned to lead systemic change through faith-informed advocacy, community building, and a commitment to the common good. This leadership is characterized by relational accompaniment, critical reflection, and courageous engagement with tensions between doctrine and social realities.

For Catholic school boards and educators, the presentation offers a framework for leadership development that integrates faith formation with social justice capacity-building. It also identifies the need for systemic support structures—such as formation programs, mentorship, and policy alignment—to enable leaders to sustain transformative practice rooted in Catholic identity.

1. Introduction

- Define transformative leadership in a Catholic context.
- Distinguish from transformational leadership.
- Introduce Renewing the Promise and Catholic Social Teaching as the framework.
- Articulate the presentation's purpose: to explore how Catholic leaders can transform schools into communities of faith, equity, and justice.

2. Foundations of Catholic Education and Leadership

- Brief history and mission of publicly funded Catholic education in Ontario.
 - Key messages from Renewing the Promise.
 - Schools as communities of accompaniment, belonging, and engagement.
 - The vocation of Catholic educators as leaders of faith and justice.
- Catholic Social Teaching principles:
 - Dignity of the Human Person
 - Common Good
 - Solidarity
 - Option for the Poor and Vulnerable
 - Participation
 - Subsidiarity
 - Stewardship of Creation

3. Defining Transformative Leadership in Catholic Education

- Description and characteristics of transformative leadership:
 - Rooted in ethical, moral, and justice-oriented action.
 - Seeks to dismantle systemic inequities (colonialism, racism, poverty).
- Scriptural and theological roots:
 - The prophetic tradition (e.g., Micah 6:8).
 - Jesus as a model of transformative leadership.
- Integration with Catholic identity:
 - Leading with compassion, humility, and courage.
 - Creating space for marginalized voices.

4. The Role of the Principal as a Transformative Leader

- The principal as a witness to faith and justice.

- Leadership practices:
 - Listening and accompaniment.
 - Building inclusive, culturally responsive communities.
 - Advocacy for equity in hiring, curriculum, discipline, and access.
- Examples (e.g., Indigenous education framed through dignity and belonging - based on my own work as a Settler Canadian Principal).

5. Enacting Catholic Social Justice in School Culture

- Embedding social justice in school mission and vision.
- Faith formation and spiritual leadership:
 - Liturgies, prayer life, and religious education that reflect justice themes.
- Curriculum and pedagogy:
 - Catholic Graduate Expectations with a justice lens.
 - Anti-oppressive and decolonizing pedagogy in a Catholic context.
- Staff and student engagement in service learning and advocacy.

6. Challenges and Tensions

- Navigating tensions between tradition and contemporary justice issues.
- Balancing institutional expectations with prophetic leadership.
- Addressing resistance within school communities.

7. Pathways Forward for Catholic School Leaders

- Strategies for ongoing formation and support:
 - Professional learning rooted in theology and equity.
 - Mentorship and faith-based leadership networks.
- Policy and governance support for justice-based leadership.
- A renewed call to leadership grounded in Renewing the Promise.

8. References

- [1] Assembly of Catholic Bishops of Ontario. (2018). Renewing the promise: A pastoral letter for Catholic education. <https://iceont.ca/wp-content/uploads/2018/05/renewing-the-promise-en.pdf>.

[2] Catholic Curriculum Corporation. (2011). Ontario Catholic school graduate expectations. <https://iceont.ca/ontario-catholic-school-graduate-expectations/>.

[3] Congregation for Catholic Education. (1997). The Catholic school on the threshold of the Third millennium. Vatican Publishing House.

[4] Pontifical Council for Justice and Peace. (2005). Compendium of the social doctrine of the Church. Vatican Publishing House.

[5] Shields, C. M. (2010). Transformative leadership: Working for equity in diverse contexts. *Educational Administration Quarterly*, 46(4), 558–589. DOI: 10.1177/0013161X10375609.

[6] Shields, C. M. (2018). *Transformative leadership in education: Equitable change in an uncertain and complex world* (2nd ed.). Routledge.

Session 2: Learning and Teaching Methodologies and Assessment

Title: Collaborative research to elaborate an effective intervention on mathematical vocabulary in 3-6-year-old children

Authors: Anne Lafay, Sonia Angonin, Carole Berger

The Influence of Cognitive Styles on Worked-Example Learning in Mathematics

Authors: Kejia Qu, Tianzhi Liu, Jingshi Xia

Title: Promoting the Scholarship of Teaching and Learning Among Health and Wellness Educators: Implications for Targeted Support Strategies

Author: Brad W. Willis

Collaborative Research to Elaborate an Effective Intervention on Mathematical Vocabulary in 3-6-year-old Children

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Abstract

The project aims to develop, within a collaborative approach, an original intervention co-constructed with teachers on mathematical vocabulary for children aged 3 to 6 in a school context. The project is led by two researchers who collaborate with an educational consultant and six preschool and kindergarten teachers in France.

For the first study (preparatory study; Lafay & Berger, in preparation), we developed the intervention during several researchers/teachers meetings and conceived the experimental tasks. We also developed two mathematical vocabulary tasks: one task assessed the understanding of French mathematical vocabulary (children were told a sentence and had to choose the correct picture) and the other task assessed the production of French mathematical vocabulary (children were shown two pictures, were told the sentence for the first picture, and were asked to complete the sentence for the second picture). We aimed to investigate the development of mathematical vocabulary understanding and production, as a function of social environment and bilingualism. Teachers tried to apply the intervention in their classes and gave their feedback. In parallel, a total of 306 French children aged from 3 to 6 years old were tested. The results showed that children knew very few mathematical words and that they produced fewer mathematical words than they understood. Also, children from low socioeconomic schools (that concern neighborhoods or isolated sectors with the greatest concentrations of social difficulties) understood and produced fewer mathematical words than those from ordinary schools. However, when children's bilingual

status was controlled, the socioeconomic environment no longer had an effect, but only the bilingual status had an impact on the understanding and production of French mathematical vocabulary. This first phase allowed us to better understand the mathematical vocabulary development of young children, to validate and modify our tasks for the second phase, to identify that 3-6-year-old children need an efficient teaching of mathematical vocabulary, and to adjust the developed intervention.

For the second study (intervention study), we used a three-phase procedure (pretest, intervention, posttest) to test the effects of this intervention on mathematical vocabulary (direct effect) and on mathematical, language (general vocabulary), and cognitive (executive functions) skills (indirect effect). The project is currently in process. A group of 300 children was pretested in November or December on mathematical vocabulary understanding and production, on mathematical skills (such as counting or problem solving), on general vocabulary and sentence understanding, and on inhibition skills. Half of the children will follow our developed intervention on mathematical vocabulary, whereas the other half will have their usual teaching. The intervention is planned to be provided between January and March. It is a direct and explicit intervention based on the shared reading. The posttests will be administered during April and May with the same tasks as those used for the pretest. We plan to analyze the direct and indirect effects of the intervention. In particular, we

will analyze the effect of the intervention on children who are multilingual and/or from disadvantaged backgrounds.

Ultimately, the project aims to develop a pedagogical tool that can be used in the classroom based on the elements of the intervention program whose effectiveness will have been demonstrated. A guide is currently in progress and will be finalized after the analysis to be freely shared with the educational community.

The Influence of Cognitive Styles on Worked-Example Learning in Mathematics

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Abstract

Example-based learning is an essential method for self-directed learning, especially in mathematics, where it helps students grasp new concepts and solve problems effectively. Understanding the factors that influence the effectiveness of worked-example learning and its role in self-regulated learning holds significant value for educational practice. This study conducted four experiments with 305 college students to examine how cognitive styles (holistic vs. sequential) influence preferences and performance in worked-example learning. Additionally, it evaluated personalized example designs—additional explanations and marking methods—for improving learning outcomes under mismatched conditions.

Key Findings:

- 1. Cognitive Style Preferences: Holistic learners preferred integrated examples, while sequential learners favored step-by-step examples, both reporting lower cognitive load and reduced perceived difficulty.*
- 2. Learning Outcomes: Both holistic and sequential learners perform better and perceive less difficulty under matched conditions compared to mismatched conditions.*
- 3. Enhancing Mismatched Learning: Additional explanations significantly improved holistic learners' performance with step-by-step examples, while marking methods notably enhanced sequential learners' outcomes with integrated examples.*

This study underscores the critical role of cognitive styles in example-based learning and proposes evidence-based strategies, including additional explanations and marking methods, to address challenges in mismatched conditions. The findings provide a foundation for developing personalized educational practices and improving mathematics learning outcomes.

Promoting the Scholarship of Teaching and Learning Among Health and Wellness Educators: Implications for Targeted Support Strategies

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1. Introduction

As educators aim to enhance student learning, the scholarship of teaching and learning (SoTL) has gained momentum across higher education despite limited studies on faculty support strategies. Consequently, a physical therapy department at a public institution of higher education in the United States established an interprofessional and theory-informed educational research lab to promote SoTL among health and wellness faculty. This study examined if the establishment of an interprofessional and theory-informed educational research lab was associated with increased SoTL productivity among members.

2. Methods

This retrospective study examined the total number of SoTL products, defined as peer-reviewed SoTL presentations and publications, by lab members ($n=11$) two years before compared to two years after lab establishment. Members included faculty with backgrounds in physical therapy, medicine, athletic training, exercise science, and psychology. Bolman and Deal's four-frame analysis of organizational structure guided lab development. Publicly available online sources, including CVs, university webpages, ResearchGate, and Google Scholar, were reviewed to compare the number of SoTL products before and after lab establishment. SPSS(v29) provided descriptive statistics, the Wilcoxon signed-rank test ($p<0.05$), and effect size (r).

3. Results

Findings indicated a significant increase in SoTL products ($p=0.04$) among members after lab establishment (Post: 38 total products, $\text{mean}=3.5\pm5.7$, 90.5% presentations; Pre:18 total products, $\text{mean}=1.6\pm0.9$, 100% presentations), while demonstrating a large effect ($r=0.61$).

4. Conclusion

Establishing a theory-informed interprofessional educational research lab was associated with

increased SoTL productivity among members, highlighting the importance of targeted faculty support strategies grounded in organizational theory and the benefits of a collaborative and interprofessional environment.

5. References

- [1] Henry D, Brantmeier E, Taylor A, Tongen A, Pierrakos O. Faculty empowering faculty: SoTL leaders catalyzing institutional and cultural change. *TLI*. 2021; 9(2): 1-20. DOI: 10.20343/teachlearning qu.9.2.15
- [2] Becker B, Shope R, Willett G, et al. (2021). Early career physical therapist faculty connecting with others for scholarly activity: A grounded theory study. *J Phys Ther Educ*. 2021;35(1): 3-11.
- [3] Jensen, G. M., Hack, L. M., Nordstrom, T., Gwyer, J., & Mostrom, E. National study of excellence and innovation in physical therapist education: Part 2-A call to reform. *Phys Ther*. 2017;97(9): 875–888. DOI: 10.1093/ptj/pzx062.
- [4] Snook A.G. (2021). Perceived faculty development needs of physical therapy adjuncts: A comparison study. *Phys Ther Rev*. 2021; 1:81-87.
- [5] Karimi, E., Sohrabi, Z., & Aalaa, M. Change management in medical contexts, especially in medical education: A systematized review. *J Adv Med Educ Prof*. 2022;10(4): 219–227. DOI: 10.30476/JAMP.2022.96519.1704.
- [6] Kolomitro, K., Hamilton, J., Leslie, K., Hazelton, L., Veerapen, K., Kelly-Turner, K., & Keegan, D. (2021). Viewing faculty development through an organizational lens: Sharing lessons learned. *Med Teach*. 43(8): 894–899. DOI: 10.1080/0142159 X.2021.1931078.
- [7] Kotter, J. (2012) *Leading Change*. Boston, MA: Harvard Business Review Press.

[8] Simmons, N. Personal reflection: Playing for SoTL impact: A personal reflection. IJ-SOTL. 2009; 3(2): 30. DOI: 10.20429/ijso.2009.030230.

Session 3: ICT in Education

Title: Experimenting with AI Chatbots in Architectural Design: Enhancing or Hindering Creative Process?

Author: Kevin Yim

Title: Fortifying Cybersecurity Strategies: Harnessing Explainable AI Against Phishing Scams

Authors: C. Emilin Shyni, Roopa Venkatakrishnan

Title: Towards Developing Gen AI Technology-Based Learning Maturity Model (GAIT-LMM)

Authors: Mahreen Nasir, Miguel Garcia-Ruiz, Laura Wyper, Khaled Wahba

Experimenting with AI Chatbots in Architectural Design: Enhancing or Hindering Creative Process?

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Abstract

This research examines how AI chatbots could enhance and hinder the creativity of designers in generating conceptual images for architectural projects. Conducted in a first-year design studio at Hong Kong Chu Hai College, the research involved 26 subjects working on two design projects. Most subjects used AI chatbots to develop their conceptual images, while one adopted a traditional approach. The research draws on surveys, AI-generated images, and final design proposals to assess how AI chatbots influenced the design process. Findings reveal that AI enhanced creativity of designers through factors such as efficiency, quick visualization, relevance, colour and mood support, and idea stimulation. On the contrary, AI hindered creativity of designers through miscommunication, over-dependency, stylistic manipulation, loss of enjoyment, and mismatched image quality. A typological case study analysis showed that subjects employ AI to generate conceptual images in three distinct approaches: Commodity, Picturesque, and Abstract Art. Across all three approaches the AI chatbot supported and at times constrained the creativity of designers in different ways. The study concludes that AI chatbots occupy a dual role in architectural design: as creative assistants that can enhance conceptual image development, and as inhibitors that may limit originality.

Keywords: AI chatbot, Conceptual Images, Enhance and Hinder Creativity

1. Introduction

In both practice and academia, architectural design begins with the schematic design phase, where early concepts are developed before drawings take form. At this stage, designers are expected to produce conceptual images that capture the essence of their ideas and guide the project's direction. As Lee, Ostwald, and Gu (2020) note, AI-based generative tools can support this phase by offering simulations and varied design options, thereby strengthening creative thinking.

2. Objectives

The research focuses on whether AI chatbots

enhance or hinder the creative process of designers during the schematic design phase. The study was conducted in a first-year design studio course at the Department of Architecture, Hong Kong Chu Hai College. Students undertook two projects: the first was a pavilion on the beach over a 7-week period, and the second a single-family house spanning 11 weeks. In both projects, designers were required to produce conceptual images during the first 1 to 2 weeks as part of the design process.

In this study, data were collected from students participating in two design projects. In the first project, all 13 students used the AI chatbot to generate conceptual images. In the second project, 12 students used the AI chatbot, while one student chose not to. This resulted in a total of 26 subjects for analysis.

All designers were free to use any AI chatbot, input any prompts they considered relevant. To gain insights into their experiences, they were surveyed using the following 11 questions:

1. Which AI chatbot did you use for generating images?
2. What prompts did you input into the chatbots to generate the AI images?
3. What prompts did you enter into the chatbot to create your images?
4. How many times did you change the prompts before getting the images you liked?
5. How many images did you use in your final project?
6. On a scale of 1 to 10, how satisfied are you with the images you generated?
7. Did the AI-generated images influence you in developing your final design?
8. On a scale of 1 to 10, how user-friendly did you find the AI chatbot?
9. Did you use AI in any other way during this project?
10. What aspects of using AI did you enjoy, and what aspects did you dislike?
11. Do you think AI is enhancing or hindering your creative process in this architectural design project?

3. Literature Review

According to Peña, Rodríguez-Fernández, and Romero (2021), AI should not be limited to delivering

fixed design solutions within a predetermined search space. Instead, it can serve as a tool for exploring requirements and testing possible design directions. Similarly, Borglund (2022) emphasized that AI enables designers to access and experiment with a broad spectrum of design alternatives, offering new opportunities for creative exploration. In this study, AI chatbots are considered useful in the schematic design phase, assisting designers and students generate conceptual images.

AI Chatbot as Assistant to Designers

Sonderegger and Seufert (2022) suggested that chatbots had the potential to assume roles such as teachers, enhancing designers' learning experience by meeting various learning requirements and achieving targeted outcomes. A previous study (Yim, 2024) examined how AI chatbots can support designers in producing conceptual images (see Figure 1). By providing prompts, designers can generate conceptual images, making the early exploration of ideas more efficient. Some designers treat AI as part of a continuous exploratory process, actively engaging with the chatbot frequently, refining prompts, generating first-round images, and producing subsequent rounds. This ongoing dialogue allows subjects to test, adjust, and evolve their design ideas, using AI as a supportive assistant in their creative workflow.

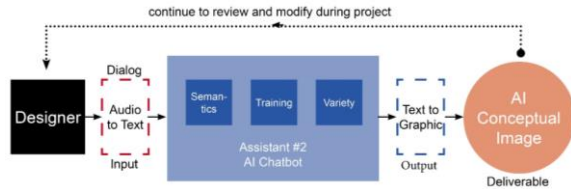


Figure 1. AI Chatbot as Assistant to Designers (modified from Yim, 2024)

AI Chatbot as Inhibitor of Designers

Some designers stop exploring once the AI produces an initial set of conceptual images.

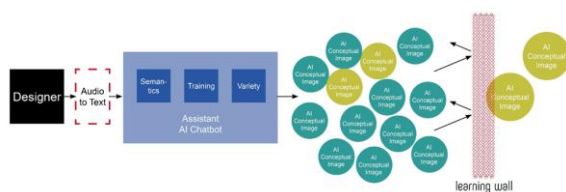


Figure 2. AI Chatbot as Inhibitor of Designers

Subjects select the images from the first batch and proceed without further exploration, treating the images as finished products. This premature conclusion of the design process can limit creativity, turning the AI into an inhibiting factor that hinders design development.

4. Data Analysis

Subject Engagement Patterns

The extent of students' interaction with the AI chatbot during the conceptual design process was examined (see Figure 3).

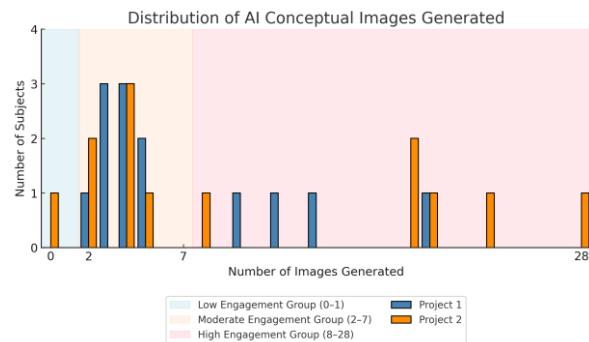


Figure 3. Number of AI Images Generated by Subjects

Subjects' engagement with the AI chatbot varied significantly and were categorized into 3 groups based on the number of images they generated during the conceptual design process.

1. High Engagement Group (6–23 images): 10 subjects (38%) engaged actively with the chatbot to generate conceptual images, refining prompts and generating conceptual images across multiple rounds. This intensive approach allowed them to explore a broader range of forms, site contexts, and spatial sensations within the same concept.

2. Moderate Engagement Group (2–6 images): 15 subjects (58%) experimented AI to a certain degree, typically finding satisfactory results after a few attempts. This group prioritized efficiency: once the AI produced images that matched their vision, they moved on to the next stage of design development.

3. Low Engagement Group (0–1 image): 1 subject (4%) interacted minimally, who had doubt that the chatbot could assist his work. The subject chose not to use AI, considering it more likely to negatively affect his design.

Findings suggest that subjects generally found AI chatbots user-friendly (mostly rating between 6 and 9 out of 10), with no notable difficulties in communicating with them. The majority of subjects also expressed a positive experience with AI-generated images (Figure 4). 14 subjects (62%) rated their satisfaction between 7 and 10, forming an Enthusiastic Group. 10 subjects (30%) gave ratings between 4 and 6, reflecting a Neutral Group. Only 2

subjects (8%) gave scores below 4, forming a Skeptical Group.

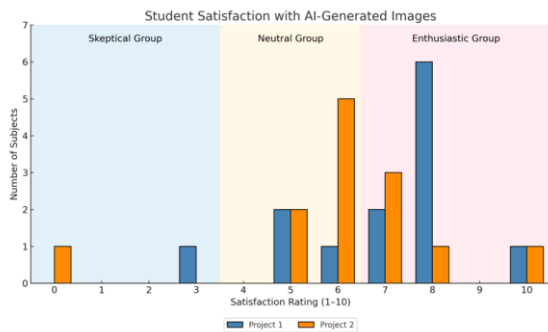


Figure 4. Satisfaction level with AI-Generated Images

Most subjects used about 3–4 prompts to generate their conceptual images. Although the number of images generated varied, most subjects (50%) ultimately selected only 2 conceptual images to carry forward into their final design proposal. Furthermore, survey responses revealed that 62% of subjects felt that AI-generated images influenced the development of their final design. In contrast, 38% (10 subjects) indicated that the images did not shape their final design.

While most subjects acknowledged the potential benefits of AI in assisting their work, others pointed out the drawbacks:

Perceived Advantages of AI in Design Process

1. Time-saving: AI helped search and integrate information quickly, organizing ideas and generating images with efficiency.
2. Efficient exploration: It enabled quick visualization of design ideas in a realistic way, allowing testing of different forms.
3. Style variety: It produced diverse architectural images, including sketch-like renderings.
4. Visualization aid: It supported clearer communication of design intent by visualizing subjects' spatial ideas.
5. Creative inspiration: It offered unexpected ideas that served as design inspiration.

Perceived Limitations of AI in Design Process

1. Misunderstanding of information and images: AI often failed to understand what designers wanted, particularly when interpreting images.
2. Repetitive trial-and-error: Designers had to input detailed prompts and rewrite many times to obtain usable results.
3. Limited features with free version: The free version restricted functions and capped the number of images generated.

4. Low image quality: The generated images did not meet the designer's expectations.

AI assisted or hindered the creative process

While AI chatbots may assist designers and students in their design, they can hinder creativity. Wadinambiarachchi et al. (2024) demonstrated that AI image generators may increase fixation on initial outputs, leading subjects to produce fewer, less varied, and less original ideas. Similarly, Zhai et al. (2024) observed that over-reliance on AI chatbots can weaken key cognitive skills such as decision-making, critical thinking and analytical reasoning.

In this research, subjects expressed a range of reflections on how AI chatbots influenced their creative process, highlighting their potential to stimulate architectural imagination and limitations in supporting deeper exploration.

5 Factors on How AI Chatbots Enhanced Creativity

1. High efficiency: Some subjects noted that the chatbot helped search for and organize ideas while generating conceptual images with speed and convenience.
2. Quick visualization: Some reported that it enabled rapid rendering of 3D architectural models with high resolution.
3. Relevance: Several participants found that AI-generated images aligned closely with their design vision.
4. Colour and mood support: Some subjects felt that it aided in exploring material palettes and atmospheric qualities of the site.
5. Idea stimulation: Several subjects felt that AI assisted in generating new design ideas and stimulated them to think more creatively.

5 Factors on How AI Chatbots Limited Creativity

1. Miscommunication: Some subjects reported spending significant time explaining their intentions to chatbots. Repeated failed attempts led to frustration and the belief that the likelihood of obtaining an image matching their intention was very low.
2. Over-dependency risk: When generating a large number of images, several subjects expressed concern about becoming overly reliant on chatbots. Others reported feeling overwhelmed by the AI-generated images, which reduced their incentive to explore ideas beyond them.
3. Manipulation in style: Some subjects felt that the chatbots psychologically "hypnotized" them into creating design that reflected the AI's preferences. Others noted that the resulting images became incoherent and

disconnected from their original design intentions.

4. Loss of enjoyment: Several subjects noted that using AI reduced their sense of enjoyment typically experienced during the architectural design process.
5. Mismatch in quality: Some subjects felt that the chatbot did not understand what they wanted. The AI-generated images also lacked the quality needed to align with their design vision.

Typological Analysis of AI Chatbot Influence on the Creative Process

This section examines how AI chatbots assisted or hindered the creative process through a series of case studies. To structure the analysis, the AI-generated images produced in this research are categorized into three approaches, following the typological framework first established in Yim (2024). Building on that framework, the present study applies the same typologies (see Figure 5):

- i. Type A: Commodity Approach (8 subjects)
- ii. Type B: Picturesque Approach (7 subjects)
- iii. Type C: Abstract Art Approach (10 subjects)
- iv. Type D: Traditional Approach/Control (1 subjects)

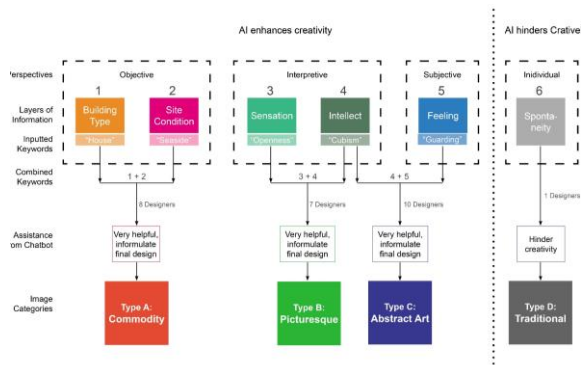


Figure 5. Designers' Perspectives and Image types modified from Yim (2024)

Type A Images: Commodity Approach

According to Yim (2024), designers using this approach asked AI chatbots to generate large quantities of realistic, fully designed houses. While this method provided fast images and a range of material options, it often resulted in generic or arbitrary content, emphasizing mass-produced houses rather than customized designed house.

In this study, 8 subjects adopted the commodity approach. In one case, the student Subject A1 entered prompts “mansion,” “seaside house,” “beach,” and “simplicity,” and generated realistic housing images (see Figure 6).



Figure 6. Type A - Generic Commodity, Subject A1 Phase 1 AI Images

Unlike in Yim's earlier research (2024), where such images were not incorporated into final design, subject A1 generated 20 AI images in the second phase, based on his own plan drawings, to test massing and spatial composition (see Figure 7).



Figure 7. Subject A1 Phase 2 AI Images

His final design showed clear continuity with earlier AI images, illustrating how even the Commodity Approach can meaningfully inform design development (see Figure 8). A1 rated his satisfaction as 8 out of 10.



Figure 8. Final Design of Subject A1

Yim (2024) previously noted that the Commodity Approach is useful for non-designers such as real estate agents who prefer quick visual images to explore a wide range of housing options. Doshi and Hauser (2024) observe that AI can lift the novelty and aesthetic quality of “average outputs”. Subject A1 worked as a real estate agent before, and he appeared to be satisfied with such “average outputs”. The chatbot enhanced A1's creativity through factor no. 1 (high efficiency), by rapidly generating conceptual images, and through factor no. 5 (idea stimulation), as

he stated it “provides some good ideas to me.” On the other hand, AI hindered his creativity through factor no. 2 (over-dependency risk), since the large quantity of outputs encouraged reliance on early images, and through factor no. 1 (miscommunication), as he explained that “it takes time to get what I want.” Overall, the chatbot raised the creative baseline while also revealing risks characteristic of the Commodity Approach.

Type B Images: Picturesque Approach

Yim (2024) described this approach as one where designers entered evocative prompts into the AI chatbot, aiming to capture the picturesque atmosphere or sensation of a place. The resulting images often conveyed a strong sense of mood and imagination, occasionally hinting at building form. However, the conceptual images were highly stylized rather than realistic, and the sites rarely resembled the actual building site.



Figure 9. Type B - Picturesque Approach, Subject B1 Phase 1 AI Images

In this research, 7 subjects adopted the picturesque approach. Subject B1 inputted prompts (monolithic, beach, secluded, Buddhist and museum), and generated a soft, romantic conceptual image depicting an atmospheric coastal landscape with an elevated box-like building (see Figure 9).



Figure 10. Final Design of Subject B1

The image suggested openness and contrasted with the actual site, presenting a pure monumental form. Impressed by the AI-generated images, subject B1 continued to develop the design in close alignment with this vision.

The final design proposal showed a clear resemblance to the original AI-generated image (see Figure 10). In this case, the chatbot enhanced B1's creativity through factor no. 4 (colour and mood support) by graphically presenting the mood and atmosphere, and through factor no. 1 (high efficiency), as he reported that “the speed of image generation is good and convenient.” The subject retained not only the atmosphere but also developed the building as an elevated, minimalist box, with the rooms organized in a way that closely corresponded to the AI picturesque image.

Nevertheless, the chatbot hindered his creativity through factor no. 3 (manipulation in style), as the strong AI-generated images limited his exploration of other ideas, and through factor no. 2 (over-dependency risk), since he “feels stuck with the AI images and unable to explore further ideas.” Despite these challenges, the images were incorporated into his final design, and B1 rated his satisfaction with the AI chatbot at 7 out of 10, acknowledging that it significantly influenced the final design.

In another case, designer B2 adopted a picturesque approach by using a descriptive, emotionally driven long prompt rather than short keywords. She wrote, “generate an image of architectural space inspired by virtues of water, different forms of water, abstract image of the space.”

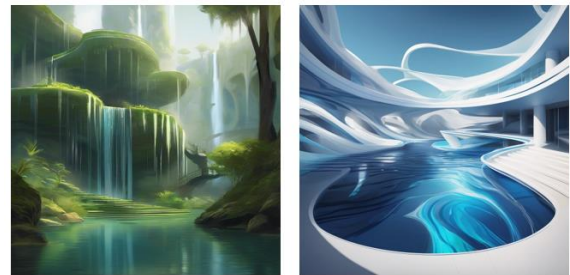


Figure 11. Type B - Picturesque approach, Subject B2 Phase 1 AI Images

The AI produced conceptual images with soft, curvilinear forms that captured the qualities of fluidity, flow, and spatial continuity (see Figure 11). These images conveyed a strong sense of nature, quietness, and emotional attachment, providing a solid foundation for her design.

Subject B2 continued to experiment with the AI chatbot in the second phase, producing a total of 23 images across both phases. From this set, 2 were selected and used as consistent references throughout the schematic design process (see Figure 12).

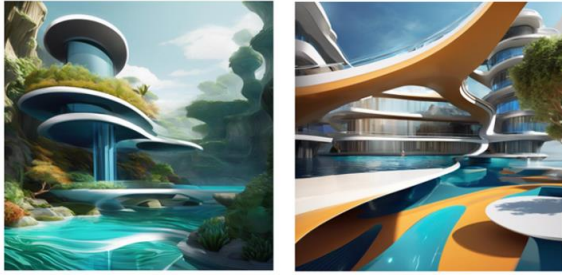


Figure 12. Subject B2 Phase 2 AI Images

The final architectural proposal by subject B2 showed a clear resemblance to the AI-generated conceptual images (see Figure 13).

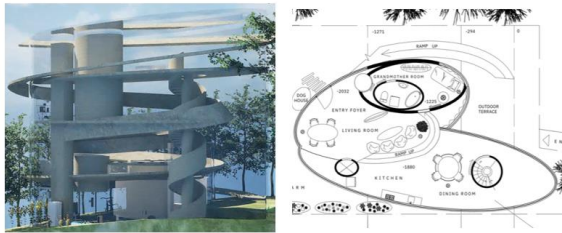


Figure 13. Final Design of Subject B2

According to the survey, the designer reported incorporating these images into her final proposal and rated her satisfaction with the AI chatbot at 10 out of 10.

The chatbot effectively enhanced her creativity through factor no. 5 (idea stimulation), by translating her abstract, sensational concepts into architectural form, demonstrating AI's value as both a source of inspiration and a tool for creative development. She also noted factor no. 1 (high efficiency), describing the process as "highly efficient."

However, the chatbot hindered subject B2's creativity through factor no. 2 (over-dependency risk), making her hesitant to move beyond the AI-generated images. The designed space was not functionally well-suited to programmatic needs such as living room and kitchen, and the site context appeared more fictional than realistic. The reason was because the strong AI-generated images discouraged her from breaking away from the fluid curvilinear form, in order to adapt the functional requirements of a house. Subject B2 also pointed to factor no. 1 (miscommunication), noting that "I need to enter text in great detail to ensure the desired result is achieved."

Type C: Abstract Art Approach

According to Yim (2024), in the Abstract Art Approach, subjects tend to use subjective prompts that reflect their intellectual preferences for geometric forms. The AI responds by producing artistic images that suggest geometric shapes or hints at architectural forms in a more interpretive way.

In this study, 10 subjects adopted the approach. Subject C1 inputted the prompts, Cubicism art approach, Pure Geometric and De Stijl architectural style in chatbots. AI generated images composed primarily of black and white 3D planes, dynamic arrangements of intersecting and overlapping squares and rectangles (Figure 14). These compositions conveyed a strong sense of movement and spatial flux, with box-within-box formation and layered planar elements that suggested depth and interaction.

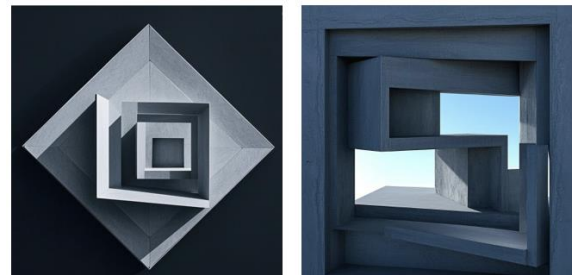


Figure 14. Type C - Abstract Art Approach, Subject C1 Phase 1 AI images

C1 transformed these abstract qualities from the chatbot images into architectural form, resulting in a house composed of intersecting planes that defined spatial boundaries without conventional walls (Figure 15). C1 also emphasized factor no. 1 (high efficiency), stating that she appreciated "the efficiency and speed of AI."



Figure 15. Final Design of Subject C1

Nevertheless, the chatbot hindered her creativity through factor no. 4 (loss of enjoyment), as the experience reduced some of the satisfaction she normally found in design exploration. She rated her satisfaction with the AI chatbot at 6 out of 10. She also pointed to factor no. 5 (mismatch in quality), noting that she "hopes the image quality can be improved."

Type D: Traditional Approach (Control)

Doshi & Hauser (2024) states that AI ideas are regarded as more creative, better written, and more enjoyable in comparison to less creative writers. However, AI ideas are so similar to each other, and it is not as creative as human with brand new ideas.

One student, Subject D1, intentionally chose not to use any AI-generated images. He reported factor

no. 5 (mismatch in quality), stating that AI “is not smart enough. Most of them cannot understand images.” He also expressed factor no. 1 (miscommunication), explaining that using AI required too much effort to convey his intentions, and the likelihood of getting an image that matched his vision was very low. He rated his satisfaction with the chatbot as zero out of ten, believing that it hindered rather than enhanced his creativity.

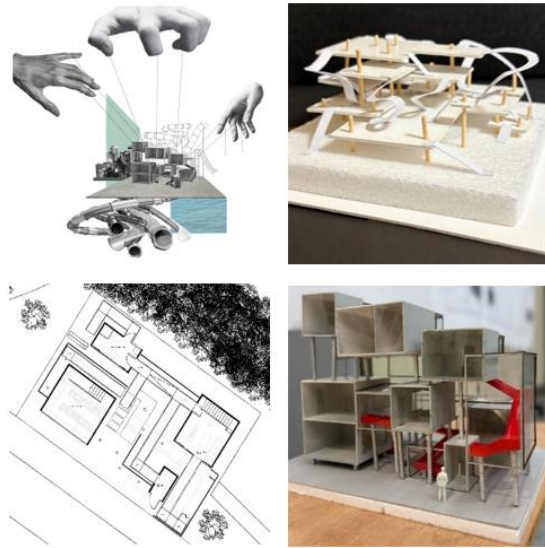


Figure 16. Type D - Traditional Approach, Subject D1 Design

During the conceptual phase, he followed a traditional design process. He created a physical concept model and produced a conceptual image only after the project was completed. While his final design demonstrated a clear intent, the process took him considerably longer than his peers who used AI. Therefore, for individuals who demonstrate strong self-direction and conceptual clarity, a traditional approach may remain an effective path.

5. Conclusion

This research examined how AI chatbots could enhance and hinder the creativity of designers and students during the schematic design stage, particularly in the generation of conceptual images. The study demonstrated that AI chatbots could serve as creative assistants, providing efficiency, visualization, and inspiration. It could also pose challenges of over-dependency, miscommunication, and reduced creative satisfaction. Through case studies, it became evident that the value of AI lies not in replacing the designer, but in how critically and thoughtfully it is integrated into the design process.

As Wnukowska (2024) states, AI is best positioned as a collaborative partner that augments

creativity while preserving human agency. He proposes a roadmap for integration, with the architect's role shifting toward directing AI outputs to achieve context-sensitive, human-centred results. This vision highlights opportunities for future studies to explore how AI chatbots can be further developed as partners with designers in architectural design projects.

6. References

- [1] Borglund, C. (2022), *Artificial Intelligence in Architecture and its Impact on Design Creativity: A Study on How Artificial Intelligence Affects Creativity in the Design Process*, KTH Royal Institute of Technology, Stockholm, Sweden. <https://www.divaportal.org/smash/get/diva2:1678575/FULLTEXT01.pdf> (Access Date: 13 May 2025).
- [2] Lee, J.H., Ostwald, M.J., & Gu, N. (2020), *Design Thinking: Creativity, Collaboration and Culture*, Springer International Publishing, Cham. DOI: 10.1007/978-3-030-56558-9.
- [3] Pena, M. L. C., Carballal, A., Rodríguez-Fernández, N., Santos, I., & Romero, J. (2021), 'Artificial intelligence applied to conceptual design: A review of its use in architecture', *Automation in Construction*, pp. 2-30.
- [4] Sonderegger, D., & Seufert, T. (2022), 'Chatbot-mediated learning: Conceptual Framework for the Design of Chatbot Use Cases in Education', *14th International Conference on Computer Supported Education (CSEDU 2022)*, Vol. 1, pp. 207-215.
- [5] Wadinambiarachchi, P., Weir, R., & Dow, S. (2024), *The Effects of Generative AI on Design Fixation and Divergent Thinking*, arXiv preprint arXiv:2403.11164. DOI: 10.48550/arXiv.2403.11164.
- [6] Yim, K. (2024). *AI Chatbots in Architectural Design: Exploring the Potential and Limitations in Conceptual Image Development*. *International Journal for Infonomics (IJ)*, 17(1), 2207–2214.
- [7] Zhai, C., Wibowo, S., & Li, L.D. (2024). The effects of over-reliance on AI dialogue systems on students' cognitive abilities: a systematic review. *Smart Learning Environments*, 11(1), Article 10. <https://slejournal.springeropen.com/articles/10.1186/s40561-024-00316-7>

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Fortifying Cybersecurity Strategies: Harnessing Explainable AI Against Phishing Scams

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Abstract

Phishing attacks continue to be one of the most significant threats in the sector of cybersecurity. Traditional methods for phishing detection are based on rule-based systems and heuristics. Such methods have limited success, as they fail to adapt with time in accordance with the latest attack tactics. Instead, ML and NLP can provide a better approach for a scalable solution that works across large data sets to recognize patterns and detect anomalies in phishing attempts. Still, the decision-making process of an AI-based system is difficult to interpret and consider a "black-box," thus making it unreliable for end-users. Lack of explainability is a barrier to trust-building, especially in the case of critical domains like security, where understanding that reasoning becomes a necessity. *Explainable AI (XAI)* counter day's this challenge by providing transparency in decision-making processes in AI. An XAI system is designed to make a prediction or classification and also explain the rationale for making that prediction, which builds trust and accountability. In the context of phishing detection, XAI will be able to explain in detail why a contextual URL, email subject, or voice message is flagged as suspicious, helping the security professional in understanding and placing more confidence in the predictions of the model. The integration of XAI into phishing detection represents a movement toward a more explainable, adaptive, and user-trusted AI model, which in turn will enhance the robustness of the cyber defence mechanisms. The framework devised for evaluating cyber risk resulting from a phishing attack would encompass three phases, each addressing a different aspect associated with phishing. The first phase would execute credibility and legitimacy checks for any given URL. The framework employs machine learning algorithms taking into consideration several aspects of URL classification including domain name, URL structure, and SSL certification. It also uses certain NLP techniques to examine the contents of a website for any discrepancies in comparison to their legitimate counterparts. Through XAI, the system describes why a particular URL is suspicious, such as explaining to the user if the domain name is irregular or if there is a lack of SSL certification, thus adding transparency and trustworthiness into the decision-making process. The second step is that the framework will examine the subject line of the emails, since this is widely used in fictitious emails for phishing purposes. The subject line on these fake emails is generally one that says urgency or alarm, such as "Your account has been compromised" or "You've won a prize." Using machine learning models, the subject line will be explored in its pattern recognition capabilities to ascertain if there are certain characteristics that fit those of phishing attempts, including emotional manipulation, urgency, or presence of odd keywords. XAI is brought in this stage of the project to explain why such a subject line could be considered suspicious due to some features of language or because it touched certain emotional triggers, thus giving some transparency into the nature of decision making. The third phase revolves around the implications of voice phishing, or "vishing," based on audio calls or messages by attackers impersonating trusted institutions, such as banks, to extract personal or financial information. In order to detect voice phishing, the audio data must be analyzed for certain patterns of interest: tone, speech patterns, and statements particular to the attacker. Deep learning models can analyze the audio signals for inconsistent or

manipulative behaviors associated with phishing attempts. Various XAI techniques will shed light on how the system picks out malicious features in the voice recordings.

The combination of machine learning, natural language processing, and explainable AI creates some sort of panacea for an adaptable cybersecurity ecosystem. Therefore, the highest accuracy of URL prediction model is 95.14% and the email prediction model gives an accuracy of 99.02% and the deep voice phishing model gives an accuracy 98.26%.

Keywords: Phishing, Explainable AI (XAI), Vishing, Machine Learning

Towards Developing Gen AI Technology-Based Learning Maturity Model (GAIT-LMM)

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Abstract

In an era marked by the pervasive integration of Generative Artificial Intelligence Technologies (GAIT) into various sectors, the education domain stands at a critical juncture, necessitating a paradigm shift in pedagogical approaches. This research introduces a novel conceptual framework, the GAIT-based Learning Maturity Model (GAIT-LMM), designed to strategically leverage the capabilities of GAIT to enhance learning experiences and redefine assessment methodologies. The GAIT-LMM posits a structured, multi-tiered approach to integrating GAIT into educational practices, moving beyond the mere adoption of technology to a fundamental re-imagining of teaching and learning. This paper examines the limitations of traditional educational models in the face of rapidly evolving technological landscapes. It argues that the prevailing emphasis on rote memorization and standardized assessments fails to cultivate the critical thinking, problem-solving, and creative skills essential for navigating the complexities of the 21st century. The GAIT-LMM is presented as a response to this challenge, offering a progressive framework that fosters deep learning, active engagement, and the development of higher-order cognitive abilities. At the heart of the GAIT-LMM are three distinct learning levels, each carefully designed to facilitate specific learning outcomes and cultivate unique skill sets. The first level, designated as 'Opportunity to Know' (O2K), focuses on structured inquiry, wherein learners are presented with meticulously crafted prompts, aligned with the CRAFT framework, to explore new concepts and subject matter. This level emphasizes the development of analytical skills and the ability to synthesize information from GAIT-generated responses. The second level, designated as 'Opportunity to Think' (O2T), introduces the Socratic method, encouraging learners to engage in iterative prompt refinement and collaborative discourse. This level cultivates critical thinking, communication skills, and the ability to formulate insightful questions. The third and culminating level, designated as 'Opportunity to Create' (O2C), empowers learners to engage in autonomous, self-directed knowledge construction, developing complex projects without prescriptive prompts. This level fosters creative problem-solving, strategic thinking, and the ability to navigate complex information landscapes.

A central set-up of the GAIT-LMM is the shift from summative, product-oriented assessments to formative, process-oriented evaluations. This research proposes a radical inversion of the traditional Q&A model, advocating for the assessment of 'Question Intelligence' (QI) over 'Answer Intelligence' (AI). By focusing on the quality of learner inquiries, rather than the correctness of their responses, educators can cultivate deeper learning and promote the development of essential metacognitive skills. The GAIT-LMM incorporates a rubric-based assessment framework, aligned with the CRAFT framework, to evaluate the sophistication and effectiveness of learner-generated prompts. This research also addresses the critical issue of academic integrity in the age of GAIT. It argues that defensive mechanisms, such as plagiarism detection tools, are insufficient to address the fundamental challenges posed by AI. Instead, it advocates for a proactive approach that embraces GAIT as a collaborative partner, fostering a culture of ethical and responsible AI usage. The GAIT-LMM represents a transformative pedagogical model that empowers educators to leverage the capabilities of GAIT to enhance learning experiences and redefine assessment methodologies. By shifting the focus from passive knowledge consumption to active knowledge creation, this model aims to cultivate critical thinkers, innovative and creative problem-solvers, and ethical AI users, preparing learners for the

challenges and opportunities of the 21st century. This conceptual research lays the groundwork for future empirical studies, which will further validate and refine the GAIT-LMM, contributing to the ongoing evolution of AI-enhanced education.

Session 4: Leadership and Teacher Education

Title: Women in Entrepreneurship: Effective Training and Development Strategies
Autors: Devin Atkin, Santiago Fuentes, Orly Yadid-Pecht

Title: The Role of Critical Reflection in the Professional Development of Teachers
Autors: Ilona Tandezgolskienė-Bielaglovė, Aušra Rutkienė

Title: VR-based Teaching, Case Studies and Skills Development Training for Educators
Autor: Fahim Ahmed

Women in Entrepreneurship: Effective Training and Development Strategies

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University of Calgary
Canada

Abstract

From Lab to Fulfillment (FL2F) is a workshop that aims to support female academics entrance into the world of entrepreneurship. The primary participants of the work- shop are professors in the engineering and medical faculties at the various universities where the workshop has been executed. Many participants have had successful startup launches in a diverse range of industries. While previous studies have characterized and optimized aspects of our teaching using machine learning, this work focuses on addressing feedback received from participants to further refine and improve curriculum outcomes. Here, we reflect on lessons learned from years of course development, identifying key challenges and insights in this unique form of the scholarship of teaching. We will then propose strategies to enhance future workshops.

Keywords: *Scholarship of Teaching and Learning, Evidence Based Teaching, Women in Entrepreneurship, University Startup Ecosystems*

1. Introduction

Female Academics are substantially less likely to engage in entrepreneurial activity. Hopefully the previous sentence will eventually be made false; however, recent statistics bear out this fact, with 4.5% of female vs. 8.5% of male PhD students engaging in entrepreneurial activities of some form [11]. Society as a whole is beginning to decide that this is an unacceptable state of affairs and effort has been focused in recent years towards correcting this gendered discrepancy. The Women Entrepreneurship Loan Fund was given a budget of \$55 Million in 2021 to provide microloans of up to \$50,000 to female led startups [3]. While financial support is a vital step forward, education plays an even more critical role in equipping female academics to succeed as entrepreneurs.

From Lab to Fulfillment (FL2F) aims to provide entrepreneurial education to bridge the gap for female academics. The general workshop schedule, shown in Figure 1, is tailored to the preferences of the hosting organization. Although the workshop has been primarily conducted for the University of Calgary, the transition to

a primarily online format following COVID-19 has allowed it to be hosted for a broader range of audiences. This includes the Edmonton Regional Innovation Network, Queen's University, Bar-Ilan University (BIU), and the Economic Development Workshop in Lethbridge. Across numerous sessions, the workshop has empowered many aspiring entrepreneurs with the tools and knowledge to succeed.

Date	Time	Activity	Duration	Topics
Monday, June 10, 2024	09:00AM - 10:00AM	Group Meeting #1	60 minutes	Introduction, Gender Bias, IP
Tuesday, June 11, 2024	09:00AM - 10:30AM	Group Meeting #2	90 minutes	IP, Real Pain, Skill Development
Wednesday, June 12, 2024	09:00AM - 10:30AM	Group Meeting #3	90 minutes	Real Pain, Vision and Mission Entrepreneurial Mindset, Skill Development
Thursday, June 13, 2024	09:00AM - 09:30AM	First Q&A Session	30 minutes	
Thursday, June 13, 2024	09:30AM - 12:30PM	First 1/1 Meeting with Coach(1)	25 minutes each	Individual Coaching
Monday, June 17, 2024	09:00AM - 12:00PM	First 1/1 Meeting with Coach(2)	25 minutes each	Individual Coaching
Tuesday, June 18, 2024	09:00AM - 10:30AM	Group Meeting #4	90 minutes	Lean Start-up, Team Buildup, Strategic Planning, Skill Development
Wednesday, June 19, 2024	09:00AM - 10:30AM	Group Meeting #5	90 minutes	Strategic Planning, Funding Support, Alliances
Wednesday, June 19, 2024	11:00AM - 11:30AM	Guest Talk (optional)	30 minutes	TBA
Thursday, June 20, 2024	09:00AM - 12:00PM	Second 1/1 Meeting with Coach (1)	25 minutes each	Individual Coaching
Monday, June 24, 2024	09:00AM - 12:00PM	Second 1/1 Meeting with Coach (2)	25 minutes each	Individual Coaching
Tuesday, June 25, 2024	09:00AM - 12:00PM	Group Meeting #6	180 minutes	Pitches, Efficacy, Summary
Wednesday, June 26, 2024	09:00AM - 09:30AM	Second Q&A Session	30 minutes	
Wednesday, June 26, 2024	11:00AM - 11:30AM	FL2F Completion - Certificate Handing Event	30 minutes	

Figure 1. FL2F Workshop Schedule

Our previous work looked at characterizing our pedagogy quality solely through machine learning methods [7]. This work will continue and extend on that to address some of the deficiencies resulting from our relatively small sample sizes and training data.

2. FL2F Workshop Overview

The FL2F workshop has before, after, and 6-month follow up surveys as shown in table 1 and table 2 respectively. Participants are also requested to provide testimonials/ written feedback about their experience with the workshop, as well as provide commentary on their entrepreneurial progress since leaving the workshop. Although early iterations of this questionnaire used a yes or no response for the 6 month follow up, more recent versions have used a Likert like scale to try and capture more nuance in terms of the discrepancies in levels of understanding.

Table 3 goes over the 6 primary sessions, sessions that compose a running of the FL2F workshop. In addition to the 6 group sessions there are also one-on-one coaching sessions to help students directly with structuring their entrepreneurial ambitions. The topics covered in the six sessions have been chosen based on their relevancy to the experiences of Dr. Orly Yadid-Pecht, during her personal entrepreneurship journey, they are intended to help others avoid potential pitfalls. The workshop itself is offered in various different length schedules; however, Figure 1 shows the general format of the workshop. Overall the workshop consists of 20+ hours of program material, 6 collaborative group meetings, 2 individual coaching meetings, 2 QA sessions, and depending on the session, 2 guest talks. The surveys contain a text response element where participants are asked to respond textually to the questions shown in the follow up survey table 2. Several web-based tools have been developed to help facilitate workshop activities in an engaging manner.

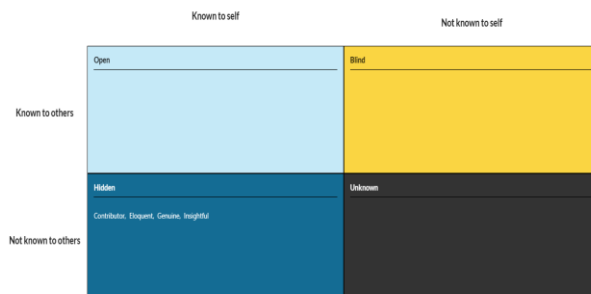


Figure 2. Peer Assessment Tool Graphic

The Peer Assessment Exercise is one that takes place during the workshop's lesson 4 focusing in on team

buildup. The webpage hosted at <https://peer-assessment.fl2f.ca/> runs the exercise based on the Johari Window [8].

As seen in Figure 2, there are four quadrants: Open, Blind, Hidden, and Unknown. The quadrants each have separate meanings as is defined: the open area is for actions and behaviors where motivation is known to others as well as ourselves, the blind area is for actions where others can see things in us that we are unaware of, the hidden area is for actions where we know their motivations but keep that hidden from others, and the unknown area is for actions where neither ourselves or others know the behavior [8]. The motivation behind the exercise is to make people aware of the parts of themselves which they may keep hidden to help encourage healthy communication.

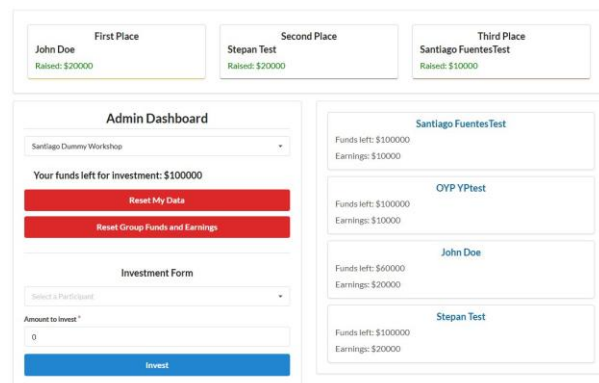


Figure 3. Investment Panel Application Admin Dashboard

Elevator pitching is covered in lesson 6 of the workshop and it is one of the most challenging things for new entrepreneurs to do. Asking someone for thousands or hundreds of thousands of dollars with the promise that your idea can make them millions can be intimidating for the uninitiated. The time-honored tradition of the elevator pitch is demonstrated through a developed web application that allows users to "bid" fake investment towards each other's pitches such that they can get a feeling for pitching. The investment panel for the workshop administrator is shown in Figure 3. The quantity of funds can be re-set and the administrator can also see and declare a "winner" based on who was able to garner the most fictitious investment during that round. Alternate formats for the pitch meeting may be considered if the setup is moved to local again as in [10] where an alternate pitch format is suggested and explored that encourages more group level participation.

Dan and Dana Roleplay is a negotiation exercise that faces workshop participants off against one another in another effort to help improve their negotiation, and communication skills. Dan and Dana are positions given

to pairs of participants to roleplay a prospective negotiation at a hypothetical startup. This framework is used over a direct representation of the individual members startups to avoid situations where an individual

is underdeveloped in their project and may not be able to fully participate in a direct parallel. Roleplay exercises like these are recognized for helping students to improve their communication skills [6].

Table 1. Example of pre- and post-workshop questionnaire: self-assessment survey for participants regarding their entrepreneurial skills

Measuring Item	Poor	Fair	Good	Very Good	Excellent
Q1: Able to Assess market needs	1	2	3	4	5
Q2: Bias Aware and Adaptive	1	2	3	4	5
Q3: Fosters Creative thinking	1	2	3	4	5
Q4: IP Knowledgeable	1	2	3	4	5
Q5: Good Communicator	1	2	3	4	5
Q6: Presenter/Self-promoter	1	2	3	4	5
Q7: Good Negotiator	1	2	3	4	5
Q8: Resilient	1	2	3	4	5
Q9: Strategic Planner	1	2	3	4	5
Q10: Alliance Builder	1	2	3	4	5

Table 2. Follow-up Questionnaire

Question	Poor	Fair	Good	Very Good	Excellent
Q1 _f : Did you pursue any IP?	1	2	3	4	5
Q2 _f : Did you apply for government grant?	1	2	3	4	5
Q3 _f : Did you have success in securing funding?	1	2	3	4	5
Q4 _f : Did you work with other FL2F participants?	1	2	3	4	5
Q5 _f : Did you start new initiatives?	1	2	3	4	5
Q6 _f : Did you open a new company?	1	2	3	4	5

3. Feedback and Lessons Learned

"...This workshop was really kind of an enlightenment. . It really helped me understand what it takes to transform the research ideas into successful companies! I know the recipe now, and I have to start using it... It was really a great learning experience for me... It hasn't really been available for me before, thank you so much!"

— Dr. Gouri Ginde, Assistant Professor, University of Calgary

Quote 3 from Dr. Ginde who attended the workshop during one of the running's at the University of Calgary helps start a qualitative assessment of the workshops lessons in teaching. We are interested in finding what students experiences have been post workshop and how the workshop content has helped them achieve their entrepreneurial goals. We can examine the various comments we have received in our follow-up surveys and perform a sentiment analysis to determine key points and try and find ways we can improve.

For the Sentiment Analysis a twitter-based model

was used to first determine the positive, negative, and neutral comments received from participants [1]. As can be seen the majority of the sentiment was determined

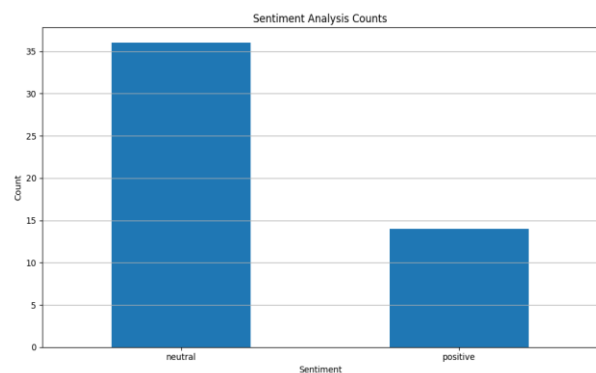


Figure 4. Text Embeddings of Survey Results

to be neutral; however, gratifyingly no participants expressed a negative sentiment. We'd like to assert that this is a pure expression of quality; however, it may also be due to the small number of comments received to look at as we are smaller organization with only a moderate

number of participants. If we take a look at one of the neutral evaluated sentiments we see "We are still in the early stages of building the platform." This would seem to indicate that a neutral sentiment is mostly just a lack of sufficient progress so far. Reading through some of

the sentiments a lot of them would likely be better classified as positive outcomes, simply delayed by circumstance or changing priorities. A lot of these outcomes can be seen in Table 4.

Table 3. Course Lessons and Descriptions

Lesson Number	Topic	Description
1	Introduction, Gender Bias, IP	Overview of course objectives, an introduction to gender bias, and the basics of intellectual property.
2	IP, Real Pain, Skill Development	In-depth discussion on intellectual property, identifying customer pain points, and foundational skill development.
3	Real Pain, Vision and Mission, Entrepreneurial Mindset, Skill Development	Understanding customer pain, crafting vision and mission statements, fostering an entrepreneurial mindset, and enhancing relevant skills.
4	Lean Start-up, Team Buildup, Strategic Planning, Skill Development	Applying lean start-up methodologies, building effective teams, creating strategic plans, and refining skills through case studies.
5	Strategic Planning, Funding Support, Alliances	Detailed exploration of strategic planning, securing funding, and forming strategic alliances, along with project requirements.
6	Pitches, Efficacy Summary	Developing and delivering effective elevator pitches and summarizing key takeaways from the course.

We can perform embeddings of the comments received from participants to try and get an idea of the relationship between the different items. Text embeddings take the text and convert it into a high dimension vector representing the ideas behind the text. Figure 5 shows those dimensions reduced to 2 in order to try and visualize any clustering in the results. Visually

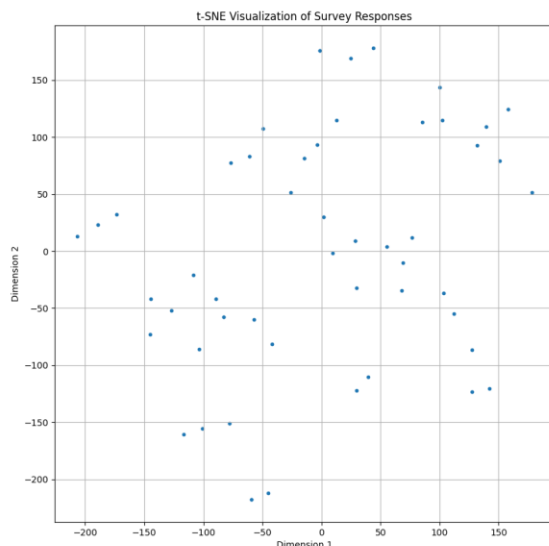


Figure 5. Text Embeddings of Survey Results

here we see some clustering starting to occur; however, there is still too little data to draw more serious conclusions, instead we can look directly at a handful of the comments to try and draw conclusions as to what relationships will arise as we continue to gather data.

If we read some of the comments received in Table 4, we can start to see some trends in the comments received. Some people made moderate progress on their entrepreneurial journey, even a simple step like starting a website can be significant in making an aspiration feel a lot more real. While some people were too busy with teaching and research responsibilities to make significant progress on their journey, an understandable sentiment, more built confidence in their mindset and gained a better feeling for what would truly be involved in beginning the journey.

4. Outcome and Impact

Dr. Elise Fear a former FL2F participant founded Wave-View Imaging [13] Kairos Cognitive Care was founded by Leah Kazmerik another FL2F Participant [2]. Dr. Kamala D. Patel was yet another FL2F participant who has been part of the founding of a company [9] Measuring the true outcomes from the workshop will require time; however, we can draw preliminary conclusions based on our survey results and feedback which show that we appear to be having a positive impact in terms of understanding across various topics.

- IP knowledgeable: This is the area where our workshop shines the brightest with the greatest average improvement across all previous participants. Hopefully this is indicative that when participants do choose to file patents, they are filing effective patents that can be actively defended and commercialized. To those familiar with this topic this may seem too obvious to be covered with an audience of professors;

however, surprisingly only roughly 22% of teachers gave a correct definition for a patent [12]. The

Table 4. Positive Results: Survey Feedback

<i>Comments</i>
<i>I think one thing is the courage to navigate the business side of the world and to come out of my comfort zone.</i>
<i>Better as a leader for my team. How to empower others.</i>
<i>I think so, I feel I have become more open to collaboration with industry companies and willing to know more about how their business operates and seek potential opportunities for myself.</i>
<i>Yes. I made progress with our company, Get a Site Going.</i>
<i>Not much. Too busy with the teaching and research.</i>
<i>It gave me the tools and motivation to initiate a start-up, which I thought was out of my abilities before the workshop.</i>
<i>yes- the workshop really broadens my entrepreneurial thoughts. I was able to come out with great ideas after the workshop, though still working on them, but I have started building a team which is a great step for me.</i>
<i>For every grant that I am applying for, I am thinking in terms of a complete solution which can be productized, Networking.</i>
<i>Yes there is positivity.</i>
<i>I gained confidence that I could have my own business based on my knowledge.</i>
<i>It provided me with knowledge of entrepreneurial activities and allowed me to decide whether I am ready to undertake it.</i>

misconceptions as to what patents can cover include many things that could sink into an otherwise successful business like thinking that it protects ideas, or thoughts [12]. Knowing what is protectable and how it may be protected is the difference between being able to operate without revealing too much or being unnecessarily guarded.

- **Able to Assess Market Needs:** We are a fan of the hilarious case of market misalignment seen in the case of the chicken eyeglasses [5]. Presumably this improvement will help our alumni to avoid failures of a similar kind.
- **Bias Aware Adaptive:** This area is our point of pride in terms of our content. Biases are typically looked at in a negative; however, emotion and bias play a role in the process of entrepreneurship. Optimism Bias increases the intention of individuals to undertake an entrepreneurial ventures [15]. Female Entrepreneurs are more likely to garner funding in a crowdfunding context; funders implicit gender biases serve to actually strengthen perceptions of women as

trustworthy valuable actors in a crowd-based funding setup over a formal market [4]. These facts suggest that funding is available for women who are aware of and willing to exploit others implicit biases to achieve better results themselves, keeping an optimistic but realistic view of the situation.

- **Good Negotiator, Presenter Self-Promoter, Alliance Builder, Strategic Planner, Good Communicator, Fostering creative thinking, Resilient:** These areas had on average less than a full point of improvement. This suggests that these are areas where we have the greatest possibility for improvement. To this end we may further develop our online tools to better teach the relevant topics through hands-on exercises.

5. Conclusion

We hope to further improve our educational offering in the years. Through reflecting upon the feedback and conclusions of our surveys we have drawn preliminary conclusions which will be used to improve future offerings of this and other courses. We seek to improve the workshop further through curriculum refinement as well as the addition of new tools and exercises to help optimize student outcomes.

Ultimately our target audience of professors presents a unique challenge in terms of the scholarship of teaching. Most of the same principles of teaching apply; however, with the overtone of entrepreneurship and the lack of a seniority relationship between student and professor makes teaching more effectively collaborative. This is in many ways ideal for minimizing the sage dynamic of some less productive classroom environments. There is still much work to do as estimates to reach gender parity in various fields places the date much too far into the future. A more equitable world will require work to help address biases and systemic advantages. This is beneficial for everyone and will strengthen the economies and overall societies of anywhere that embraces equitable entrepreneurship.

6. References

- [1] Camacho-collados, J., et al. (2022). Tweet NLP: Cutting-Edge Natural Language Processing for Social Media. In: Proceedings of the 2022 Conference on Empirical Methods in Natural Language Processing: System Demonstrations. Abu Dhabi, UAE: Association for Computational Linguistics, Dec, pp. 38–49. URL: <https://aclanthology.org/2022.emnlp-demos.5> (Access Date: 25 November, 2024).
- [2] From Lab 2 Fulfillment (FL2F). (n.d.). <https://fl2f.ca/>. (Access Date: 30 December, 2024).
- [3] Innovation, Science and Economic Development Canada.

(n.d.). Women Entrepreneurship Loan Fund. URL: <https://ised-isde.canada.ca/site/women-entrepreneurship-strategy/en/women-entrepreneurship-loan-fund> (Access Date: 25 November, 2024).

[4] Johnson, M. A., Stevenson, R. M., and Letwin, C. R. (2018). A woman's place is in the . . . startup! Crowdfunder judgments, implicit bias, and the stereotype content model. In: *Journal of Business Venturing* 33.6 (2018), pp. 813–831. ISSN: 0883-9026. DOI: 10.1016/j.jbusvent.2018.04.003.

[5] Jackson, Jr-A. (June 16, 1903). Eye-Protector for Chickens. US730918A. URL: <https://patents.google.com/patent/US730918A/en> (Access Date: 25 November, 2024).

[6] Kirk, A. G. (2018). Using role play exercises to enhance communication competence and persuasive communication skills in entrepreneurship programs". In: *Issues in Information Systems* 19.2.

[7] Liu, Z. (2022). Neural network-based learnings in support of two application domains. Master's thesis. Calgary, Alberta, Canada: University of Calgary, September.

[8] Luft, J. (1961). The Johari window. In: *Human relations training news*, 5.1, pp. 6–7.

[9] Luxidea Inc. (n.d.). About the Team – Luxidea. URL: <https://www.luxidea.ca/about-the-team>. (Access Date: 28 November, 2024).

[10] McCollough, M. A., Devezer, B., and Tanner, G. (2016). An alternative format for the elevator pitch. In: *The International Journal of Entrepreneurship and Innovation* 17.1, pp. 55–64. DOI: 10.5367/ijei.2016.0211.

[11] Muscio, A., and Vallanti, G. (2022). The gender gap in Ph.D. entrepreneurship: How do students perceive the academic environment? In: *PLOS ONE* 17.4, e0261495. DOI: 10.1371/journal.pone.0261495.

[12] Starkey, L. et al. (2009). Intellectual property: what do teachers and students know?" In: *International Journal of Technology and Design Education* 20. August 2010, pp. 333–344. DOI: 10.1007/s10798-009-9088-6.

[13] Wave View Imaging. (n.d.). Imaging. URL: <https://www.waveviewimaging.com/>. (Access Date: 25 November, 2024).

[14] Yadid-Pecht, O. (n.d.). LinkedIn Profile. <https://www.linkedin.com/in/orly-yadid-pecht-1416332b/> (Access Date: 30 December, 2024).

[15] Zhao, Y., and Xie, B. (2020). Cognitive Bias, Entrepreneurial Emotion, and Entrepreneurship Intention. In: *Frontiers in Psychology* 11. ISSN: 1664-1078. DOI: 10.3389/fpsyg.00625.

The Role of Critical Reflection in the Professional Development of Teachers

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The starting point of the research is reflexive practice and its development in relation to different levels of reflection: descriptive, comparative (contextual) and the highest level of critical reflection. In this context, reflection is perceived as an essential element in supporting the teacher's personal growth and professional development in practice or in the workplace.

The general aim of the study was to highlight the personal and professional growth characteristics of teachers with different work experience in the development of reflective practice.

Research questions:

- How can teachers' reflective practice be developed from different perspectives of teacher experience?*
- Which elements have the most significant impact on teachers' personal and professional growth?*

A qualitative research approach was chosen to achieve the aim of the study. The study used several methods of data collection: semi-structured interviews (n=12), focus group discussion (n=4) and case studies (n=10). The study followed a multiple triangulation approach. In the first phase of the study, semi-structured interviews were conducted with teachers who have been working in the school for several years. The second phase included focus group discussions and focused on everyday experiences, which are brought to the forefront of decision-making and collaboration during the focus groups. In the third phase, specific cases presented by teachers were analysed. The fourth phase focused on the analysis of theory according to the main themes that were identified.

In this study, data were coded and analysed using thematic analysis. Three key features were followed in the data analysis: 1. Elements; 2. Interactions; 3. Growth. Elements include people, objects, experiences, roles, social events, etc.; interactions include the explanation of the elements, the interconnections between them; and growth refers to turning points that indicate change.

The study showed that teachers analyse and reflect on current situations by paying attention to emotions, insights and elements of experience. This did not allow for loss of important details but enabled a deeper discussion and analysis of existing complex experiences and emotions. The participants were actively involved in participation, focusing on knowledge, information flow management, identification of key situations and detailed analysis of current problems.

VR-based Teaching , Case Studies and Skills Development Training for Educators

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Abstract

VR-based training offers a transformative approach to staff development in education. By utilizing immersive technology, educators can improve their teaching skills and engage students more effectively. With the rapid growth of VR technology, now is the ideal time to adopt this trend and enhance classroom teaching through effective use of VR. In this project we also collaborated with the BODYSWAP VR platform, this innovative training program is designed to empower educators with cutting-edge VR technology to enhance their teaching skills and classroom engagement. Participants received VR headsets and engage in immersive experiences that focus on essential areas such as customer management, improving customer experience, healthcare, and operations management. One key aspect of the program is soft skills development, so inviting staff from all disciplines, including engineering and medical, to attend. Other experiment included creation of VR based case studies in Operations Management.

Session 5: STEM

Title: Applying Team-Based Learning Activities to STEM Education

Authors: Pedro J. Roig, Salvador Alcaraz, Katja Gilly, Cristina Bernad, Carlos Juiz

Title: Enhancing ICT Skills of Pre-Service Teachers using Multimedia Package

Authors: Pinkal Chaudhari, Anjali Khirwadkar

Title: Academic Integrity and Individual Accountability in Collaborative Assessments:
Practitioner Views of Higher Education STEM Faculty

Authors: Allan Jay Dinglasan, Jennifer Weible

Applying Team-Based Learning Activities to STEM Education

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Abstract

Team-based learning activities are one of the most commonly used initiatives within the active learning paradigm in order to give students a more active role in the learning process. In this paper, the academic results and the success rate in a STEM course are compared between two consecutive academic years where different types of team-based learning activities were proposed to the students. According to the descriptive statistics applied to the outcome obtained in both years, it gets confirmed that students improved their marks in two-digit figures when they were more involved in the activities. Additionally, the results in the t-test applied to the distributions of the marks achieved in both years confirmed that there is a statistically significant improvement in the results when students got more involved in the team-based learning activities proposed.

Keywords: active learning, team-based learning, STEM education, descriptive statistics, inferential statistics.

1. Introduction

The role of active learning within the education field has been growing in recent years, mostly since the pandemic lockdown rapidly transformed the landscape related to teaching and learning in all areas and levels of education [1]. Active learning requires some prerequisites in order for students to succeed, such as a good alignment between research and teaching practices, along with a supporting infrastructure related to teaching and learning, and also staff professional development together with appropriate learning designs [2].

Basically, active learning approaches allow students to interact with each other and with the teacher in order to be more engaged, such that discussion gets encouraged, critical thinking gets promoted, and problem solving gets enhanced [3]. Furthermore, incorporating active learning methods with a pedagogical view boosts the outcome obtained [4]. Additionally, many empirical studies in the literature have proved that the use of any of the active learning methods usually results in an improvement of

the learning outcomes [5].

Team-based learning furnishes an active and structured scenario for small group learning, which may be applied in classes of any size [6]. It allows to apply conceptual knowledge through a string of activities, which include individual work, team work and immediate feedback within the context of a small group instructional strategy [7].

The interest in team-based learning has been recently growing and it has been spread throughout all education areas and levels, although it seems that medical and nursing education are the most prominent areas and higher education is the most prominent level [8]. Also, team-based learning are considered when it comes to stimulating the development of some key transversal skills, such as problem solving, critical thinking, collaboration, leadership, and communication [9].

There are some references in the literature establishing an association between team-based learning with an improvement in academic performance and success rate [10]. Moreover, other references state a positive relationship between the use of team-based learning activities and the success rates achieved by students [11]. Therefore, it appears that the time and effort needed to implement team based learning activities is worth as it results in improving academic results and success rates [12].

Hence, the research goal in this paper is to try to corroborate the increase in academic performance and success rate when implementing team-based learning activities within a STEM course in order for students to better consolidate the concepts learned.

The rest of the paper is organized as follows: section 2 describes the method used, section 3 displays the results obtained, section 4 presents the discussion on those results, and finally, section 5 draws the final conclusions.

2. Method

This study was carried out in a college course dedicated to the physical foundations of computer networks, with 50 students registered in the current academic year, namely 2024-2025. Out of those 50 students, 31 were men and 19 were women, whose

ages ranged between 18 and 25 years old. Likewise, in the last academic year, the course also had 50 students, with 33 men and 17 women. In both academic years, the course was composed of 5 teaching units, whose target was to introduce the physical foundations under the computer network operations and management.

In this context, last academic year it was decided to implement a team-based learning activity per each teaching unit, such that a collection of 20 physics problems were proposed to be resolved in groups. At the beginning of the course, ten volunteer students were appointed as team leaders of the corresponding teams, and afterwards, four students were randomly assigned to each of these teams. Hence, ten teams were formed, where each one was composed of five students including the team leader. The structure of those teams was the same all along the academic year, such that the components of each group remained immutable for the five team-based activities proposed during the course.

The type of problems to be resolved in each teaching unit were the following: the first one was related to transmission time and throughput, the second one was about modulation and multiplexing, the third one was related to transmission and error control codes, the fourth one was about the Aloha protocol and carrier sense multiple access mechanisms, whilst the fifth one was related to Bellman-Ford and Dijkstra algorithms.

The only requirement imposed during last academic year in the team-based learning activities was for a team leader to collect the solved problems and submit them to the teacher through the Learning Management System (LMS) established by the college. However, it was detected that some teams ended up equally distributing the twenty problems assigned in each team-based learning activity into all team components, thus accounting for four problems to each of the five members. Then, each student just solved the amount of problems assigned individually, and in turn, forwarded the solutions to the team leader in order to get all twenty solved problems packed together and submitted to the teacher. This way, some students did not face all kind of problems proposed, and this fact got reflected in the checkpoint exams for each teaching unit, where some students did not know how to face some specific problems.

In order to avoid this behavior and to force real team activity, this academic year it was required to present graphical evidence of real teamwork while solving the problems. This could be done by presenting pictures of the group solving problems with a timestamp, which applied to either group meetings in-person or online. This way, no matter whether the work was done such in person or online, as long as the problem-solving was carried out on a synchronous basis, meaning that all team members were present during the resolution process. Hence,

this approach aims at involving all students in all kind of problems, such that they will know how to face any of them in the checkpoint exams.

In summary, with the system established last academic year, some students did not get in touch with some specific sort of problems proposed, which got them to underperform in the checkpoint exams. Therefore, with the system established this academic year, the goal was to get all students involved in every sort of problems proposed in order to try to improve their performance in the checkpoint exams.

In order to check if this goal was achieved, the grades obtained in the five teaching units in both academic years are confronted regarding academic performance and success rate by means of descriptive and inferential statistics.

3. Results

The following tables display the statistical measures related to the results obtained in the course dedicated to physical foundations of computer networks for the past and the current academic years. It is to be noted that the Spanish grading system ranges from 0 to 10, where 5 is considered as the passing mark [13].

Specifically, Tables 1 to 4 are dedicated to descriptive statistics, such that Tables 1 to 3 apply centralization statistics, whereas Table 4 applies dispersion statistics. Furthermore, Table 5 works with the Cronbach's Alpha, which is not a statistical test, but it is actually a coefficient of reliability or consistency. On the other hand, Tables 6 and 7 are dedicated to inferential statistics.

To start with, Table 1 shows the average marks obtained by all the students in the checkpoint exams, considering each teaching unit within both academic years, along with the increments experienced.

Table 1. Average marks per teaching unit

	Past year	Current year	Increment
Teaching Unit 1 (TU 1)	6.48	7.04	+08.64%
Teaching Unit 2 (TU 2)	6.02	6.60	+09.63%
Teaching Unit 3 (TU 3)	6.08	6.70	+10.20%
Teaching Unit 4 (TU 4)	6.44	7.16	+11.18%
Teaching Unit 5 (TU 5)	6.06	7.32	+20.79%

The overall mark for each student is calculated by taking the average scores obtained in all teaching units. This way, the overall mark for the whole course is obtained by calculating the average marks among

all students, which is labeled as the academic performance. Table 2 exhibits the academic performance registered in both academic years, along with the increments experienced.

Table 2. Academic performance in the whole course

	Past year	Current year	Increment
Academic performance	6.22	6.96	+12.03%

Additionally, the success rate is calculated as the number of students who got an overall mark equal or greater than the passing mark, which is 5 out of 10. Table 3 displays the success rate registered in both academic years, along with the increments experienced.

Table 3. Success rate in the whole course

	Past year	Current year	Increment
Success rate	37/50 = +74%	42/50 = +84%	+5/50 = +10%

Table 4 exhibits the dispersion statistics related to the distribution of marks in both years.

Table 4. Dispersion statistics for the overall marks

	Past year	Current year	Increment
Variance	3.41	3.28	-3.73%
Standard deviation	1.85	1.81	-1.88%
Coefficient of variation	0.297	0.260	-12.42%

Table 5 shows the reliability and internal consistency of the marks obtained in each academic year by means of the Cronbach's Alpha, which is also related to the correlation degree between the corresponding sets of marks.

Table 5. Internal consistency of the marks per year

	Past year	Current year	Increment
Cronbach's Alpha	0.828	0.860	+3.85%

On the other hand, Table 6 presents the relevant measures needed to apply the t-test to the distributions of the marks obtained in both years.

Table 6. Relevant measures before applying t-test

	N	Mean	Standard deviation
Past academic year	50	6.22	1.85
Current academic year	50	6.96	1.81

Finally, Table 7 shows the calculations to find out if the differences between the distribution of marks in both years are statistically significant by means of the two-sided t-test, also known as significance test.

Table 7. T-test applied to both distribution of marks

t-student	2.045
degrees of freedom (df)	50+50-2 = 98
p-value	0.043
s-value	0.05
Interpretation of the p-value	significant

4. Discussion

The main point in this paper is to compare the influence of team-based learning activities into the academic performance and the success rate in a STEM college course devoted to physical foundations of computer networks. This is done by comparing the results obtained in the past academic year with those in the current academic year, based on the statistics calculated in the previous tables [14].

Table 1 shows the average marks per teaching unit, where there are increments in all five cases. In fact, the increment rate keeps growing as the teaching units go by, reaching a steep rise in the last one. Specifically, the increase is about 10% in the first four teaching units and about 20% in the last one. This fact indicates that the new system had a positive impact in the academic performance by clarifying concepts to the course attendants, especially in the last teaching unit of the course.

Table 2 exhibits the academic performance in the whole course, thus considering the average of the five teaching units composing the course. There is an increment of around 12%, which reinforces the fact that the new system had a positive impact in the overall academic performance.

Table 3 displays the success rate obtained at the end of the course, where an increment of 10% has been experienced. This fact reveals that the implementation of the new system implied a fairly high rise in the students being fit enough to pass the course, which strengthens the idea that the new system got the students more prepared.

Table 4 exhibits the dispersion of the results obtained with respect to the mean point. Specifically, variance and standard deviation got reduced nearly

4% and 2%, respectively, whereas the coefficient of variation got shrunk around 12,50%, namely one eighth. These facts reflect that the distribution of marks got closer to the mean value in the current year. Hence, considering that the mean results have been risen as stated in Table 2, it can be said that a great proportion of the students got better marks due to the implementation of the new system. Furthermore, both coefficients of variation were located under 0.30, which is taken as the limit for moderate variability of the data considered.

Table 5 shows the outcome of the Cronbach's Alpha, which accounts for the reliability and internal consistency of the marks obtained. The values obtained in both years ranged between 0.8 and 0.9, which implies good internal consistency and reliability, along with a high correlation degree among the marks obtained in both years. Furthermore, there has been an increase of around 4%, thus the new system provided more internal consistency of the marks attained.

Table 6 displays the relevant statistics for the distribution of the marks in both years in order to apply the t-test for inferential statistics purposes. In this context, the distribution of the marks obtained in each year is considered as a sample. This way, the measurements shown therein are all referred to a given sample, such as its number of items, its mean and its standard deviation.

Table 7 shows the application of a two-sided t-test to the distribution of the marks in both years. It is to be noted that, regardless of the type of hypothesis proposed, the process to undertake a significance test is always the same, such that it just contains four basic steps. The first step is to state the null and alternative hypotheses, the second step is to collect and summarize the data, the third step is to use the test statistic to find out the p-value, and the fourth step is to interpret the p-value [15].

Generally speaking, the null hypothesis usually states that two samples belong to the same population, whereas the alternative hypothesis usually states that two samples belong to different populations. Hence, focusing on the data studied in this paper, the null hypothesis corresponds to the case where the distributions of marks referred to both years belong to the same population, meaning that there is not a significant change in the marks due to the new system put in place. Otherwise, the alternative hypothesis corresponds to the case where the distribution of marks related to both years belong the different populations, meaning that there is indeed a significant difference in the marks because of the new system established.

With respect to the collection and summarization of data, it has already been contemplated in the previous Tables from 1 to 5, whereas the relevant data to apply a student's t-test have been displayed in Table 6. It is to be reminded that a t-test is a statistical test

used to find out if the difference between the responses of two samples or groups is statistically significant, or otherwise.

At that point, the way to obtain the p-value is to calculate the t-student value out of the two samples involved by considering their number of items, their means, and their standard deviations. After that, the p-value is taken out of the t-distribution regarding the t-student value, the degrees of freedom and the number of tails considered.

It is to be noted that the degrees of freedom are taken as the addition of the number of samples minus one item per sample. Moreover, it has been considered a two-tailed test, such that the critical area of the t-distribution is two-sided, thus it is tested if the estimated value goes higher or lower than a certain range of values. This is more appropriate in order to determine if there is a statistically significant difference between the groups involved. In other words, the two-tailed test searches for a change in a given parameter, no matter if this is an increase or a decrease, whereas the one-tailed test searches for either an increase or a decrease in a given parameter.

Once the p-value is obtained, it is compared with the s-value, also known as alpha value, and if the p-value is lower than the s-value, then we would reject the null hypothesis and we would accept the alternative hypothesis. Otherwise, we would fail to reject the null hypothesis, so we would not accept the alternative hypothesis.

In this case, as the p-value is lower than the s-value taken, then we may interpret the p-value as significant, thus meaning that the outcome obtained could happen too frequently, such that we can be confident that the new system had an effect on academic performance. In other words, the chances that the outcome obtained happened by chance can be neglected, as the result obtained is statistically significant.

In summary, a t-test has been performed involving the distribution of the final marks from both academic years. This way, if the p-value reported is less than 0.05, then it can be said that the result obtained is statistically significant. Otherwise, if the p-value is greater than 0.05, then it can be said that the result obtained is statistically insignificant. Focusing on the data studied in this paper, as a significant result has been obtained in the t-test, then it implies that the two samples compared belonged to different populations, because the difference in marks between both academic years was significant in statistical terms.

Therefore, as the result of the t-test with the distribution of marks in both years, which ended up being statistically significant, it was revealed that there has been a significant improvement in the overall marks in the year where the new method for team-based learning activities was implemented.

5. Conclusions

In this paper, a study about an enhancement of a team-based learning activity in a college course on physical foundations of computer networks has been exposed. Last academic year, such an activity was proposed where each team had a coordinator or team leader who was in charge to distribute a set of problems among the member of the team, and eventually, collect their solutions and submit them through an LMS to the teachers. However, we suspected that some students did not get fully involved, so in the present academic year, we improved the system by asking for evidence that all members actively participated in the activity.

In order to make sure that the new system accounted for better outcome regarding academic performance and success rate, we undertook a statistical treatment of the results obtained in this course regarding the current and past academic year.

With respect to the average marks per teaching unit, there was a growth in the increasing rate along the course. In this sense, the four first teaching units experienced a rise of around 10%, whilst the fifth one experienced a rise of around 20%, where this last steep rise was due to its inherent difficulty which was partly overcome due to the new system. As a consequence, the average academic performance during the course experienced a rise of around 12%, along with a rise in the success rate of 10%.

Furthermore, the dispersion statistics were reduced, which meant that a bigger proportion of marks were located around the central point of the distribution of marks, while less marks were located far away from that point. Moreover, the coefficients of variation got under 0.30, which accounted for the boundary of the region of moderate variability. Additionally, the reliability and internal consistency of the data obtained were calculated by the Cronbach's Alpha, whose results were increased with the new system, although both sets of marks fell under the interval range of good reliability.

Eventually, the t-test was applied to the distributions of the marks obtained in both academic years in order to check whether the differences in marks were significant or otherwise. The p-value obtained got under the significant value, which was set to 0.05, hence it could be concluded that the difference in marks was statistically significant. Therefore, the implementation of the new system led to a statistically significant improvement in the results obtained during this academic year compared to those obtained during the past one.

6. References

[1] Maldonado-Trapp A., and Bruna C. (2024). The Evolution of Active Learning in Response to the Pandemic:

The Role of Technology. *Advances in Experimental Medicine and Biology*, 1458, 247-261.

[2] Borte, K., Nesje, K., and Lillejord, S. (2020). Barriers to student active learning in higher education. *Teaching in Higher Education. Critical Perspectives*, 28(3), 597-615.

[3] Torralba, K.D., and Doo, L. (2020). Active Learning Strategies to Improve Progression from Knowledge to Action. *Rheumatic Disease Clinics of North America*, 46(1), 1-19.

[4] Anosova, A., Horpynchenko, O., Bulavina, O., Shevchuk, H., and Valentieva, T. (2022). The use of active learning methods for lifelong education. *Journal for Educators, Teachers and Trainers*, 13(3), 260-273.

[5] Hartikainen, S., Rintala, H., Pylväs, L., and Nokelainen, P. (2019). The Concept of Active Learning and the Measurement of Learning Outcomes: A Review of Research in Engineering Higher Education. *Education Sciences*, 9(4), 276.

[6] Burgess, A., van Diggele, C., Roberts, C., and Mellis, C. (2020). Team-based learning: design, facilitation and participation. *BMC Medical Education*, 20, 461.

[7] Parmelee, D., Michaelsen, L.K., Cook, S., and Hudes, P.D. (2012). Team-based learning: a practical guide: AMEE guide no 65. *Medical Teacher*, 34, 275-287.

[8] Flores-Cohaila, J.A., Moreno-Coama, V.P. Baca-Quispe, A.L., López-Ayquipa, A.M., Paz-Gammarra, F.A., Alfaro-Peña, P.V., and Copaja-Corzo, C. (2024). The constituents, ideas, and trends in team-based learning: a bibliometric analysis. *Frontiers in Education*, 9, 1458732.

[9] Roossien, L., Boerboom, T.B., Spaal, G.W., and de Vos, R. (2022). Team-based learning (TBL): Each phase matters! An empirical study to explore the importance of each phase of TBL. *Medical Teacher*, 44(10), 1125-1132.

[10] Sterpu, I., Herling, L., Nordquist, J., Rotgans, J., and Acharya, G. (2024). Team-based learning (TBL) in clinical disciplines for undergraduate medical students - a scoping review. *BMC Medical Education*, 24(18), 018.

[11] Vlachopoulos, P., Jan, S.K., and Buckton, R. (2021). A Case for Team-Based Learning as an Effective Collaborative Learning Methodology in Higher Education. *College Training*, 69(2), 69-77.

[12] Darby, S., O'Hanlon, D., Casterton, S., Harding, N., O'Brien, A.M., Quinn, G., Urmeneta, O., and Tweddell, S. (2023). Improved learning outcomes and teacher experience: A qualitative study of team-based learning in secondary schools. *Social Sciences & Humanities Open*, 8(1), 100590.

[13] Polytechnic University of Valencia. Spanish grading system, <https://www.upv.es/entidades/OPII/infoweb/pi/info/1147768normali.html> (Access Date: 26 December 2024).

[14] Roig, P.J., Alcaraz, S., Gilly, K., Bernad, C., and Juiz, C. (2024). Design and Assessment of an Active Learning-Based Seminar. *Education Sciences*, 14(4), 371.

[15] Dahiru, T. (2008). p-value, a true test of statistical significance? A cautionary note. *Annals of Ibadan Postgraduate Medicine*, 6(1), 21-26.

Enhancing ICT Skills of Pre-Service Teachers using Multimedia Package

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Abstract

Education in contemporary times has become more technology-oriented, especially after COVID-19. The twenty-first century has witnessed an accelerated growth in technology and its applications. For teaching and instructing, teachers need to harness these technological tools to retain the interest of the students in the learning process. The technological developments are posing challenges for teachers as these technologies are far more sophisticated. Teachers in the modern era ought to know how to use Web 2.0 tools for educational purposes, for sharing information, online collaboration, and accessing and assessing information to guide students to accomplish learning goals. Multimedia provides an optimal tool as it presents text, graphics, videos, and active links, making learning interactive and engaging. Multimedia presents a priming feature to make learning interactive and relevant to the students in a technologically driven world. It is important that teachers have these important ICT skills are required in the technology-driven 21st century to reflect the best practices of "Web-enhanced" education (March, 2009). The study was conducted in the teacher education institutes in India, and a perception scale and lesson plans were used to answer the research questions like how multimedia helps in acquiring ICT skills among pre-service teachers for teaching and learning in the technological world. Some of the major findings of the study indicate that multimedia packages were found to be effective in developing ICT skills like skill of data processing, skill related to accessibility of technology, skill related to technology integration, skill related to media design, skill of collaboration and communication, and skill related to web-enhanced learning environment among pre-service teachers, an important skill in the present world.

Academic Integrity and Individual Accountability in Collaborative Assessments: Practitioner Views of Higher Education STEM Faculty

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Abstract

Despite research indicating the positive impact of collaborative assessment and group testing practices for students of varied disciplines, higher education STEM faculty have expressed reservations on its use, particularly for a lack of individual learner accountability and a belief that it promotes prevalent academic integrity issues. This study explores the experiences of university faculty who have previously implemented collaborative assessments in their STEM courses. Interviews of five (5) STEM faculty were analyzed using thematic analysis; findings indicate that hesitance to implement collaborative assessment practices extends beyond academic integrity concerns, effective mitigation is already in place should academic integrity issues arise, and a deep-seated philosophy rooted in various fears and uncertainties surrounding individual accountability in collaborative pedagogical and assessment practices drive skepticism among other faculty. In addition, the practicing higher education STEM faculty called for a paradigm shift in how STEM is taught in order to overcome the hesitance in implementing collaborative assessment and group testing.

1. Introduction

When asked about the nature of collaboration, Sir Ken Robinson commented how “in the work world, collaboration and teamwork are essential to success,” but in school, “it’s called cheating.” For decades, faculty have utilized collaborative assessment group testing across higher education in different disciplines, but its use was limited. Although it provided an alternate means of evaluation, with many benefits to students, collaborative assessment also created headaches for faculty with many questions of individual accountability and academic integrity.

The pandemic-induced pivot to remote online learning forced faculty of all disciplines to move to different modalities of assessment and evaluation, often venturing into practices involving group dynamics. In addition, conditions required for education during the pandemic made academic

integrity a key point for educators resisting the move to online assessment and evaluation. With the rise of collaborative assessment and group testing at this time, because of its ease of implementation in the online and hybrid learning environment, concerns regarding academic integrity have arguably tainted its use in the eyes of many faculty, particularly in STEM fields.

Although questions about accountability and integrity are prevalent, research on collaborative assessment has been primarily limited to class activities. Therefore, this study seeks to explore experiences of higher education faculty using collaborative assessment in STEM courses and their perceptions of academic integrity, individual accountability, and degree to which the use of collaborative assessment and testing is legitimized and normalized in their field.

2. Literature Review

Studies on the efficacy of group work have been mixed at best, with the focus being on the challenges that group dynamics poses on collaborative-based forms of assessment and the difficulties in treading the line between what constitutes authentic collaboration and cheating. There has been limited research on how academic integrity issues can be mitigated in group settings.

2.1. Challenges of Group Dynamics

Group dynamics has long played a pivotal role in perceptions of the efficacy of any collaboratively inspired pedagogy in colleges and universities. Research has shown that student and instructor perceptions are rooted in preconceived notions and experiences of working as a team in various group settings. Faculty perspectives have implications on the extent of students’ entrenched beliefs about how chemistry and science work for the duration of their academic experience [1]. Hamnett et al., identified group work as particularly important for postgraduate science students as it provided opportunities for those

from diverse cohorts to get familiar with each other's experiences and build their confidence [2].

Research indicates that strategies for implementation of group work can favor skill development for students through a supportive work environment; this has been shown to promote a more positive attitude as well as perceived greater benefits to their own skill development than their peers who operated in an unsupported work environment [3], although participating in unsupported group activities benefits students by developing their organizational skills.

However, it can be frustrating to work in teams; some members may not fulfil their responsibilities and higher achieving students could potentially be grouped with those who are less capable [4]. The phenomenon of social loafing is widespread: students often work harder individually than when placed in groups to work collaboratively [5]. Social loafing is prevalent in the workplace, classrooms and laboratories as well as learning groups in both online and face-to-face environments [6].

Likewise, concerns exist about equitable collaboration or groups in which one individual tends to dominate [7]. However, research has indicated that instructor support of emerging leaders in the course and efforts towards minimizing the problem of free riders can alleviate this issue [8].

2.2. Collaboration vs. Cheating

The division between cheating and collaboration has limited research at this point, focusing more on the mechanics of student cheating. Collaborative assessment has been viewed as practices that could create academic integrity issues. In addition, students in higher education STEM courses collaborate much less than those in liberal arts or humanities. Miro Julia and Lopez point to the need to rethink this "collaborative-cheating border", considering faculty concerns of cheating in the computer science discipline.[9] They point to the relativism that is practiced when determining what constitutes cheating: professors' opinions of whether helping a student that is stuck on an individual assignment constitutes cheating or a valid means of collaboration and cooperative learning.

Issues surrounding the assessment of individual performance within a group setting have long triggered resistance from parents and students alike [10]. Additionally, the impact of any potential cheating in that environment is found in anti-cheating measures employed in courses where AI is being used [11]. How faculty and students view what constitutes academic dishonesty and where this collides with genuine collaboration has fueled debate on the merits of collaborative assessments [12], particularly when faculty are asked to differentiate between collaboration and cheating [13]. While previous

research had linked cheating with competition, collaboration across various studies was found to have potential for cheating behavior with students, something that appears to be culturally specific in nature [14]. Few studies on collaboration versus cheating in academic environments exist [15],[16].

Researchers have proposed adopting collaborative assessment to improve alignment between instruction and assessment, especially in STEM courses preparing students to thrive in the scientific enterprise [17]. In addition, faculty reported having concerns about "unintended collaboration" [18] because of collaborative testing; similar concerns about inflation of grades were reduced by the use of weighted grades [19]. Collaborative assessment, however, has been shown to encompass more than just correct answers. Studies show that more than half of students with incorrect answers prior to collaboration were able to obtain the correct answer following collaboration indicating the positive educational efficacy of collaborative assessments [16].

2.3. Mitigating Academic Integrity Issues

Academic integrity issues can be alleviated by ensuring that an appropriate number of students, about five to six members in a group, is formed. Research indicates that smaller groups tend to have less participation [20]. Providing enough time for both individual and group answers allows for more accountability and adequate time to complete both aspects of the test [20]. Newton et al. posits that a grading system with individual and group components, with subsequent weighting allocated by the instructor, promotes individual preparation and rewards for a strong individual performance while simultaneously incentivizing contribution to the group effort [21]. Stearns allowed for two-thirds of the exam grade to come from individual and one third from collaborative efforts [20].

Teacher perspectives on the efficacy of any assessment practice is also fundamental to embracing innovation in this realm. Woodbury and Gess-Newsome proposed a Teacher-Centered Systemic Reform (TCSR) model that highlights the lasting effects of teachers' knowledge and beliefs on their subject matter, pedagogy, and motivation to participate in curriculum reform efforts both within their own classrooms as well as in various institutional contexts [22]. In citing the effect of "paradox of change without difference," the model highlights the importance of alignment with teacher beliefs about content or pedagogy; any reform is bound to fail without it.

3. Methods/Research Methodology

This study seeks to examine where instructors are as far as their perceptions of academic integrity and

individual accountability within collaborative testing environments in higher education STEM courses. It seeks to add to the limited research on the relationship between faculty perceptions and their hesitance to implement these practices.

3.1. Research Questions

This study seeks to explore the following question: “What are the perceptions of collaborative assessment practitioners in higher education STEM on the role that academic integrity and individual accountability play in an environment where hesitance to implement prevails?”

3.2 Setting and Participants

A virtual conferencing app was used for all interviews to record responses for later analysis and align with best practices for observation of tone and body language [23], which Sturges and Hanrahan found did not change outcomes of the study when using a telephone versus face-to-face interviews. [24] Interviews followed a semi-structured protocol.

A survey was sent to STEM faculty; five (5) participants additionally consented to participate in a semi-structured interview conducted via video conferencing software. These faculty teach STEM courses using a collaborative assessment protocol. Three participants were female and two male from biology, geosciences, statistics, physiology, and chemistry.

3.3 Analysis

Thematic analysis was utilized to draw out emerging patterns using Creswell’s process of eliciting codes from interview transcripts, then analyzing and grouping into themes [25]. Merriam and Tisdell describe the constant comparative method where codes are continually compared with one another in a process that triggers more elaborate codes from those found initially [26]. The data were copied into *Microsoft Excel* where the codes can be more focused and where the themes that emerged can be subsequently grouped.

4. Results and Discussion

Two main themes emerge from interviews with STEM faculty who are practitioners of collaborative assessment and group testing: 1) Academic integrity issues can be reasonably mitigated and 2) Implementation is rooted in a more deep-seated philosophy regarding pedagogy. Additionally, the interviewees point to a need for a paradigm shift to overcome this hesitance to implement an otherwise efficacious practice.

4.1. Academic Integrity Issues Mitigated

The findings of this study align with research on faculty perceptions of collaborative assessment and group testing that cited concerns about academic integrity but suggested that it is not an issue if a serious effort is made to minimize or alleviate it [18],[19]. Furthermore, they exhibited a keen awareness of its presence in the classroom and have shown considerable willingness to mitigate it. An emphasis on the individual accountability built-in to group assessments as well as having a large percentage of students’ grades still being based on individual work is at the core of this mitigative approach.

Instructors faced the academic integrity issues emerging in higher education and specifically from collaborative assessment practices, with realistic expectations that it is an undesirable part of teaching that cannot be easily ameliorated. However, they remain cognizant that putting in an appropriate amount of effort helps moderate instances of perceived cheating.

In Katie’s (geosciences) experience, trusting students is something she learned to value in her efforts to maintain academic integrity in her courses. She spoke of the emotional toll and her experience of anger when students do cheat is compounded by what she feels as students taking advantage of their instructors and feeling let down. That feeling turns to fear for Reanne (statistics) who is aware that the preponderance of artificial intelligence (AI) has only made the situation worse. She still prefers to focus on maintaining high engagement levels for her students in the collaborative assessment practices; she feels that academic integrity issues arise when group members become disengaged. Adley (physiology) shared similar awareness of his colleagues’ concerns for an increase in “*parasitism*” in the collaborative assessment model, as well as expressing worry that technology used to enhance collaboration may be inadvertently fueling the academic integrity fire.

“To do the collaboration effectively requires.. doing (it) through electronic means.... that also requires the students have access to their laptop throughout... and then there’s the whole concern about whether they are just going to Google answers to questions.” (Adley)

Adley uses higher-order thinking questions during the group exams to alleviate students having access to electronic tools and devices during the exam. For Katie, academic integrity issues are minimized when instructors are clear with their expectations for students in so far as what can be shared within the assessments as well as the appropriate way of sharing credit for the responses. Adley added that his group exam protocol has included students being explicitly told that while they can discuss the questions, there

cannot be sharing of complete answers. While both the student groups and the instructor took on added responsibility in getting more seemingly unwilling participants to engage in her group exams, Louise (chemistry) believed that having individual components to those exams actually *“skirted the academic integrity concerns.”* Gerald (biology) and Adley stated that the conflict between the obligation of institutions of higher learning to elicit individual competence out of their students and the need to prepare them for workplace collaboration certainly needs more attention. Adley took a firmer resolve, saying in part that *“I certainly realized there can be parasitism (here).... but I'm not prepared to throw out the whole collaborative model because there's a handful of people abusing the system.”*

Gerald believes that collaborative assessment allows for individual accountability and has an affordance built-in to the model. Reanne pointed to various *“small things”* that support the existing individual accountability components such as the point distribution system she uses to hold students more accountable to the group. She is convinced that collaborative assessment actually *“fights cheating since a whole group would be very unlikely to cheat.”* Louise's students and colleagues have been more receptive to collaborative exams with individual components being written first to demonstrate knowledge. Likewise, Adley stated that incorporating more individual components to a group exam makes collaboration better. Adding to his efforts to build more individual *“nature”* back into his collaborative exams, his students are required to decide for themselves how they are going to answer each individual question. He posited that it did not become a *“group exam”* in the strictest sense of the phrase, since there was only one exam that the whole group submitted. Gerald finds that allocating percentages helps legitimize the practice since some instructors may not think it is fair to give a grade for collaborative assessment. Reanne and Louise are more comfortable with combining the individual part of the exam with the group effort. In her experience, Louise finds combining group and individual scores benefits the students without penalizing them if the group dynamics were not ideal. This adds a *“cushion”* to the individual score that she argued, generates more individual accountability, and helps maintain academic integrity.

4.2. Hesitance Rooted in Fears and Uncertainty

Faculty interviewed suggested that colleagues hesitant or dismissive of collaborative assessment

practices are also concerned for their own accountability for student learning knowledge and skills required. Despite reassurances that academic integrity issues can indeed be mitigated in this environment, the unanswered questions regarding individual accountability in their roles as course instructors continue to feed hesitance and uncertainty.

Participants pointed also to faculty fearing both a loss of control as a teacher as well as uncertainty regarding the future of collaborative assessment with implementation barriers. This confirmed findings by Marks and O'Connor about the motivations of instructors about any process involving student collaboration [27]. Participants cited lack of confidence and the fear of losing credibility in front of the classroom as reasons driving this hesitance. Katie posited that this fear often drives faculty to embrace pedagogy that is within their *“comfort zone”* when their attempts at trying something new somehow fail.

“The fear is appearing vulnerable, like you don't know what you're doing. Some faculty can recover from making a mistake in classes, and some can't, and....when there's failure..., they think that they're gonna lose all.. credibility.” (Katie)

Gerald posited that there are also faculty fears stemming from a mistaken belief that most students are not fans of collaborative assessment. But Reanne agreed that this fear also extends to a loss of autonomy as far as individual assessment goes. *“I think some instructors might be scared to let go of (Individual assessments) ...,and (that)...it's not fair to give a grade for collaborative efforts.”* (Reanne)

Uncertainty also appears to drive faculty's hesitance to embrace collaborative assessment practices. Katie spoke of the uncertainty she sees other faculty share regarding whether student understanding was getting truly assessed this way. Adley pointed to not being completely sure that collaborative assessment was helping students, as some have told him that it did, but others would not say otherwise. On the other hand, Louise channeled this same doubt by some veteran educators (on whether collaborative assessment will work) who she said were used to *“doing things a certain way.”* She added that they may need to make some adjustments to their professional outlook to make this new pedagogy work for them.

“It does take..courage to try something new, something...you've never experienced as a student.... I don't know how you give people courage beyond trying to get out good research...that this is... important because of the impacts it has on your students and (that) you..should...give it a shot.” (Louise)

The instructors also spoke about how the uncertainty surrounding whether collaborative assessment and group testing will ever become part of the traditional evaluation for STEM courses.

According to Louise, this lack of optimism is prevalent in higher education circles. She is one of two people actively involved with it in her college. Physiology professor Adley said that rampant skepticism from colleagues regarding collaborative assessment practices is nothing new, despite his numerous individual conversations about it. He said in part that whenever he spoke to his colleagues “about what I’m doing, most of them would just give (me) that strange look like, “I would never do that.”

5. Conclusion

Addressing the legitimate reasons for faculty ambivalence towards collaborative assessment serves the collective interests of all stakeholders in higher education and discourages hesitance towards group testing. It also allows for an attempt at implementation without setting it up for failure in the process. This study found that accountability and academic integrity were foundational in this hesitance. In addition, collaborative assessment has been perceived in the past as faculty ceding control of the evaluation process to the student learners. Faculty utilizing collaborative assessment feel that it makes every stakeholder in the learning process more accountable to each other, while elevating evaluation from beyond a mere check of rote learning to enabling instructors to assess for higher-order thinking skills in the STEM disciplines where students stand to benefit the most.

Practitioners in higher education STEM courses emphasized that while instructors are free to devise their own ways of ensuring accountability and minimizing loafing in collaborative testing, they must also allow for opportunities to work out its inevitable kinks. When faculty outright dismiss collaborative assessment for its flaws without allowing opportunity for improvements, the potential affordances that come with it are greatly diminished, to the detriment of learners and instructors alike.

6. References

- [1] Smith, K. C., and Sepulveda, A. (2018). Students’ perceptions of common practices, including some academically dishonest practices, in the undergraduate general chemistry classroom laboratory. *Chemistry Education Research and Practice*, 19(4), 1142–1150. DOI: 10.1039/C8RP00058A.
- [2] Hamnett, H. J., McKie, A. E., and Morrison, C. (2018). Postgraduate students’ attitudes towards group work: Experiences within a forensic chemistry programme. *Chemistry Education Research and Practice*, 19(4), 1240–1252. DOI: 10.1039/C8RP00126J.
- [3] Natoli, R., Jackling, B., and Seelanatha, L. (2014). The impact of instructor’s group management strategies on students’ attitudes to group work and generic skill development. *Pedagogies*, 9(2), 116–132. DOI: 10.1080/1554480X.2014.912519
- [4] Grzimek, V., Marks, M. B., and Kinnamon, E. (2014). Do Differences in GPA Impact Attitudes About Group Work? A Comparison of Business and Non-Business Majors. *Journal of Education for Business*, 89(5), 263–273. DOI: 10.1080/08832323.2013.872591
- [5] Karau, S. J., and Williams, K. D. (1993). Social Loafing: A meta-analytic review and theoretical integration. *Journal of Personality and Social Psychology*, 65(4), 681–706. DOI: 10.1037//0022-3514.65.4.681.
- [6] Piezon, S. L. (2011). Social loafing and free riding in online learning groups [Ph.D., The Florida State University]. In *ProQuest Dissertations and Theses*. <https://www.proquest.com/docview/897114500/abstract/D120FE02B6D740C7PQ/1> (Access Date: 29 July, 2025).
- [7] Theobald, E. J., Eddy, S. L., Grunspan, D. Z., Wiggins, B. L., and Crowe, A. J. (2017). Student perception of group dynamics predicts individual performance: Comfort and equity matter. *PLOS ONE*, 12(7), e0181336. DOI: 10.1371/JOURNAL.PONE.0181336.
- [8] Rudawska, A. (2017). Students’ Team Project Experiences and Their Attitudes Towards Teamwork. *Journal of Management & Business Administration. Central Europe*, 25(1), 78–97. DOI: 10.7206/JMBA.CE.2450-7814.190.
- [9] Miró Julià, J., and López, D. (2013). Rethinking the collaboration-cheating border. *Proceedings of the 18th ACM Conference on Innovation and Technology in Computer Science Education*. DOI: 10.1145/2462476.2465603.
- [10] King, P. E., and Behnke, R. R. (2005). Problems Associated with Evaluating Student Performance in Groups. *College Teaching*, 53(2), 57–61.
- [11] Goldberg, D. (2021). Programming in a pandemic: Attaining academic integrity in online coding courses. *Communications of the Association for Information Systems*, 48, 47–54. DOI: 10.17705/1CAIS.04807.
- [12] Amzalag, M., Shapira, N., and Dolev, N. (2021). Two sides of the coin: Lack of academic integrity in exams during the Corona pandemic, students’ and lecturers’ perceptions. *Journal of Academic Ethics*, 20(2), 243–263. DOI: 10.1007/S10805-021-09413-5.
- [13] Deale, C. S., (Jenna) Lee, S. H., (Stephanie) Bae, J.-I., and White, B. J. (2019). An exploratory study of educators’ and students’ perceptions of collaboration versus cheating in Hospitality and Tourism Education. *Journal of Teaching in Travel & Tourism*, 20(2), 89–104. DOI: 10.1080/15313220.2019.1679695.
- [14] Jamaluddin, S. F., Adi, S. P., and Lufityanto, G. (2021). Social influences on cheating in Collectivistic Culture: Collaboration but not competition. *Group Dynamics: Theory, Research, and Practice*, 25(2), 174–189. DOI: 10.1037/GDN0000122.

- [15] Jang, H., Lasry, N., Miller, K., and Mazur, E. (2017). Collaborative exams: Cheating? Or learning? *American Journal of Physics*, 85(3), 223–227. DOI: 10.1119/1.4974744.
- [16] Sheard, J., Dick, M., Markham, S., Macdonald, I., and Walsh, M. (2002a). Cheating and plagiarism: perceptions and practices of first year IT students. *Proceedings of the 7th Annual Conference on Innovation and Technology in Computer Science Education*. DOI: 10.1145/544414.544468.
- [17] Siegel, M., Roberts, T., Freyermuth, S., Witzig, S., and Izci, K. (2015). Research and teaching: Aligning assessment to instruction: Collaborative group testing in large-enrollment science classes. *Journal of College Science Teaching*, 044(06). DOI: 10.2505/4/JCST15_044_06_74.
- [18] Lewis, S. E. (2020). Chemistry assessments through the sudden implementation of online instruction. *Journal of Chemical Education*, 97(9), 3418–3422. DOI: 10.1021/ACS.JCHEMED.0C00697.
- [19] Bloom, D. (2009). Collaborative test taking: Benefits for learning and retention. *College Teaching*, 57(4), 216–220. DOI: 10.1080/87567550903218646.
- [20] Stearns, S. A. (1996). Collaborative Exams as Learning Tools. *College Teaching*, 44(3), 111–112.
- [21] Newton, G., Ritchie, K., Albabish, W., Gilley, B., Rajakaruna, R., and Kulak, V. (2019). Research and teaching: Two-stage (collaborative) testing in science teaching: Does it improve grades on short-answer questions and retention of material? *Journal of College Science Teaching*, 048(04). DOI: 10.2505/4/JCST19_048_04_64.
- [22] Woodbury, S., and Gess-Newsome, J. (2002). Overcoming the Paradox of Change without Difference: A Model of Change in the Arena of Fundamental School Reform. *Educational Policy*, 16(5), 763–782. DOI: 10.1177/089590402237312.
- [23] Opdenakker, Raymond (2006, August). Advantages and Disadvantages of Four Interview Techniques in Qualitative Research [44 paragraphs]. Forum Qualitative Sozialforschung / Forum: Qualitative Social Research, 7(4), Art. 11, <http://nbn-resolving.de/urn:nbn:de:0114-fqs0604118> (Access Date: 29 July, 2025).
- [24] Sturges, J. and Hanrahan, K. (2004). Comparing Telephone and Face-to-Face Qualitative Interviewing: a Research Note. *Qualitative Research*. 4(1):107-118. DOI: 10.1177/1468794104041110.
- [25] Creswell, J. W. (2014). *Educational research: Planning, conducting and evaluating quantitative and qualitative research*. Pearson.
- [26] Merriam, S. B., and Tisdell, E. J. (2017). *Qualitative research: A guide to design and implementation*. Langara College.
- [27] Marks, M. B., and O'Connor, A. H. (2013). Understanding Students' Attitudes About Group Work: What Does This Suggest for Instructors of Business? *Journal of Education for Business*, 88(3), 147–158. DOI: 10.1080/08832323.2012.664579.

Session 6: Learning and Teaching Methodologies and Assessment

Title: Improving Standard Setting Accuracy through Variance Component Analysis:
A G-Theory-based Approach for Assessing Rater Consistency in High-Stakes Medical Examinations
Authors: Hussein Abdellatif, Mohamed-Rachid Boulassel

Title: Active Learning And Cooperative Instructional Strategies: A Panacea for Secondary School Students' Academic Achievement and Retention in Physics in Uyo Educational Zone, Akwa Ibom State, Nigeria
Authors: Patience C. Agommuoh, Bassey Ezekeil Udoudo, Ursula N. Akanwa

Title: The Interaction of Resilience, Autonomy, and Stress Among Teachers During Times of Educational Reform
Authors: Ausra Rutkiene, Ilona Tandzegolskiene-Bielaglove

Improving Standard Setting Accuracy through Variance Component Analysis: A G-Theory-based Approach for Assessing Rater Consistency in High-Stakes Medical Examinations

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1. Introduction

In medical education, standard settings require precise approaches to establish defensible cut scores. While the Modified Angoff method is somewhat popular, enhancing judgment accuracy relies on understanding the impact of various variance components on rater consistency. This work investigates how variance component analysis, utilizing Generalizability Theory (G-theory), can enhance our understanding of raters' practice and improve the precision of cut score determination. Rater-dependent standard settings were implemented in two successive cycles. One cycle was conducted without test data exposure, while the other was conducted after raters were exposed to empirical test data to refine their cut-off scores accordingly. The results were reviewed and analyzed.

2. Methods

A quantitative comparative design was used to statistically analyze a standard setting cut-off score for one of the undergraduate courses (Uro-reproductive course for phase II medical students). The relative contributions of raters ($n=12$), items ($n=150$), and their interactions to the total score variance across two rounds were assessed through variance components analysis based on G-theory. The study aimed to identify the primary factors influencing rater consistency and the accuracy of their decisions by decomposing variance sources. Classification consistency and accuracy indices were calculated to evaluate how variance components affect the reliability and accuracy of cut scores.

3. Results

Variance component analysis revealed that while item-related variance remained relatively unchanged (0.31 to 0.29), rater-related variance decreased from 0.42 to 0.28 between the two cycles. With a decline from 0.27 to 0.12, the rater-item interaction component showed a significant reduction, indicating improved consistency in item-level evaluations. In the second round, this reduction in variance components corresponded with enhanced consistency (0.90) and classification accuracy (0.96).

4. Conclusions

G-theory's variance component analysis provides valuable insights into the factors contributing to inconsistency in standard setting judgments. The significant decrease in rater-related and interaction (rater-item) variance components suggests that understanding these sources will guide targeted improvements in rater training and decision-making practices. Through a thorough examination of variance components, this approach establishes a framework for enhancing the accuracy of cut score decisions in high-stakes medical assessments.

Active Learning And Cooperative Instructional Strategies: A Panacea for Secondary School Students' Academic Achievement and Retention in Physics in Uyo Educational Zone, Akwa Ibom State, Nigeria

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Abstract

The study was carried out to examine the effect of active learning and cooperative instructional strategies on secondary school students' academic achievement and retention in Physics in Uyo Educational Zone, Akwa Ibom State, Nigeria. The study was guided by six research questions and six corresponding null hypotheses were formulated and tested at 0.05 level of significance. The study adopted quasi-experimental research design; the population of the study was 3,620 Physics students comprising 1,951 males and 1,669 females Physics students in all the public secondary schools. The sample size for the study was 127 Physics students comprising 72 males and 55 females senior secondary II Physics students selected using purposive sampling technique. Physics Achievement Test (PAT) and Physics Retention Test (PRT) were used as instruments for data collection. The instrument was validated by three experts, two from Science Education Department and one from Measurement and Evaluation. Kuder-Richardson (KR-20 and PPMCC were used to calculate the reliabilities of PAT and PRT and their reliabilities were obtained as 0.83 and 0.79 respectively. The data from the pre-test, post-test and delayed post-test were analyzed using mean and standard deviation to answer the research questions and Analysis of Covariance was used to test the hypotheses at 0.05 level of significance. The result of the data analyses revealed that: There was a significant difference in the mean achievement scores of Physics students taught using active learning method, cooperative instructional strategy and lecture method in favour of active learning method and cooperative instructional strategy. There was a significant difference in the mean retention scores of Physics students taught using active learning method, cooperative instructional strategy and lecture method in favour of active learning method and cooperative instructional strategy. There was no significant difference between the mean achievement scores of male and female Physics students taught using active learning method. There was no significant difference between the mean achievement scores of male and female Physics students taught using cooperative instructional strategy. There was no significant difference between the mean retention scores of male and female Physics students taught using active learning method. There was no significant difference between the mean retention scores of male and female Physics students taught using cooperative instructional strategy. Based on the findings, it was recommended that: Physics teachers in Akwa Ibom state should endeavor to adopt active learning and cooperative instructional strategy in secondary schools as effective instructional strategies in order to improve students' academic achievement and retention.

The Interaction of Resilience, Autonomy, and Stress Among Teachers During Times of Educational Reform

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Abstract

Educational reforms often impose increased workloads, policy changes, and accountability measures, which significantly impact teachers' stress levels [8]. Teacher resilience, defined as the ability to adapt and thrive in challenging conditions, plays a critical role in mitigating the negative effects of these stressors [2]. Autonomy, or the degree of control teachers have over their professional decisions, has been shown to enhance resilience by fostering a sense of empowerment and self-determination [1]. Research suggests that higher autonomy levels correlate with lower stress, as teachers can adapt their instructional approaches to meet individual classroom needs [7].

However, during times of reform, autonomy can be constrained by rigid policies, which may undermine resilience and exacerbate stress [4]. Resilient teachers often employ coping strategies such as flexibility, problem-solving, and seeking professional support to manage stress effectively [6]. Autonomy also enhances self-efficacy, enabling teachers to feel more competent in handling challenges [9]. Together, resilience and autonomy create a buffer against burnout, helping teachers maintain their emotional well-being and job performance [5]. Despite their importance, these factors are often overlooked in policy discussions, which tend to prioritize external accountability over internal teacher empowerment [3]. Exploring the interplay of resilience, autonomy, and stress in times of reform is essential for developing supportive strategies to sustain teachers' well-being and professional effectiveness.

The implementation of the renewed curriculum in Lithuania started in September 2023. A survey on teachers' resilience, autonomy and stress was completed in September-October 2024. 427 responses were collected. Correlation shows that there is a negative correlation between stress and autonomy, stress and resilience, however not very strong.

References

- [1] Deci, E. L., & Ryan, R. M. (1985). *Intrinsic Motivation and Self-Determination in Human Behavior*. Springer.
- [2] Gu, Q., & Day, C. (2007). *Teachers' Resilience: A Necessary Condition for Effectiveness*. *Teaching and Teacher Education*, 23(8), 1302–1316.
- [3] Hargreaves, A. (2000). *Four Ages of Professionalism and Professional Learning*. *Teachers and Teaching*, 6(2), 151–182.
- [4] Ingersoll, R. M. (2003). *Who Controls Teachers' Work? Power and Accountability in America's Schools*. Harvard University Press.
- [5] Kyriacou, C. (2001). *Teacher Stress: Directions for Future Research*. *Educational Review*, 53(1), 27-35.
- [6] Mansfield, C. F., Beltman, S., Price, A., & McConney, A. (2012). "Don't Sweat the Small Stuff": Understanding Teacher Resilience at the Chalkface. *Teaching and Teacher Education*, 28(3), 357–367.

[7] Pearson, L. C., & Moomaw, W. (2005). *The Relationship Between Teacher Autonomy and Stress, Work Satisfaction, Empowerment, and Professionalism*. *Educational Research Quarterly*, 29(1), 37–53.

[8] Skaalvik, E. M., & Skaalvik, S. (2017). *Dimensions of Teacher Burnout: Relations with Potential Stressors at School*. *Social Psychology of Education*, 20(4), 775-790.

[9] Tschannen-Moran, M., & Hoy, A. W. (2001). *Teacher Efficacy: Capturing an Elusive Construct*. *Teaching and Teacher Education*, 17(7), 783–805.

Session 7: Pedagogy

Title: Using Community-Based Learning to Teach Sociological Research Methods
Author: Kaelyn Wiles

Title: Towards the Development of Critical Thinking Framework for Enhanced Student Learning in Higher Education Institutions
Author: Fahim Ahmed

Title: Perceptions of the Factors That Influence Learner Engagement and Their Strategic Implications – A Qualitative Case Study
Author: Jeffrey O’Leary

Using Community-Based Learning to Teach Sociological Research Methods

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Abstract

This paper will share the organization, framework, and lessons learned from nine years of teaching a community-based learning course in rural Kentucky. In this course, students are introduced to the fundamentals of sociological research, and they apply their skills to collect data for community partners, culminating in a public presentation. The class has addressed important local topics such as food insecurity, the opioid epidemic, houselessness, and loneliness. Community partners have used this research to apply for grants, secure funding, and create new policies. This paper will outline an overview of the projects, the contributions of our community partners, the obstacles we encountered, and the impact of these projects on student learning.

Keywords: *community-based learning, pedagogy, houselessness, opioids, food insecurity, loneliness*

1. Introduction

I use community-based learning (CBL) in many of my courses. These projects allow students to apply the sociological imagination, challenging what they have learned about individual responsibility and revealing the social structures that constrain people's choices. I have organized and led collaborations with community partners through my Sociological Research Methods course for the past nine years. In this class, students learn the basics of sociological research and use their new research skills to collect data for our partners, culminating with community presentations. This paper will outline the methods we use as well as some of the partnerships and projects that we developed through this course. This has been a highly successful model for community-based learning that could be used by others to strengthen community partnerships and create transformative educational opportunities for students.

2. Class Organization

The research methods class is organized into five main sections. During the first month of the course,

students read a sociological research methods textbook and take online quizzes after each chapter. This gives students a foundation for understanding the methods they will use in the later parts of the course. Our community partners also visit the class during this first section of the course and help the students understand their mission and goals.

The next three sections of the course are each devoted to learning a different sociological method by collecting data for our community partners. Students go through our institution's IRB training. In most of the classes, I have had students practice ethnographic, interview, and survey methodologies. The last section of the course leads students through the process of compiling and summarizing our findings and creating a public presentation. Since the Covid-19 pandemic, I have found that students have less capacity for doing all three of these methods in a single semester and many of the courses I've taught since 2020 have only covered interview and survey methodologies.

Students have interviewed a wide range of community members through these classes. Our community partners develop a list of people they want students to interview. The students choose which individual they would like to interview and use contact information to arrange a time and place for the interview. These interviews are often conducted on campus, at the public library, or at a local coffee shop. Students record, transcribe, and de-identify these interviews and then upload them onto a database that they can all access. They learn and practice open-coding, focused-coding, and memo writing, and they turn each of these pieces in for their interview assignment.

After conducting interviews, students build on the qualitative data they have collected to develop a survey. They create survey questions in collaboration with the community partner. Students typically distribute between 50-250 hard copies of their surveys, depending on the population that they are studying. After collecting the surveys, students input the data into SPSS and learn to run descriptive statistics and some basic analyses on the survey data. Each student submits an individual survey assignment.

During the last phase of the course, students work on a group presentation. They divide themselves into two or more groups and these groups tackle different sections of the presentation. This process usually takes about a week at the end of the semester. The interview group sub-divides into a data summary group and a coding/analysis group. The survey group sub-divides into a descriptive statistics group and a data analysis group. Each student takes the lead in presenting 1 or 2 slides, and the presentation lasts for 30-45 minutes. These presentations have been a wonderful time of celebration and discussion about the data students have collected in response to community concerns. The students are careful to respectfully share what they have identified as problems, issues, and areas for improvement.

Because students are working with one community partner and one topic for the entire semester, they are able to compare methods, express a preference for one method over another, and see the benefits of using a mixed methods approach. Students also learn that research is not as straightforward as it appears in publications or in media outlets. They are confronted with various obstacles and difficulties throughout the semester and our research typically progresses non-linearly. Students not only learn the methods themselves, but they also develop skills in critical thinking and problem solving as they determine how to collect the best data possible given the constraints of the class.

3. Food insecurity

Our first community partnership was with a local café, Grace Café, to help them assess the progress they were making toward achieving their mission of ending hunger & food insecurity in Danville, K.Y. Grace Café is like any other café, except that they are a pay-what-you-can café and their primary goal is to welcome and serve their patrons healthy food in a respectful and dignified manner regardless of their ability to pay. Grace Café had applied for city funding to support the café in 2015 but were turned down because the restaurant could not provide adequate proof that it was helping the people in the city who most needed food assistance. Grace Café partnered with our research methods class because they wanted us to collect data that they could use to make another appeal to the City of Danville's Commissioners for funding. Grace Café applied for funding again in 2016 and it was granted funding for the first time, in part because of the data that our research methods class was able to help them collect.

There were three main parts to our research project with Grace Café. Students conducted observations of the café during which time they volunteered for their meals. They each conducted a 45-minute interview with either a customer or a stakeholder at the Café. After that, students administered a survey to over 200

customers. Teams of two students were assigned to hand out the surveys during all of Grace Café's open hours for the period of one week.

This was an important project for many reasons, not least of which is that it was the first and only research that we know of thus far in the United States that has been systematically collected on a pay-what-you-can Café. Students were invested in their research because they wanted to produce meaningful data for the Café and for other pay-what-you-can Cafés around the country.

One of the students who took the class in the fall loved working at Grace Café so much that she decided to do an internship at Grace Café in the spring. Another student from the class loved doing research so much that she decided to do an independent study with me to collect more data about Grace Café and practice the methods that she hopes to use one day in graduate school. She presented her findings on campus and worked together with the owner of Grace Café after the presentation to put out a press release on her findings. For a class that had been a dreaded requirement for the major with few students going on to graduate school in anthropology or sociology, this model for teaching research methods has been a substantial improvement.

4. Recovery from opioids

From 2017-2022, the research methods class partnered with the Boyle County Agency for Substance Abuse Prevention or ASAP. The mission of the Boyle County Agency for Substance Abuse Policy is to reduce the incidence of smoking alcohol, and illegal drug use in Boyle County, Kentucky. Recently, they've been focusing their attention on the opioid epidemic in Kentucky. I contacted ASAP during the summer of 2017 to see if they would like my research methods class to collect data that might be helpful to them. The opioid epidemic has been devastating in our community, and this was a perfect opportunity for a CBL class because the students would learn how to conduct research in a "real-life" setting that matters and that could help the community.

ASAP had very little funding and needed to prioritize where they spend their funds. The goal of the partnership was to collect quantitative and qualitative data that would help ASAP assess the obstacles to recovery in Boyle County and to improve the services currently offered to those struggling with addiction from opioids. Students were invested in this research, with over half of the students in the class having a close friend or family member touched by the opioid epidemic.

This has been a tremendously successful partnership. The effects of opioid addiction and other addictions have been devastating in Kentucky and across the United States and it is our hope that by

helping them to identify some of the barriers to recovery in our area, our community partners can devote the time and resources necessary for breaking them down.

5. Houselessness

During Fall 2023, we partnered with the ASAP group again to conduct research on houselessness in our community. Students gathered data by interviewing key stakeholders and surveying individuals experiencing housing insecurity. In addition to an on-campus presentation, students also made two presentations of their findings to the city council. This has been an extremely important topic in our community and there were hundreds of people watching these presentations.

6. The lonely campus

Our most recent project that was conducted in Fall 2024 was called “The Lonely Campus.” We examined post-COVID-19 loneliness among college students, drawing on the sociological literature on loneliness, belonging, and community. This was the first time that we partnered with someone on campus as our “community” partner. The research has the potential to inform current discussions on health, social connection, and civic engagement by highlighting structural causes of loneliness. It also explores how structural inequalities due to social location can contribute to feelings of loneliness and disconnection among marginalized groups on campus. This research has important implications for how institutions can better support the mental health and well-being of students from diverse backgrounds. The final presentation for this class was well attended by senior staff members and other people working in the mental health and student life offices on campus. Several students were so interested in the topic that we created an Advanced Research Methods course to continue the research the following semester.

7. Conclusion

Community-based learning has been transformative for my students and for my own teaching. I enjoy learning about local needs and priorities, and I value the relationships I have built through these community partnerships. I want to sincerely thank all of our community partners and the participants in our research. These groups have been patient, warm, and open with my students and they have shared their experiences in hopes of helping strengthen our community.

Towards the Development of Critical Thinking Framework for Enhanced Student Learning in Higher Education Institutions

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Abstract

There is extensive literature that exists on "critical thinking" in Higher Education Institutions (HEIs)," so proposing a new framework may appear redundant. However, this work focuses on adopting a practical classroom perspective on critical thinking instead of emphasizing philosophical taxonomies. The researcher identifies four key components of the framework based on student feedback collected over years of teaching. Educators often feel pressured to implement innovative technological advancements or complex pedagogical heuristics, which are valuable but should not detract from fundamental teaching methods. By integrating straightforward innovative elements into a critical thinking framework, student engagement and inclusivity can be enhanced, leading to improved learning outcomes through increased classroom interactivity. The proposed framework has shown positive results in both undergraduate and postgraduate modules, with course evaluations consistently highlighting the "interactive class" experience. Students feel engaged, and their voices are acknowledged during sessions. The paper also addresses the challenges, and future work.

1. Introduction

In the last eight years of teaching in HEI, the researcher has witnessed one important ideology:

"It is not what you teach, it is how you teach it "

This work is a basic introduction to the proposed project which focuses on a critical concept of "delivery" in HEI. It is a result of various achievements, student feedback, course evaluations, career progression, quality enhancement, and student-centred learning that the researcher has encountered throughout these years. As mentioned before, it is not difficult to search literatures on the critical thinking in HEI and how it is perceived from various stakeholders. Some notable works are discussed in [1],[2],[3],[4],[5] and although critical thinking is seen as an important aspect of teaching and learning,

little effort is devoted in mapping out the actual activities that can be linked to various aspects of critical thinking in the class. This observation has motivated this research. The project aims to provide a comprehensive toolkit for educators formed on the key aspects of critical thinking from students' perspective. The basic building blocks based on a critical thinking framework complemented by a focused sets of activities and a step-by-step educator guide is hard to find in one place. Moreover, this proposal is more towards enhancing the student experience which can effectively combine some well-established techniques into an impactful product.

2. The Framework

The Critical Thinking Framework (CTF) has the following 4 major components:

- Questions at key stages of lectures (strategically placed acting as think points)
- Open Case Discussion and examples to be linked with student experience.
- Feedback and collaborative review of assessments
- Promote active learning through sensory simulation and emotional intelligence.

The 4 components are briefly discussed below:

CTF begins with a thought-provoking question on a topic that encourages students to relate it to their experiences or previous understanding. This prompts discussion, enhancing understanding and increasing attentiveness as students feel empowered to drive the conversation.

In addition to pre-assigned case studies, CTF facilitates an open discussion for students to share their experiences in each session. This connection keeps them engaged and responsive.

In CTF, live feedback sessions are arranged where students can link their coursework to the topics studied, helping them identify strengths and

weaknesses while monitoring their progress. A recent collaborative review of a group assignment in second year class was well-received, allowing students to discuss their approach and clarify concepts in their class time.

CTF incorporates various interactive elements, such as videos and polls, to capture students' attention and stimulate their senses. Recognizing the role of emotions in learning, it conducts non-academic polls during lectures (e.g., "How are you feeling today?" or "What would you prefer to do now?") to relieve stress and uplift the student mood, ultimately helping to maintain their attention span.

3. Main activities in CTF

The main activities that can be mapped to the above 4 components of CTF are as follows:

- Critical questions (and answers) - both oral and via polling.
- Peer discussion
- Group discussion.
- Assignment review and feedback
- Video learning (and follow up questions)
- Case discussion
- Emotional intelligence monitoring (to steer the mode of class).

The above can be deployed in any order given the pace and overall environment of the class. There are various tools that can be used to support the above activities during the session. Educators are encouraged to adapt as per their comfort level and knowledge. Some activities do not require any formal tool or platform and can simply be integrated through verbal/written discussions. Few useful tools used by researchers in CTF are noted in [6].

4. Monitoring and Evaluation

CTF has completed the first stage of evaluation where the results were monitored in the second year UG class taught using CTF. The survey was conducted after 5 weeks of study (2 hours per week). Ethics protocol was completed via Departmental Ethics Committee. The registered students were 151, where 120 students were invited to participate (present at the time of survey) out of which 71 responses were recorded in the class time. The participation was voluntary and anonymous. A set of 7 questions on a 5-point Likert scale along with 1 choice question and 1 open-ended question was setup for the survey. Summary of the results are discussed below with reference to Figures 1 and 2.

From the data we have in Figure 1, the overall percentage of the "agreement" are distributed as follows:

- 53% of students were in favour of the CTF, indicating they either "agreed" or "strongly agreed" on 7 closed questions.
- 20% of students expressed disagreement in total, suggesting they either "disagreed" or "strongly disagreed".
- 27% of students did not have a strong opinion either way, indicating they neither agreed nor disagreed with the CTF.

Finally, some responses from open-ended question:

"I believe the class size is rather too big for active participation, smaller tutorial groups would create a better and more engaging environment".

"I enjoyed using this framework and I feel that the course was very helpful, and I learned a lot."

"It made the class more interactive rather than the lecturer just giving a lecture, however, majority of the students did not engage".

"Because the class is not receptive to large scale discussions, I feel that CTF is not conducive for the environment because of the wasted time waiting for people to respond. In the form of individual feedback, peer discussions, emotional intelligence polling and video learning CTF works well within the typical classroom environment. I think class discussions should be reevaluated to see if they work in a large-scale classroom, ex. 150 or more people."

"I believe that this model allows for greater student engagement, although the class could progress more quickly and cover more content, there are many moments of pause/reflection".

This distribution of opinions suggests a majority support for the CTF (53%), while also highlighting that a significant portion of students either disagreed or were neutral. This is an interesting scenario and requires further investigation, considering:

- The implications of the majority support.
- The potential reasons behind the 20% disagreement.
- Ways to engage the 27% who are neutral to understand their perspectives better or to help them form a stronger opinion.

From the open-ended question responses in Figure 2, it seems like majority of the students like the idea of critical questions (and answers) and video learning (with follow up questions) in CTF. Open-ended responses indicate that while students find the CTF useful, they recommend conducting more trials with larger classes to determine the optimal balance between CTF activities and lecture content. This

Survey Questions	CTF has increased my interest in the module	CTF has increased my level of engagement in the class.	I have better understanding of concepts learned through CTF	I feel empowered in learning through CTF (e.g. more comfortable asking/answering questions)	CTF gives fair chance of participation to all students.	CTF meets the requirements of diverse range of learners.	CTF has helped me in understanding the course work better (via feedback and review sessions on assessments)
Strongly Agree	6	4	8	6	14	9	9
Agree	30	26	35	14	38	33	29
Neither agree nor disagree	19	23	15	30	12	20	15
Disagree	12	9	8	14	5	6	12
Strongly Disagree	3	9	4	7	2	2	6
Agreement Total percentage	51.43%	42.25%	61.43%	28.17%	73.24%	60.00%	53.52%
Disagreement Total Percentage	21.43%	25.35%	17.14%	29.58%	9.86%	11.43%	25.35%
Neutral	27.14%	32.39%	21.43%	42.25%	16.90%	28.57%	21.13%

Figure 1. Summary of results for closed questions in CTF

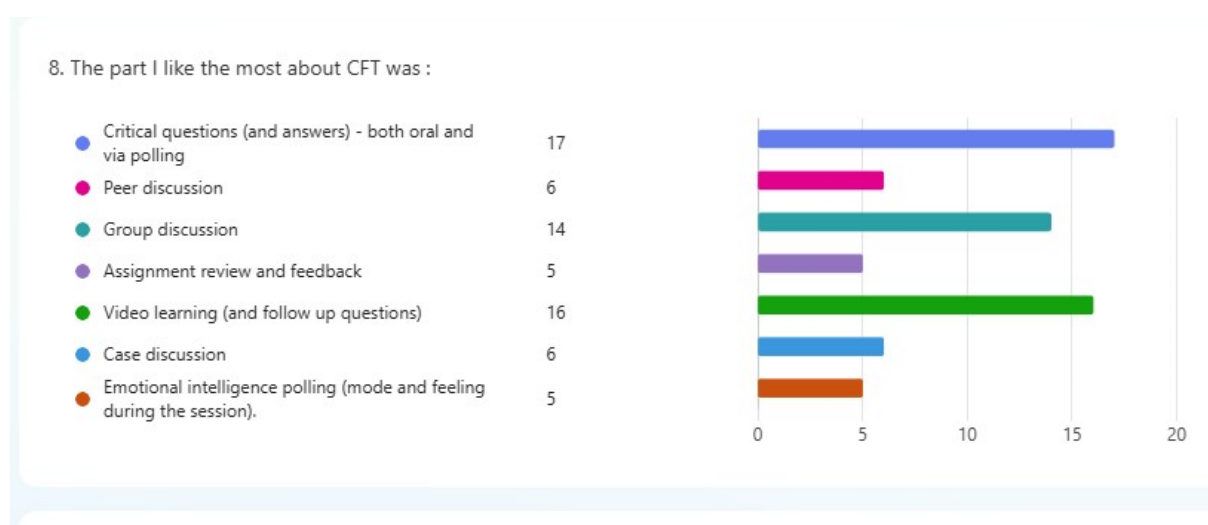


Figure 2. Summary of results for open-ended question in CTF

Initial monitoring cycle serves as a foundation for a larger investigation into critical thinking development in HEIs. Additionally, testing of the framework in a postgraduate module yielded much positive results, highlighting enhanced engagement and interactivity as key strengths. We do not have space to present the full results of post graduate survey in this paper but, it suggests differing perceptions between undergraduate and postgraduate students regarding such interventions, warranting further data collection to substantiate this observation.

5. Discussion

The current CTF, when extended and upscaled as mentioned in the previous section is expected to deliver the following results:

- Increased awareness and highlighting the importance of critical thinking in HEI for enhancing student learning experience.

- Establish evidence of critical thinking as central to the student-oriented learning.
- Empowering students in their learning by considering them as co-partners in the overall learning and teaching.
- Provide a diverse and inclusive environment so all students have fair chance to participate and learn in the class.

The benefit to be obtained from the CTF over the years are as follows:

- Practical user-guide with step-by-step deployment plan of the framework in the module, along with potential activities and assignments designs (customisable for individual scenario)
- Instructional video on how to implement the above in the Virtual Learning Environment including interactive elements like H5P,

Centimetre slide integration, Intous pen tablet, Rubric design, one-click continuous monitor/ feedback points, catchboxes and others.

- Establish a network support group for queries from wider community on implementation, and guidance for using CTF in their context and share their experiences. This will also be linked to other educational forums for blog posts and dissemination of work from range of HEI educators using CTF or similar approaches.

All the above resources will be accessible on an online digital platform (such as Microsoft Teams) and serve as a dynamic resource for members. Participants can suggest modifications, which will be reviewed periodically to facilitate continuous improvement.

6. Extension and future Work

The future work on this project can be extended as follows:

- To complete more cycle of Monitor, Review and Evaluation so the effectiveness of the framework can be established. Note that one monitor cycle has been done at Strathclyde Business School on UG class (as discussed above), while the second monitor cycle will be done next semester on a PG module and results will be reviewed again. After successful monitor and review cycle, comprehensive evaluation of the framework will be conducted. This cycle needs to be conducted across various disciplines in multiple departments.
- Development of a comprehensive toolkit for educators to implement CTF in their modules and for the benefit of wider community and members of professional bodies.

7. Conclusion

The Critical Thinking Framework (CTF) is a practical, student-focused approach to encouraging critical thinking in higher education. It emphasizes interactive and inclusive teaching methods, such as strategic questioning, open case discussions, real-time feedback, and emotional intelligence checks. These strategies are designed to boost student engagement and improve learning outcomes. So far, early feedback has been encouraging, with most students responding well to the framework's active approaches. However, challenges like large class sizes

and different student attitudes mean the framework needs further testing and refinement.

Moving forward, the plan is to carry out additional evaluations, try it with postgraduate students and in different fields, and develop a toolkit for educators to make adoption easier. Ultimately, the goal of the CTF is to turn the theoretical ideas around critical thinking into practical, classroom-based strategies. By focusing on student participation and voice, it is hoped that this framework can help make higher education more engaging and effective.

8. References

- [1] Golden, B. (2023). Enabling critical thinking development in higher education through the use of a structured planning tool. *Irish Educational Studies*, 42(4), 949–969. DOI:10.1080/03323315.2023.2258497.
- [2] Zembylas, M. (2022). Revisiting the notion of critical thinking in higher education: theorizing the thinking-feeling entanglement using affect theory. *Teaching in Higher Education*, 29(6), 1606–1620. DOI:10.1080/13562517.2022.2078961.
- [3] Lee, N. Y., Wang, Z., and Lim, B. (2021). The development of critical thinking: what university students have to say. *Teaching in Higher Education*, 29(1), 286–299. DOI: 10.1080/13562517.2021.1973412.
- [4] Pithers, R. T., and Soden, R. (2000). Critical thinking in education: a review. *Educational Research*, 42(3), 237–249. DOI: 10.1080/001318800440579.
- [5] Davies, M. (2015). A Model of Critical Thinking in Higher Education. In: Paulsen, M. (eds) *Higher Education: Handbook of Theory and Research*. Higher Education: Handbook of Theory and Research, vol 30. Springer, Cham. DOI: 10.1007/978-3-319-12835-1_2.
- [6] Tools/platforms used in implementing CTF: Mentimeter, Catchbox, intous pen-tablet, A/V recording in VLC, OBS studio, MS Stream, e-planet stream, Moodle based Rubric, PDF annotation, Turnitin studio feedback, Audio feedback using Audacity.

Perceptions of the Factors That Influence Learner Engagement and Their Strategic Implications – A Qualitative Case Study

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Abstract

The purpose of this presentation is to present the findings from a recent research study conducted by the speaker on the topic of learner engagement in online professional education. This research, which served as part of the speaker's dissertation, aimed to identify and explore the various factors that influence engagement in the context of online professional education programs. Specifically, the study used the Canadian Marketing Association (CMA) as a case study to understand the perceptions of working professionals pursuing an online professional certification.

The research was grounded in engagement theory and equity theory. Engagement theory focuses on the factors that contribute to a learner's emotional, cognitive, and behavioural involvement in the learning process. Equity theory, on the other hand, emphasizes fairness and the importance of providing equal opportunities for learning and participation. By using both frameworks, the study sought to uncover the complex relationship between learners' perceptions of their engagement in the program and the factors that may impact this engagement, such as program design, social interaction, and perceived value.

The research methodology was multi-faceted, employing qualitative data collection techniques to ensure a comprehensive understanding of learners, instructors and CMA management experiences. The study utilized focus groups, surveys, and interviews to gather a rich set of data, which were then triangulated to ensure the validity and reliability of the findings. This methodological approach allowed for a nuanced understanding of the learners' perspectives and the factors that most influenced their engagement levels throughout the certification process.

The findings of this study highlighted several key factors that influence learner engagement in online professional education, including the perceived relevance of the course content, the quality of instructor support, the availability of interactive elements, and the flexibility of the learning environment. The research identified strategic implications for program administrators and educators. By understanding the perceptions of learners, educators can design programs that are more likely to foster engagement. This includes considering the balancing of equity and flexibility, ensuring that all learners have equal opportunities for participation, and providing timely, personalized feedback.

The motivation for this presentation is to share the research findings and recommendations with a broader audience, with the hope that administrators, educators, and other stakeholders can use these insights to improve the design and delivery of online professional education programs. The goal is to enable those in attendance to apply the research outcomes to enhance the engagement and satisfaction of their learners, ultimately contributing to the success of their programs.

This research provides valuable insights into the factors that influence learner engagement in online professional education. By considering the perceptions and needs of learners, and adopting the strategic recommendations based on the research findings, educators and program administrators can create more engaging and effective learning environments that cater to the diverse needs of working professionals.

Session 8: Digital Society

Title: The Views of Teachers and Parents of Primary School Students about Digital Games
Authors: Evangelia Pouliou, Ioannis Lefkos, Nikolaos Fachantidis

Title: Studying English in the Virtual Realm: A Reality Check into the Benefits and Challenges
Author: Norrisa Newton

Title: Digital Transformation in South Africa's Higher Education Landscape
Author: Ephrem Habtemichael Redda

The Views of Teachers and Parents of Primary School Students about Digital Games

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Abstract

This study explores the perspectives of parents and teachers regarding the use of digital games by primary school students in Greece. Using a quantitative approach, data were collected via an online questionnaire from 180 respondents, including parents and teachers, to investigate their views on the advantages, disadvantages, and educational potential of digital games. The results indicate significant differences in perceptions: parents focus more on disadvantages, whereas teachers recognize both challenges and opportunities, particularly in fostering motivation, collaboration, and engagement in learning. Teachers are generally more supportive of digital games as tools for enhancing creativity and problem-solving in educational contexts. The study underscores the need for better collaboration between educators and parents to optimize the educational benefits of digital games, suggesting frameworks for addressing concerns and promoting their productive use in schools. Implications for educational practices and future research are also discussed.

1. Introduction

It is well known that we live in a digital age, with children being considered digital natives as they are born into this new world. This digitalization is also affecting the way children play. But ever since ancient times, playing games has never been meant to be an activity only targeted at amusement. The educational aspect of gaming is always very prominent. Nevertheless, teachers and parents often discuss children playing digital games on computers, consoles or mobile devices and spending more screen time daily. Hence, it is worth investigating the educational aspect of digital games, as perceived by the teachers and parents of students in primary school.

2. Background

As Burghardt [1] mentions, playing games generally has a wide range of definitions, and many studies have been written about it. Roopnarine and

Davidson [2] claim that play involves activities that involve "playfulness." An earlier definition by Vygotsky [3] states that when children create an imaginary situation, it changes the meaning of objects and actions.

Playing games has changed with the evolution of technology, but it retains its role in development and learning [4]. A digital game [5], is a multimedia interactive entertainment medium for one or more people, with hardware and software controlled by peripheral devices, and its actions are projected on a screen. Moreover, the purpose of a game is to entertain or educate the player, with the difficulty increasing according to the performance.

Prensky [6], who was a strong advocate of digital games, argued that they attract players' interest by comprising several characteristics, like the type of entertainment they offer, the user's interaction with the game and other players, the rules and structure, the goals and motivation to the player, the flexibility, the real-time evaluation, the rewards, the competition and the creativity. All these characteristics sound like qualities and competencies that, for sure, we would like our students to develop, hence the educational value of gaming, either physical or digital.

Al-Hileh et al. [7], studied the views of mothers and teachers of children aged 3 to 6 on the advantages and disadvantages of computer games. The results showed that both mothers and teachers agreed on many of the advantages and disadvantages of computer games, and there are no significant differences between them.

On a different age scale, the study of Noraddin et al.'s [8], is related to the perceptions of university teachers from Malaysia on the use of digital games in learning. Although teachers responded positively to their use, there were only a few respondents who actually used them in practice.

Eklund et al. [9] focus on parents' rules for their children regarding the use of digital games and the Internet. The sample consists of Swedish children aged 9-16 years and their parents, mainly the mothers. The results show that parents generally restrict their children's use of computer games and the Internet,

with boys being more restricted than girls. In addition, mothers intervene more than fathers; in general, the adults in the sample reacted negatively to children playing these games.

Hazar [10] deals with the addiction of children and their parents to digital games. The quantitative study involved 246 students, while the qualitative study involved interviews with 14 participants who had a high level of addiction and played digital games frequently. According to the results, higher rates of addiction seem to be found in people involved in sports, parents addicted to digital gaming, low educational levels and disturbed interpersonal relationships between family members.

These findings reflect the opportunities and challenges digital games present in educational and domestic settings. They reveal varied perspectives among teachers and parents while finding significant agreement on the advantages and disadvantages of computer games, suggesting shared concerns and benefits from both groups.

Our research focuses on the views of parents and teachers of Primary School students in Greece regarding digital games. We aim to investigate whether they agree with their children playing such games, what they think about them, and what challenges or benefits they observe. Parents and teachers are the most influential people for children of this age range. Additionally, to the best of our knowledge, there are no studies in Greece on the views of parents and teachers concerning digital games in this age range.

3. Methodology

In the following section, the research questions, the research instrument and the sample population are described.

3.1. Research questions

The research questions of our study are as follows:

RQ1: What are the views of teachers and parents about the advantages and disadvantages of students' playing digital games? Are there differences between the views of parents and teachers?

RQ2: What are the views of teachers and parents about using digital games to motivate learning? Are there differences between the views of parents and teachers?

RQ3: What are the views of teachers and parents about fostering collaboration through digital games? Are there differences between the views of parents and teachers?

RQ4: What are the teachers' views of digital games as a tool for learning?

3.2. Research instrument

This research uses a quantitative approach, using a closed-ended questionnaire to collect data. The questions are answered using a Likert scale, with five points for frequency, agreement, and preference (depending on the content of the question).

The questionnaire consists of questions with multiple sub-questions, comprising eight subscales and is divided into three parts (Table 1). The first part aims to collect data about the demographics of the sample, such as their gender, their age and the age of their children or students. Additionally, data were collected regarding their familiarity with digital games (S1a,b,c). The second part explores the advantages and disadvantages of children playing digital games (S2a,b). The third part refers to attitudes towards using digital games in education (S3a,b,c).

For the second part, questions from Al-Hileh and Ibrahim's [7] questionnaire were used to measure the advantages and disadvantages of online games. For the third part, Noraddin and Kian's [8] questionnaire was used, which measures the attitudes of teachers and students' parents toward digital games as tools for motivation, collaboration, and learning. The questionnaire was slightly modified to better serve the needs of our study.

Table 1. The eight subscales of the questionnaire

Subs cale	Content
S1a	How familiar are you with various types of digital games?
S1b	What is the frequency of the use of digital games in the classroom or school?
S1c	How familiar are your students/ children with various types of digital games?
S2a	What are the advantages of using digital games?
S2b	What are the disadvantages of using digital games?
S3a	Are students / children motivated while playing digital games?
S3b	Is cooperation promoted when students / children are playing digital games?
S3c	Are digital games useful in the classroom as a teaching tool?

3.3. Research sample

The questions will be answered by parents and teachers of children aged 4 to 12 (Primary School in Greece). The sampling type was convenient, as the questionnaire was administered anonymously online via social media in groups related to parents and teachers. A total of 180 questionnaires were collected from 64 parents (35.6%) and 116 teachers (64.4%).

Regarding gender, 163 respondents were women (90.6%) and 17 were men (9.4%) and were split into four age groups: 29 were from 24-30 y/o (16.1%), 57 of them from 31-40 y/o (31.7%), 65 of them 41-50 y/o (36.1%) and 29 of them over 51 y/o (16.1%).

The respondents were also asked to declare the age of the children they are parenting /teaching on a scale from 4-6, 7-9 and 10-12 y/o. If they do both, or they are working on/ parenting a variety of ages, they could tick multiple boxes. This way, 84 respondents (46.7%) ticked the 4-6 y/o box, 78 respondents (43.3%) the 7-9 y/o box and 71 respondents the 10-12 y/o box. For the reasons explained previously, the sum of the answers to this question is larger than the number of respondents.

4. Results

The data analysis was done using Jamovi. Cronbach's α coefficient was used to analyze the reliability of the questionnaire. The coefficient was calculated for all eight subscales comprising the questionnaire. It was found to be, in all cases, good or excellent, except for subscale S3b, which was acceptable (0.7796), as shown in Table 2.

Table 2. The Mean value, the SD and Cronbach's α coefficient for the eight subscales of the questionnaire

Subscale	Mean	SD	Cronbach's α
S1a	3.3556	0.7921	0.8475
S1b	3.3000	1.0660	0.8770
S1c	3.0786	0.8934	0.8784
S2a	3.2734	0.7803	0.9420
S2b	3.6381	0.8481	0.9462
S3a	2.7556	0.6129	0.8466
S3b	2.4704	0.6379	0.7796
S3c	2.9750	0.6111	0.8974

Section 1 investigates the familiarity and experience of teachers and parents with digital games. In subscale S1a, which refers to respondents' familiarity with different types of games (a list was presented), teachers and parents answer identically, i.e. parents and teachers agree that they are moderately familiar with these games, as this is revealed by standard deviation. On the other hand, in subscale S1b the standard deviation is slightly higher. Therefore, the answers of teachers and parents do not so much agree with each other on the frequency with which the different types of digital games are used in the classroom. Also, in subscale S1c the answers collected show that their children/ students are moderately familiar with the types of games presented in the questionnaire, and this can be inferred from the small standard deviation of the answers.

Section 2 investigates parents' and teachers' views on the advantages and disadvantages of using computer games. Specifically, in subscale S2a, which lists the advantages of use, the answers of parents and teachers are in agreement with a small standard deviation. Both populations present a moderate view. A similar view is presented in subscale S2b on the disadvantages of using digital games, indicating a similar moderate attitude towards them.

Section 3 investigates the attitudes of parents and teachers towards digital games in terms of motivation and cooperation and whether they are a valid educational tool for teachers. Thus, in subscale S3a, both groups think that children are slightly motivated while playing computer games, and in S3b, again almost agree that cooperation is moderately promoted. However, in subscale S3c, where only teachers were asked to answer, they presented a more positive view of digital games as a teaching tool.

5. Discussion

Concerning the first research question, it was observed that parents hold the view that digital games have more disadvantages than advantages. However, teachers seem to identify some advantages of digital games without ignoring their disadvantages. Therefore, the views of parents and teachers are not similar.

In the second research question, concerning the motivation given to children through computer games, parents agree with teachers in almost all questions that this purpose is achieved. Therefore, the views of parents and teachers are similar.

The third research question explores the agreement between parents and teachers on promoting collaboration through digital games. According to the survey data, parents and teachers answer this question identically and agree that collaboration is promoted.

Finally, the fourth research question is addressed only to the teachers, as it deals with using digital games as a teaching tool. The teachers seem to agree with this statement.

Moreover, we should note some similarities and differences between our research and others dealing with similar questions. Regarding the similarities, it was found that this research is largely in agreement with the advantages and disadvantages presented in previous research, as the respondents show resemblances in their responses. Specifically, in the study of Noraddin et al. [8], teachers are also positive towards the use of computer games, as they consider them a useful tool for their teaching, and they argue on the promotion of collaboration and motivation through digital games. In the same research, there is an agreement regarding fostering creativity and imagination, as well as cultivating competencies in digital technologies and skills such as problem-solving [8]. The study by Al-Hileh et al. [7] also

presents a similarity with our findings, as it highlights the problems that the overuse of digital games can cause.

Apart from the similarities, some differences between previous research can also be identified. For example, Al-Hileh et al. [7] found that there are no significant differences in the advantages and disadvantages of playing digital games between the views of mothers and teachers investigated; however, in the present research, we found that parents do not particularly agree with teachers. In addition, Norradin et al. [8] found that only a few teachers use computer games as a teaching tool. These findings were not confirmed in our study.

5.1. Limitations and future research

Concerning the findings of our work, some limitations should be noted. One of them was the sample. Since the questionnaire was distributed to teachers and parents randomly, most of those who responded were teachers. For this reason, the sample is not representative of the total number of teachers and parents in Greece. In addition, the largest percentage of the respondents were women. This somehow reflects the gender balance in the population of teachers but certainly not in the population of parents. In future research, the sample could be evenly distributed by gender and teacher or parent status. Furthermore, it would be better if the sample was larger.

Another limitation is that we used questionnaires exclusively for data collection. Thus, we did not delve in-depth into the respondents' views, as could have been done with an interview. In future research, researchers could interview teachers and parents in addition to the questionnaires.

6. Conclusions

Based on the findings of our research, the following conclusions can be drawn:

Parents and teachers hold differing perspectives on digital games. Parents focus more on the disadvantages, while teachers acknowledge both the benefits and challenges, reflecting a divide that needs to be bridged to create a unified approach to digital games in education. Both groups agree that digital games can motivate students and foster collaboration to a moderate extent. This alignment highlights a shared recognition of certain educational benefits provided by digital games. Teachers are generally more favorable towards using digital games as teaching tools, viewing them as resources to enhance creativity, problem-solving, and engagement. This finding suggests a potential for further integrating digital games into classroom practices.

While the study's findings largely align with existing research regarding the educational potential

of digital games, notable differences, such as the more substantial parental skepticism in Greece, highlight regional and cultural variations.

Previous studies have shown that parents of children who play computer games often have a negative attitude towards due to the possible negative effects on their children. Therefore, the acceptance of technology among students is related to their parents' attitudes towards digital games [11].

Other researchers [12] support the view that introducing digital technologies in education should be gradual, and expectations should be lowered to avoid parents losing enthusiasm. Bourgonjon et al. [13] claimed that engaging parents with digital games can be a helpful approach to revising their perceptions of negative effects. Then, once they understand that learning occurs through play, their preferences for digital games may change. If parents accept that they offer learning opportunities, such as experimentation and knowledge, they will adopt a more positive attitude towards video games [13]. According to McDougall et al. [14], engaging parents in digital game-based learning not only helps parents familiarize themselves with digital media but, more generally, helps them learn to distinguish the risks they may encounter by driving their children away from such content. Moreover, it has been suggested that frameworks could be developed to help parents choose appropriate digital games for their children [15].

In short, the literature suggests that they can become more favorable toward them through the engagement and familiarization of parents with digital games and their gradual integration into education. The more familiar parents and teachers are with new technologies, the more they seem to perceive the role they can play in improving learning performance and teaching methods. Digital games could be better integrated into the learning process by developing a framework for collaboration and communication between parents and teachers. To increase the likelihood of using ICT in the classroom, parents and teachers need to be encouraged and supported in gaining experience in the effectiveness of digital games in teaching and learning. This needs to be organized within a framework of broader educational reforms targeting curricula, educational resources and, most importantly, the pedagogical practices used.

In addition to the suggestions in the literature to eliminate parents' fears about computer games, this research suggests the following. Firstly, free or low-cost online seminars could be targeted at parents. In a theoretical part, parents could be informed about the results of studies, such as this one, that promote the benefits of online gaming and the effects of overuse. Then, a practical part should follow, in which parents are invited to play such games and then discuss their experience.

In addition to parents, it would be useful to hold similar training seminars for teachers. In this way, this group can gradually become familiar with digital games and use them in their teaching, thus demonstrating to parents how learning can take place through digital games. Once the teachers are fully familiarized, they could set up a 'Parents' School' in the schools they teach in, if it does not already exist, in which they could inform parents of all the advantages that children gain through the digital world, as well as the curriculum and pedagogical practices that the school follows on digital games. Of course, schools must also be equipped with the appropriate technological means to achieve this in addition to trained teachers.

Targeted initiatives could educate parents about the benefits of digital games while addressing their concerns. This could foster better collaboration between educators and parents in leveraging digital games for learning.

Policymakers and educators should consider frameworks for integrating digital games into educational curricula while addressing stakeholders' concerns. Guidelines for healthy and productive use of digital games could help maximize their educational benefits.

7. References

- [1] G.M. Burghardt, "Defining and recognizing play," in A.D. Pellegrini (Ed.), *The Oxford Handbook of the Development of Play*, Oxford University Press, 2011, pp. 9–18.
- [2] J.L. Roopnarine and K.L. Davidson, "Parent-child play across cultures: Advancing play research," *American Journal of Play*, vol. 7, no. 2, 2015, pp. 228–252.
- [3] L.S. Vygotsky, "Play and its role in the mental development of the child," *Voprosy Psichologii*, vol. 12, no. 6, 1966, pp. 62–76.
- [4] L. Elliott, G. Ream, E. McGinsky, and E. Dunlap, "The contribution of game genre and other use patterns to problem video game play among adult video gamers," *International Journal of Mental Health and Addiction*, vol. 10, 2012, pp. 948–969.
- [5] M.Á. Bernal-Merino, *Translation and Localisation in Video Games: Making Entertainment Software Global*, Routledge, New York, 2014.
- [6] M. Prensky, "Fun, play and games: What makes games engaging," *Digital Game-Based Learning*, vol. 5, no. 1, 2001, pp. 5–31.
- [7] M.M. Al-Hileh and N.S.I. Ibrahim, "The advantages and disadvantages of electronic games played by children aged (3-6) years, from mothers and kindergarten teachers' point of view," *International Journal of Applied Engineering Research*, vol. 13, no. 4, 2018, pp. 1805–1812.
- [8] E.M. Noraddin and N.T. Kian, "Three learning potentials in digital games: Perception of Malaysian university teachers," *Journal of E-Learning and Knowledge Society*, vol. 11, no. 2, 2015, pp. 143–160.
- [9] L. Eklund and K. Helmersson Bergmark, "Parental mediation of digital gaming and internet use," in *FDG 2013 – The 8th International Conference on the Foundations of Digital Games*, 2013, pp. 63–70.
- [10] Z. Hazar, "Children's digital game addiction and opinions about their parents' playing digital games (a mixed method study)," *Journal of Education and Training Studies*, vol. 7, no. 1, 2019, pp. 85–93.
- [11] Hart Research Associates Poll, "Parents' and teachers' attitudes and opinions on technology in education," *LEAD Commission*, 2012. <http://www.leadcommission.org/sites/default/files/LEAD%20Poll%20Deck.pdf>. (Access Date: 5 April, 2025).
- [12] C. Courtois, H. Montrieux, F. De Grove, A. Raes, L. De Marez, and T. Schellens, "Student acceptance of tablet devices in secondary education: A three-wave longitudinal cross-lagged case study," *Computers in Human Behavior*, vol. 35, 2014, pp. 278–286.
- [13] J. Bourgonjon, M. Valcke, R. Soetaert, B. De Wever, and T. Schellens, "Parental acceptance of digital game-based learning," *Computers and Education*, vol. 57, no. 1, 2011, pp. 1434–1444.
- [14] J. McDougall, M. Zerkova, B. Van Driel, and D. Sternadel, *Teaching Media Literacy in Europe: Evidence of Effective School Practices in Primary and Secondary Education*, NESET II Report, 2018.
- [15] J.C. Hong, C.L. Cheng, M.Y. Hwang, C.K. Lee, and H.Y. Chang, "Assessing the educational values of digital games," *Journal of Computer Assisted Learning*, vol. 25, no. 5, 2009, pp. 423–437.

Studying English in the Virtual Realm: A Reality Check into the Benefits and Challenges

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Abstract

The COVID-19 pandemic necessitated a global shift in education from traditional face-to-face instruction to online learning platforms. This phenomenological study examined the experiences of students enrolled in online English courses at a two-year vocational institution in Nassau, The Bahamas. The research explored two key questions: (a) To what extent does studying English in a virtual setting enhance language proficiency? and (b) What impact do online learning experiences have on students? Using convenience sampling, 90 participants were interviewed through semi-structured and focus group interviews. Data were analyzed via open coding, guided by Knowles' (1980) andragogy framework and Harasim's (2012) online collaborative learning theory. Findings revealed that college students experienced challenges in virtual English courses due to lack of engagement, inefficient instructors lacking competence in technology, limited technological resources and skills, and ineffective accommodation of their individual learning styles. The study highlights the importance of instructional quality and resource accessibility in online education. Recommendations for improving English instruction in virtual settings are provided, emphasizing the critical role of educators in this new educational paradigm.

Digital Transformation in South Africa's Higher Education Landscape

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Abstract

Over the past few years, digital transformation (DT) has evolved into relevance in a range of industries, including higher education, to create access to education and improve the quality of education. The advent of the COVID-19 pandemic has brought these issues to light, particularly for students from low-income families, emphasising the importance of finding digital solutions. The purpose of this study is to assess the state of digital transformation and the impact of the COVID-19 pandemic on South Africa's higher education, including the challenges and opportunities offered and how South African universities (higher education institutions – HEIs) adapted to teaching, learning, and assessment during and after the pandemic. The study followed a qualitative research approach based on a narrative literature review (desk review) to address the research objectives of the study and applied content analysis to identify relevant themes and subthemes. The study has established that digital technologies are crucial to improving the teaching, learning, and research processes of academic institutions within the context of higher education. The study has found that pre-COVID-19, South African higher education institutions were already on the path to digital transformation with marked financial constraints, inadequate infrastructure, and human capital issues. The major disruption of the COVID-19 pandemic was instrumental in accelerating digital adoption in teaching, learning, and assessment. Post-COVID-19, South African universities are seen to adopt a hybrid teaching and learning model. Moving forward and taking lessons from the experience of the pandemic, South African universities should embrace digital transformation to improve access, inclusion, and quality of education.

Session 9: Learning and Teaching Methodologies and Assessment

Title: Neutralizing Assessments by Converging Affective Domain
Authors: Sujata Purohit, Rushikesh(Rishi) Purohit

Title: Teaching Innovation Under the Nightlights: Advancing Experiential Learning and Community Engagement through the Richmond Night Market Project
Authors: Patricia Ann Villacorta, Jim Sun, Arnav Chugh, Parinita Malhotra, Sahar Movahedi, Iuliia Gromykhlova

Title: What is Behind the Retrogression of Arab Learners Interlanguage System?
Author: Amir Mohammed

Neutralizing Assessments by Converging Affective Domain

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Abstract

This paper examines the effect of conducting assessments by focusing on the affective traits of the digital learners [1] in the process of second language acquisition. This has also resulted in the development of varied affective traits in the learners along with the enhancement of their communication skills. The current era, in which technological revolution is taking place at a lightning speed, is affecting the millennials and their learning patterns as well. The role of English language in this age of globalization, especially for communication and higher education cannot be denied. The emphasis on the affective traits like attitude, emotions, feelings, interests, values, beliefs, dispositions, enhances student learning and neutralize the disadvantages prevalent in the classrooms. Research has established clear linkage between affect and learning [2]. Students' attitude towards learning second language plays a critical role in internalizing their learning and also in how much learning they subsequently pursue. The values students have regarding truthfulness, honesty, humility, cooperation and integrity shape their daily conduct [3]. In the process of teaching-learning English or more accurately communication skills, integrating cognitive-affective euphoria, which results in an enhanced curiosity, shaping of a committed learner and gradually his/her unmonitored application of the language in day-to-day life. The paper focuses on amalgamating three domains of learning to internalize learning and eventually enhance communicative proficiency of the learners.

1. Introduction

This paper is an endeavor addressing the challenge of teaching English as a second language confronted by higher education and modern society in India; the challenge to organize both work and learning by emphasizing the overlooked affective domain, in education and profession as well, contributing to the generations of self-motivated, self-regulated and innovative hearts and minds. The paper also focuses on striking a balance among the three domains of learning i.e. cognitive, psychomotor

and effective [4], [5] in the process of language teaching and learning. The communication apprehensions and the negative attitude of college students taking professional or vocational courses towards learning English has inspired the authors to do research by laying emphasis on the affective traits, trying to integrate cognitive-affective euphoria and help the learners to learn the second language without fear and with confidence and interest. The research has been carried over a period of two and a half years after discussions, semi-structured interviews, general conversations, observations, reflections of the pupils and faculties alike on the issue of negative attitude or step-motherly treatment towards learning and using English language. The effort has been created to provide the learners a flexible, conducive and productive learning environment. Despite the fact that today, careers in the field of science and technology, business and commerce require a good knowledge of English [6], the pupils hesitate to pay more attention on the learning of English, albeit later in their professional careers, take extra English classes to sustain their jobs and get promotions. The National Employability Report of India (2014) shows that nearly 78 percent graduate engineers lack communication skills [7]. Azam, Chin, and Prakash [8] also find that employers demand English skills. Many career alternatives once regarded insignificant are gaining importance at present such as communication skills, soft skills, ICT, interpersonal skills, critical thinking, creativity etc. The knowledge-flooded world with global economy and globalization of opportunities for graduates not only requires them to be fundamentally strong but also demand from them 21st century skills like ability to think critically and creatively, dealing with problems, contributing to local, national and global ecosystems etc. which are shown in Figure 1.

Specifically, Azam et al. [8] estimate based upon a large household survey that English communication skills increase the hourly wages of men by a whopping 34%. Hence, the change in the trend, especially the teaching-learning of English language has to undergo a transition for the betterment [3].

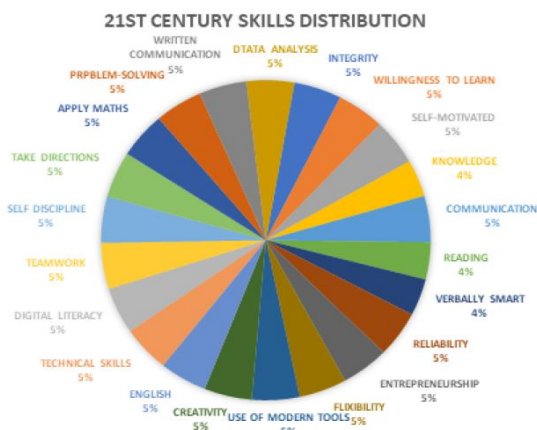


Figure 1. 21st Century Skills

2. Recalibrating English Language Teaching

The most important factor responsible for the poor or dearth of communication skills is the old methods of teaching English: The Direct Method of 1940s (a thematic and L2-only approach to traditional, grammar driven instruction) and the Audio-Lingual Method (ALM) of the 1960s and 1970s [9]. English language usage taught at the school level is less communicative in nature [10] and hence boring and dry. Besides, L1 interferences also hinder the understanding of syntax and structures as every language has its own set of rules and structure, pronunciation; many diphthongs do not exist in L1/Indian languages. Ironically, every Indian student is exposed to English from pre-primary in English medium schools or from grade 6 in state board schools. But still only 40 per cent or less is able to communicate with proficiency at the time of interviews. This is majorly because the students have to memorize and regurgitate during examinations.

They hardly get a chance to apply the language learned in their real-life situations. Hence, many of them develop a negative attitude towards learning English and English grammar or are scared to learn and speak English. After 12th grade, a student has ample passive vocabulary in English, as he never got the chance to be active in using it during his school or even in the college. This passive vocabulary will not become active till he is not given a chance on regular basis to communicate, that too in connection with the every-day events or real-life incidents and happenings. This has to be accompanied with positive reinforcement from teachers and peers alike. On the contrary, what is worth mentioning here is that many pupils who are fluent in communication after high school tend to lose that flow or fluency after joining the college. The authors posit that the adult learners become more conscious of the choices of their peer community, more aware of being

mocked at for speaking English and flaunting their “language-ego”, the term used by Guairá and his research group [11], [12]. The prevailing trends of teaching English, rigid curriculum and huge syllabi and normal conversation in regional languages threaten students and become an obstacle in having an interest or zeal to learn and speak English. Hence, there is a dire need to change the way English is taught.

The recent paradigm shift in higher education has witnessed reconstruction of the traditional teaching-learning practices recalibrating the current pedagogical methods. The shift is from teacher-centric, content-centric or curriculum -centric to student-centric, grammar translation to the communicative approach. The learner-centric approach with integration of affective domain should be focused to make the learners love the language and be the active users of the language. To encourage the learners to use language (naturalistic approach) with confidence is a daunting task. It can be accomplished by focusing on the affective traits of learners.

3. The Untouched/overlooked Domain

Many educational research primarily focus on cognitive domain development and so as the curriculum, ignoring the affective domain. The educational activity of what and how we learn was divided into three domains of learning by the psychologist Benjamin Bloom and his committee in 1956 [13]. They published taxonomy of educational objectives. This taxonomy has become a standard reference work for designing curriculum as well as instructional design.

The learning process takes place at three levels or realms. Domains can be called as realms related to knowledge, attitude and skills that the learners will acquire after the content has been taught. Primarily, these are the learning outcomes. The affective domain is a part of a system that was published in 1965 for identifying, understanding and addressing how people learn. The part of Bloom’s taxonomy, this classification of educational objectives includes the three domains: the cognitive domain, the psychomotor domain, and the affective domain as shown in Figure 2.

- Cognitive: Mental skills
- Affective: Feelings, emotions, interests, attitudes, moods etc.
- Psychomotor: Motor or Physical skills

However, their international acceptance and utilization have been subdued as compared to the educational objectives of cognitive domain. The following table shows the categories of the three learning domains viz.

Taxonomy of Educational objectives		
COGNITIVE	PSYCHOMOTOR	AFFECTIVE
Knowledge	Initiation	Receiving
Comprehension	Manipulation	Responding
Application	Precision	Valuing
Analysis	Articulation	Organization
Synthesis	Naturalization	Characterization
Evaluation		

Figure 2. Taxonomy of Educational Objectives [13]

4. Affecting with Affect Approach

The current research was carried out on a group of almost 500 students of varied engineering streams:- Mechanical, Civil, Computer and Science, Electronics and Communication, Electrical Engineering and Information and Technology in an engineering college named B.H.Gardi College of Engineering and Technology, Rajkot. The focus group comprised of students from different strata of the society, especially rural Gujarat. As far as medium of schooling is concerned, more than 80% learners were from vernacular medium and the remaining 20% were from English medium- partially or fully. It must be mentioned that some part of the initial research has been presented as a Case Study in GTU and has also been witnessed by honorable ex-Vice Chancellor Dr. Akashi Aggrawal and almost 200 faculties.

5. Finding reasons for resistance

To facilitate the process of language learning, reconstructing beliefs and attitudes of the learners was considered to be the first task. Hence, to know the reasons of this negative attitude for English language learning and speaking (applying) and communication apprehensions, the following strategies and tools were used to collect data (qualitative and quantitative):

- Interviews (semi-structured and open-ended) of pupils
- Interviews (semi-structured and open-ended) of faculty members
- Interviews (semi-structured and open-ended) of higher authorities
- Observations (in and outside classes)
- Impromptu casual conversations
- Daily debriefings during regular instructional hours
- Analysis of the documents (students' assignments, daily work, notebooks, oral conversations etc.)
- Oral presentations by students
- PRCA

- Scores in Tests (university-based curriculum)
- Participant-teaching
- Regular interactions with the senior students.

6. Observations and analysis

The reported gaps in the students were insufficient writing skills, improper presentation skills, lack of vocabulary, insufficient documentation skills, inability to understand hidden meaning, inability to present project objectives and basic proposals etc. The basic reason of negative attitude or fear for English language learning was their focus on marks in grade 12th, lack of conducive environment, traditional grammar-driven methods, untrained teachers, large classrooms, emphasis on content (what) rather than method(how) and lack of opportunities to speak the second language. This is all a result of gatherings based on students' learning experiences.

1	Strongly Agree
2	Agree
3	Are undecided
4	Disagree
5	Strongly Disagree

Figure 3. Scale of PRCA 24

To find out communication apprehensions of the learners, a diagnostic survey was conducted by using PRCA-24 (14). PRCA is composed of 24 statements relating to the feelings about communicating with other people w.r.t. Group Discussion, Meetings, Interpersonal Conversations and Public speaking.

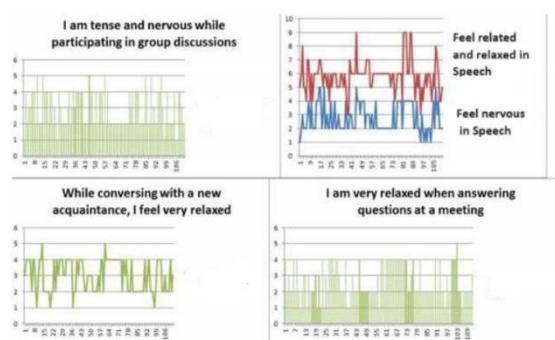


Figure 4. Responses of PRCA Survey

The scale shown in Figure 3 is applicable for PRCA. It is evident from the survey that most of the students like to participate in group discussions, but they feel tense and nervous in a group discussion with new people. As far as Public speaking is

concerned, it is noticeable that most of the students do not feel relaxed while giving a speech and more than 55 % agree that certain parts of their body feel very tense and rigid while giving speech. In interpersonal communications or interactions with new acquaintances, most of the students do not feel nervous (see Figure 4).

7. Affecting the learners with Affect

It was observed that very few students (15%) really wanted to improve their Communication skills in the beginning. Many of them had a fear of speaking or communicating in English. Many admitted that they have spoken English for the first time. Some of them were misguided by their seniors regarding the use and importance of English. Almost after one month of regular discussion, brainstorming and interactive sessions, observations, diagnostic tests etc. the students agreed that communication skills are important for them in future and can be learned in an interesting manner with a student-centered approach i.e. implementing Activity Based Learning (ABL) with focus on affecting domain. A set of eight activities weekly and regular classroom instruction sessions modeled on CELTA approach, (the author being CELTA certified) were designed and implemented for 2+2 hours weekly. The content used in classroom sessions was also from the prescribed book by Cambridge University Publications. Every week, the students were exposed to speaking English in a motivated, conducive environment with peer feedback and mentor's comments and compliments. At the end of two semesters, they were supposed to come up with a technical script in a team of 10-14 members. The students were noticed to carry out persistent and pervasive practices or rehearsals during their extra hours in the campus. The total groups formed were almost 50. Each group was allotted to a technical faculty as a mentor to write a meaningful script highlighting a technical concept. Intensive care was taken to observe the affective behavior of the learners. The online assessments played a significant role in enhancing responsibility and language learning. Using mobile applications to encourage student-centered approach to learning also leads to improved motivation, engagement and performance [15]. In this sense, many studies have been conducted to improve students' performance improving individual and collaborative learning [16].

The most liked but time consuming aspect of this process had been the peer review and peer feedback. The online peer review by each member of the group was to be given for each member of the group, at least once a month, from anywhere and at any time. The grading was to be done on the scale of 1 to 5, 1 being the least and 5 being the extraordinary. There were 18 skillsets selected from World Bank survey

conducted by Blom and Saeki [6] that were categorized as core employability skills, including communication skills.

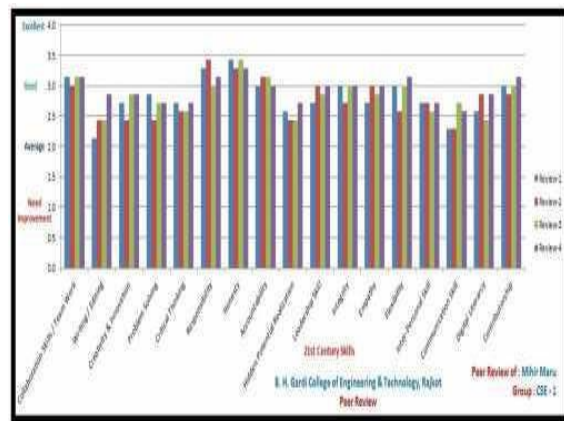


Figure 5. Average Peer Review of 4 months

Remarks / Justification :	Group Comments/compliments	Mentor Comments for Mihir
Mihir is a our leader but i never fill that mihir is a leader because he give chance to everyone . He is clever boy & he always seek to find some critical or non easy task.	Hiren has good communication skill as he can communicate with everyone. In other skills in which i have given him average, he is quite good but may his some effort can give him 'good'. he is not mature about his leadership and also not flexibel with some reasons. He is not aware about his some very good thinking sense, so he didn't his potential.	The evaluation is based on meeting him twice for the WWE discussion. The evaluation can be changed as more interaction is done.
mihir is very good and honest leader because he always give chances to do work with full independencies. He is learning new things so he is very good learner and after he learned one topic he share it. He always ready to face any problem and he is solving problem of her peers by his full efforts.	Hiren is a nice communicator and also having nice digital literacy, he also knows little about his own ability, he can match-up with all.	team work and leadership skill are good. he is good speaker but somewhat is increase in this vocabulary. he is very flexible with all the team member and he is very punctual in his work it's his very good point, his communication skill is also good.
he is regular atten the all the class. he is always ready to help another. she is able to take the leadership so this our lider. he is speak very nice and smooth english.	Arjoo is a nice at her behaviour and also in honesty, she is very flexible with all, she also have problem solving thinking.	Good in team work & leadership skill also. he is good speaker but somewhat improve in his vocabulary. his very flexible all the team member.
he is good speaker . he is good in leadership . he is good in digital literacy .	Happy knows about her own talent. She is also a nice contributor. But she need to improve more better. I think she can improve that by more practice.	
he is good speaker and good leadership skill he is good in english.	Parina is very good and intelligent person. She also poses good leadership skill and also team work skill. Her critical thinking is also good and one better thing that she could use it.	
good leader shipe skill	Krishna have many good skills like she is very honest and also accountable for her work. She is also quite good in communication. According to me, i don't think that she can lead the team.	
he is good in leadership & communication skill.	Maulik is a very creative and energetic guy, but he is not aware about that. He also have nice command on English. He have so much nice skills.	
he is very honest in his work.	Charmi is very good in her work, but she have less skills related to communication. She is good but she does not know about her own.	
Mihir is very good in leadership skill. he has many good and positive ideas. he is also good in communication skill.	Ekta is a unknow girl for herself. As she does not know about her own skills. She needs to improve a lot. She have nice skills but require to come it out.	
he is very good in his all work. he is done his work properly.	Hiral is a excellent girl who have good speaking and communication skills. She can do very good team work.	
over all he is good in most of skills	Nupur have nice skills but still she needs	
he is good in most of skills.		
he is a leader of our group he is very honest and good person. he is also a good friend. he's English is not that much good but he motivate other.		

Figure 6. Peer Review, Mentor's Comments, Groups' Comments

To maintain the authenticity, the review form required a reason in English to give any marks to the member as shown below in Figure 5 and Figure 6.

8. Discussions and Implications: The Emerging L2 Self

Over a period of one year, the research started with resistance and apprehensions blended with

negative attitude but reflected resilience, contributorship, leadership skills, responsibility, accountability with increased attendance in the classes, encouraging the juniors to learn and speak English, positive attitude for the language learning as well as the campus, inculcating varied essential skills, increased sense of ownership, collaboration skills, sense of appreciating, affective euphoria, respect for others as evidenced in the survey conducted after the research was completed. They started communicating in English without the need of external monitoring or any pressure or restriction. Each learner seemed to be motivating the other to use the target language (TL), wherever and whenever possible. The learning transformed into acquisition and the emerging L2 self could be noticed in many of the learners. This could be feasible with the affective learning strategies used throughout the year. The Affective learning refers to the learning that relates to students' interests, attitudes and motivations [17]. Figure 7 shows the affective traits acquired by this pedagogical framework that blended cognitive and affective domain. Undoubtedly, the communication skills in English were honed in the regular classroom sessions, script writing, and weekly activities. Besides, the learners were observed to speak and initially incorrect English, gradually being better.

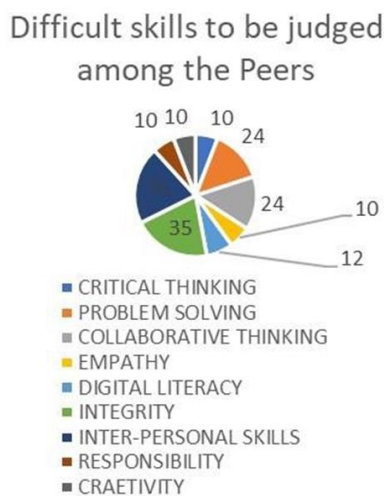


Figure 7. Acquired Affective Traits

What was important for the researchers was to change the attitude of the learners for English language and make them life-long learners. The challenges faced were that almost 30 learners could not participate completely and hence, could not be trained effectively. They also failed the university examinations.

Inferences: The research is exploratory in nature, and it offers an array of opportunities to amalgamate the three domains of learning to improve the educational achievable outcomes of any course. The most overlooked affective domain shall not receive

step- motherly treatment. The ability of teachers to create richness and flexibility in the learning environment, incorporative constructive feedbacks, positive air of instructions, paying heed to learners' interests and motivations, results in establishing and creating their productive state of alertness and interest. To conclude with the statement of Terrell, "Acquisition does not occur automatically in the absence of affective block, but that "it needs a positive drive to go after something (18)." This research is also to highlight that learning is a product of cognitive, psychomotor and affective processes. Hence, only giving importance to cognitive and psychomotor domain will inhibit internalizing the learning.

9. References

- [1] Prensky, M. (2001). Digital Natives, Digital Immigrants. Digital natives. <http://www.marcprensky.com>. (Access Date: 1 April 2025).
- [2] Ormrod, J. E. (1999). Human Learning. (3 Ea). s.l.: Upper Saddle River, NJ: Merrill! PrenticeHail.
- [3] Agih, A. A. (2016). Breaking new frontiers for effective teaching and learning through the development of affective traits and dispositions. 1, Niger Delta Journal of Education(NIDJOE), Vol.3
- [4] Krathwohl, D. R., Bloom, B. S., Masia, B. B. (1964). Taxonomy of educational objectives: The classification of educational goals, Handbook II: Affective domain. David McKay Company, Inc. New York.
- [5] Bloom, B. S. (1956). Taxonomy of educational objectives, handbook I: The cognitive domain. New York: David McKay Co Inc.
- [6] Blom, A., Saeki, H. (2011). Employability and Skill Set of Newly Graduated Engineers in India. Education Team, The World Bank. South Asia Region : The World Bank. Policy Research Working Paper 5640.
- [7] National Employability Report Engineers. Annual report. (2014). s.l.: Aspiring Minds. Annual.
- [8] Mehtabul, A., Chin, A., Prakash, N. (2010). The Returns to English Language Skills in India. University College, London, UK: CREAM Discussion Paper Series 1002.
- [9] Spielmann, G. and Radnofsky, M.L. (2001), Learning Language under Tension: New Directions from a Qualitative Study. The Modern Language Journal, 85: 259-278. DOI: 10.1111/0026-7902.00108.

- [10] Narayanan, R., Rajasekharan Nair, N., & Iyyappan, S. (2009). English language teaching In India: A theoretical study. *The Modern Journal of Applied Linguistics*, 1 (1), 2-16.
- [11] Guiora, A., Acton, W. (1979). Personality nad language: a restatement. *Language Learning*, Vol. 29, pp. 193-204.
- [12] Guiora, A. (1975). *Language and Person. Studies in Language Behavior*. 1975, *Language Learning*, Vol. 25, pp. 43-61.
- [13] Krathwohl, D. R., Bloom, B. S., & Masia, B. B. (1964). Taxonomy of educational objectives: The classification of educational goals, *Handbook II: Affective domain*. New York: David Mckay Company In corporated.
- [14] Berger, B. A., Richmond, V. P., McCroskey, J. C., & Baldwin, H. J. (1984). Reducing communication apprehension: Is there a better way? *American Journal of Pharmaceutical Education*, 48, 46-50.
- [15] Wadhwa, S., Barlow, A., & Jadeja, S. (2016). Facilitating Assessments to Foster 21st Century Skills:Towards Technological Terrains. *Journal of Engineering Education Transformations*, 24–29. DOI: 10.16920/jeet/2016/v30i2/105433.
- [16] Mosawi, E.A.W. Athraa al. (2015). Exploring the Potential of Mobile Applications to support Learning and Engagement in Elementary Classes. *International Journal of Mobile and Blended Learning*, pp. 33-34.
- [17] Gano-Phillips, S. (2009). *Affective Learning in General Education*. s.l.: University Of Michigan, Flint.
- [18] Young, D.J. (1992). Language anxiety from the foreign language specialist's perspective: Interviews with Krashen, Omaggio-Hadley, Terrell, and rardin. *Foreign Language Annals*, Vol. 25, pp. 157-172.
- [19] Bennett, S., Matont, K. (2010). Beyond the 'digital natives' debate: Towards a more nuanced understanding of students' technology experiences. s.l. : Blackwell Publishing Ltd., *Journal of Computer Assisted Learning*, Vol. 26, pp. 321-331. Digital Natives.

Teaching Innovation Under the Nightlights: Advancing Experiential Learning and Community Engagement through the Richmond Night Market Project

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Abstract

This study is an example of curricular innovation at Western Community College (WCC) involving problem-based and experiential learning paradigms in a multidisciplinary, community-oriented project anchored at Vancouver's iconic Richmond Night Market. The project was created for the learning benefit of Hospitality students. By integrating situational learning and a dynamic environment, it aims to address gaps in traditional teaching, especially around applied skills, communication, and stakeholder engagement.

The initiative involved approximately 180 students across five coordinated courses. Along with the guidance of faculty teams, students engaged with market vendors, local entrepreneurs, and night market organizers to analyze, in real-time, the night market's operations. Anchored in Kolb's Experiential Learning Cycle and supported by structured Problem-Based Learning (PBL), the project emphasized iterative inquiry, critical analysis, and collaborative solution design. Students collected both qualitative and quantitative data via surveys, interviews, and observational fieldwork. Their findings were then studied and showcased in reports, proposals, and presentations.

The project's importance lies in its multi-layered integration of experiential learning with community-based research and policy-oriented deliverables. Unlike traditional case-study approaches, this intervention allowed students to generate context-specific insights and develop actionable recommendations with real stakeholders. The process started the development of a comprehensive proposal to replicate the night market concept in Surrey—positioning the activity not only as a learning tool, but as a platform for community impact and local economic advancement.

Key outcomes included measurable growth in students' communication, critical thinking, data analysis, teamwork, and decision-making. Course and program learning outcomes were directly aligned with the institution's broader mission of community advancement. Moreover, faculty collaboration across disciplines introduced a replicable model for cross-curricular integration of experiential learning.

The project contributes to experiential education research by offering a transferable model that incorporates Kolb's cycle in community-based environments. Its hybrid approach - merging classroom theories with on-site exposure and observation - augments current knowledge of how immersion in the real world enhances student motivation, retention, and application of skills. Industrially, the project offered strategic insights into customer satisfaction, pricing, sustainability, and vendor relations, thereby creating practical value for local businesses.

In scalability, the model indicates possibilities for replication in other urban or multicultural settings, especially where institutions seek to incorporate academic education with civic and entrepreneurial innovation. Follow-up phases include policy

consultations, vendor interviews, and creating peer-reviewed case studies for academic dissemination.

In conclusion, this initiative addresses a critical gap in hospitality education by offering an integrative, community-responsive learning model. It bridges both theory and practice. It also strengthens institutional ties to local communities. The Richmond Night Market project showcases how experiential learning can drive student success and community engagement.

What is Behind the Retrogression of Arab Learners Interlanguage System?

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Abstract

This presentation aims to reflect the cross-linguistic factors affecting the progress of learners' interlanguage language system. The significance of this topic stemmed from the Arab learners' failure to use the English language competently. There are certain linguistic and teaching factors attributed to such retrogression, as stated below as follows:

- *The first factor is the status of English as a foreign language in Saudi Arabia. That is, English is spoken and used only in limited contexts, such as universities, and a few schools where English is taught as a minor subject, so that the role of English is only for academic purposes.*
- *The second factor is the sociolinguistic background of the English teachers; those teachers speak different varieties where different non-standard Arabic languages are spoken in each Arab country. Consequently, learners experience challenges of getting a standardized medium of learning inside classrooms.*
- *The third factor is the interference of learners' native language, as the learners have no way out of code-switching other than their native language. In addition, the teachers adopt the Grammar Translation Method of teaching, which encourages learners to depend greatly on their native language, as GTM appeals more to them in learning English in general.*
- *Finally, Foreign or second language learning involves learners' capability of formulating their own system that lies between their first language and the target language, so that they can spontaneously go forward and achieve native-like and linguistic competence.*

Session 10: Learning and Teaching Methodologies and Assessment

Title: Scaffolding Support to Induce Effective Self-explanations for Learning Problem-solving Programming

Authors: Chun-Ying Chen, Shih-Hsuan Wei, Pey-Ru Yen

Title: Coming Out Queer and Dis/Abled in Higher Education

Author: Lesley Siegel

Title: Social Entrepreneurship Education Challenges and Opportunities: A Comparative Case Study Canada-European Union

Author: Tatjana Brkic

Title: From Awareness to Action: Exploring the Conscientization Experiences among Indigenous Teachers in Taiwan

Authors: Liang Yu Ong, Hsiao-Lan (Sharon) Chen

Scaffolding Support to Induce Effective Self-explanations for Learning Problem-solving Programming

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Center for General Education ¹, Department of Mathematics Education ², Department of Education ³, National Taichung University of Education
Taiwan

Abstract

Research indicates that novices benefit more from worked examples when they engage with them through self-explanations. However, learners often need prompts to self-explain, especially if they do not do so spontaneously. This study explores how scaffolding support (i.e., guided questions and a subgoal-labeled flowchart) can foster effective self-explanations in problem-solving programming. The experiment will compare three conditions: (1) worked examples with instructional explanations, (2) worked examples with guided questions and self-explanations, and (3) worked examples with a subgoal-labeled flowchart and self-explanations. Active self-explanations are those supported by either guided questions or a subgoal-labeled flowchart. We will evaluate participants' cognitive load during learning and assess learning outcomes using a posttest and a problem-solving programming task. The self-explanation process will also be analyzed by observing participants' in-code comments to understand better how they engage with worked examples and the impact of this process on their learning.

1. Introduction

Learning to program is a complex task, particularly for novice learners. Example-based approaches are commonly used in programming courses. Worked examples that provide fully worked-out problem solutions can reduce cognitive load and have proven more effective than traditional practice-based problem-solving [18], [21]. Studies suggest that novices learn more effectively from worked examples when they actively explain each step to themselves, rather than passively reviewing them (e.g., [7], [9]). This active self-explanation promotes deeper cognitive engagement, enhancing learning and supporting knowledge construction [27]. This study thus investigates how to prompt effective self-explanations in the context of learning problem-solving programming.

This study proposes two types of scaffolding support to induce self-explanations for learning

problem-solving programming. The first type involves guided questions that help learners think about how to code the solution to the problem. These questions help focus on relevant conditions and encourage reflection to promote active engagement when self-explaining worked examples. The second type of scaffolding is a flowchart integrated with subgoal labels [5] that represent conceptually meaningful chunks of a problem's solution or subgoals by explicitly labeling each solution step. This strategy is supposed not only to decrease cognitive load but also to scaffold the problem-solving process effectively. We aim to investigate how these two scaffolding supports can induce effective self-explanations that enhance learning.

2. Literature review

This section outlines the theoretical and empirical foundations of the study, focusing on cognitive theories, the benefits of worked examples and self-explanations, their application in programming education, and the role of scaffolding tools like flowcharts in supporting novice learners and reducing cognitive load.

2.1. Theoretical background

The theoretical foundations of this study are Cognitive Load Theory (CLT; [21], [22]) and the Cognitive Theory of Multimedia Learning (CTML; [14]). Both theories highlight that learners can engage in cognitive processes to construct knowledge within the limits of their memory capacity.

According to CLT, the cognitive load can arise from three sources: intrinsic, extraneous, and germane cognitive load (IL, EL, and GL). IL is the complexity inherent in learning materials. EL is caused by inadequately designed instruction. GL is the cognitive effort aimed at knowledge construction; it refers to working memory resources required to manage IL, thereby resulting in learning.

CTML provides principles to optimize cognitive capacity through instructional design. This study

applies the worked example principle and the self-explanation principle from CTML for effective instructional design, aiming to reduce EL (e.g., through worked examples) to better manage IL, allowing more GL for constructive learning activities (e.g., self-explanations) to achieve understanding.

2.2. The worked examples and self-explanations

Novices are prone to experience high IL from the learning materials due to a lack of prior knowledge. They learn better from the instructional format, such as worked examples (i.e., fully worked-out solutions) than from practice problems they must solve alone. While presented with worked examples before problem-solving, novices often employed more efficient problem-solving strategies and appeared to focus on structural aspects of the problem. Learners used typical novice strategies like trial and error when presented with traditional practice exercises. Worked examples thus can help novices develop schemata from an expert's solution to a problem (see [18], [21]).

There are instructional principles for designing effective examples [1]. First, the examples should be well designed to avoid the split-attention or redundant effect (see [21]). Second, instructional effectiveness is enhanced within a complex problem when the problem's subgoal structure is displayed by explicitly labeling each step or by visually isolating steps [4]. Third, to enhance transfer performance, at least two examples are presented for each type of problem taught [17]. Fourth, the instructional sequence is essential. For novices, examples must be available in memory during problem-solving, so the worked-out example should be presented before the practice problem [23]. Finally, inducing self-explanations in example-based instruction is an important learning activity because the self-explanation strategy is suggested to engage students in deeper learning [27].

Self-explanation is a constructive learning activity in which learners generate verbal statements (involving inferences) to clarify the meaning of the learning material to oneself [8]. Self-explaining involves explaining new information to oneself to integrate it with prior knowledge and infer new knowledge [27]. Self-explanation prompts come in several forms, including open-ended, focused, scaffolded, resource-based, and menu-based [27]. Previous research suggests that providing a more specific form of explaining through focused, scaffolded, or resource-based prompts results in more profound learning than free-form, open-ended explanations [27]. Particularly for novices, self-explanation is typically more effective when they receive guidance and scaffolding support to help them focus on relevant information. Additionally, self-explanation was generally more effective than instructional explanation [2], [12].

2.3. Applying worked examples with self-explanations in programming education

Learners' self-explanations of worked examples showed benefits for learning in computer programming [16], [25]. Prior studies show several approaches to elicit self-explanations, such as providing reflection prompts, questioning strategies, writing in-code comments, and using subgoal labels. In learning JavaScript, students performed better in problem-solving tasks when actively engaged in the reflective self-explanation process [10]. Studying the effect on student performance of introducing different types of questions for eliciting self-explanations (a control group offering no self-explanation activities, compared to a group was asked to self-explain and the other group received multiple-choice questions that promoted participants to consider certain aspects of the code) when learning programming language Java, the results show that self-explanation activities increased student performance, with additional advantages gained through supporting questions that helped focus learners' explanations [26].

Using in-code comments as a self-explanation strategy for students' engagement with the worked examples, Vieira et al. [24] identified students' perceived uses of the in-code commenting activities, including understanding the example, making a connection between the programming code and the disciplinary problem, and becoming familiar with the programming constructs. When teaching programming C# and algorithm design, Vieira et al. [25] show that students can effectively carry out an elaborated self-explanation (in-code comments) of their coded solutions when using worked examples pedagogy, leading to improved learning outcomes. In this study, students often mentioned that many comments within the example code decreased readability. Complex explanations within the code could generate additional cognitive load for students. Vieira et al. [25] identified four commenting styles: detailed, relevant, basic, and unclear. Although non-significant differences were found between the four commenting styles, the authors observed that novices with a more profound self-explaining process (detailed or relevant commenting style) benefited more from the worked examples when they actively engaged with them.

Garces et al. [9] incorporated explicit forms of engagement (i.e., debugging and self-explaining) to enhance the effectiveness of worked examples in teaching C programming. They concluded that combining both strategies, explaining first and debugging second, may result in a more effective approach. When teaching how to create applications using App Inventor, the study showed the effectiveness of learner-constructed subgoal labels in scaffolding programming problem-solving, requiring

learners to deconstruct problem-solving procedures into subgoals and explain the purpose behind each step of the worked example [12]. The study's authors explained that this approach was implemented to enhance self-explanations, addressing the risks associated with learners producing ineffective or inaccurate explanations.

2.4. Scaffolding for problem-solving programming with flowcharts

Programming education is crucial in developing computational thinking, a problem-solving approach that involves decomposition, abstraction, algorithm development, and evaluation. Due to the close relationship between computing and programming, computational thinking skills appear to be improved via computational tools, such as programming languages or environments [19]. Because the cognitive process is quite abstract and complex due to the nature of programming problem-solving, novices easily get overloaded when they have to juggle programming constructs and problem-solving processes simultaneously. It often overwhelms novice programmers while confronting many interacting elements to be learned at once [21]. Besides the worked examples, programming flowcharts were often used as learning scaffolding to support novice programmers (e.g., [3], [20], [28]).

A programming flowchart is a visual tool that programmers use to understand the problem-solving process or algorithm when creating applications. The flowchart typically uses geometric shapes to represent steps and arrows to communicate the flow of data and the flow of execution of a program, so this tool offers guidance for explicit problem-solving processes for novices. In this regard, presenting a matched flowchart representing the visualized solution of the worked example was assumed to mitigate novices' cognitive load during learning.

3. The present study

This study investigates the effects of scaffolding support to induce effective self-explanations with worked examples for learning problem-solving programming on learners' cognitive load and problem-solving performance. We propose two types of scaffolding support: guided questions and a subgoal-labeled flowchart.

This experiment will include three conditions: (1) worked examples with instructional explanations (IE), (2) worked examples with guided questions and self-explanations (QE), and (3) worked examples with a subgoal-labeled flowchart and self-explanations (FE). The IE condition is the control group. There will be two examples and problems in each condition to ensure transfer performance, as suggested in previous

research [17]. Each example will be followed directly by a similar problem to solve.

Learners engaging in self-explanations of the examples could ensure the worked example effect. Instructional explanations are regarded as the most cognitively passive form [27]. Active self-explanations are those that are scaffolded with either guided questions or a subgoal-labeled flowchart. Guided questions provide clear guidance in the form of questions for learners to think about how to code the solution to the problem. In this regard, this strategy might induce higher GL for understanding and self-explaining. A subgoal-labeled flowchart is designed to explicitly label each solution step in the flowchart to emphasize chunks of the problem's solution. In this way, the flowchart could enhance understanding and result in actively engaging with self-explaining examples. Thus, we expect the flowchart to minimize EL to maximize GL, thereby benefiting student learning.

The discussions above lead to the development of the following hypotheses:

Hypothesis 1. Participants in the IE condition would exhibit lower GL and lower problem-solving performance than those in other conditions.

Hypothesis 2. Participants in the QE condition would exhibit higher GL and higher problem-solving performance than those in the IE condition.

Hypothesis 3. Participants in the FE condition would exhibit lower EL, higher GL, and higher problem-solving performance than those in other conditions.

4. Method

This section details the study's methodology, including participant recruitment, learning materials, assessment measures, and experimental procedures.

4.1. Participants

The study will involve approximately 100 university students from two regular classes during the Spring term at the Center of General Education in Taiwan. The experiment is integrated into their regular classes, which are introductory courses in computational thinking and programming tailored for non-computer majors. Students from various disciplines, except those in computer-related fields, are eligible to participate, with the majority coming from Humanities and Social Sciences. To support beginner learners, Scratch—a block-based programming tool—has been selected as the learning environment. Unlike text-based programming languages, its highly visual design helps minimize common beginner errors such as syntax and typing mistakes.

At the beginning of the semester, all participants will be surveyed to assess their programming

experiences and asked to take the pretest to evaluate their prior knowledge of Scratch. All students will participate in the learning tasks of the experiment as part of their regular class activities. At the end of the semester, data will be collected from those with no prior experience with Scratch or any programming. Ensuring that participants are programming novices reduces potential confounds related to their prior knowledge.

4.2. Learning materials

The instructor (the first author) initially teaches computational concepts using all block functions of Scratch, covering data representation with variables and lists, flow controls, abstraction and problem decomposition, user interactivity, parallelism, and synchronization. These foundational lessons will span seven weeks. The class then will apply what they have learned to create Scratch projects focused on problem-solving programming.

By adapting original examples from Marji [13], we design and develop all formats of worked examples for programming projects involving the classification of different types of triangles and quadrilaterals. Each condition includes two worked examples: one for a triangle classification game and one for a quadrilateral classification game. The first problem-solving task involves creating a game to identify different types of triangles. The second task required programming a game to identify different kinds of quadrilaterals.

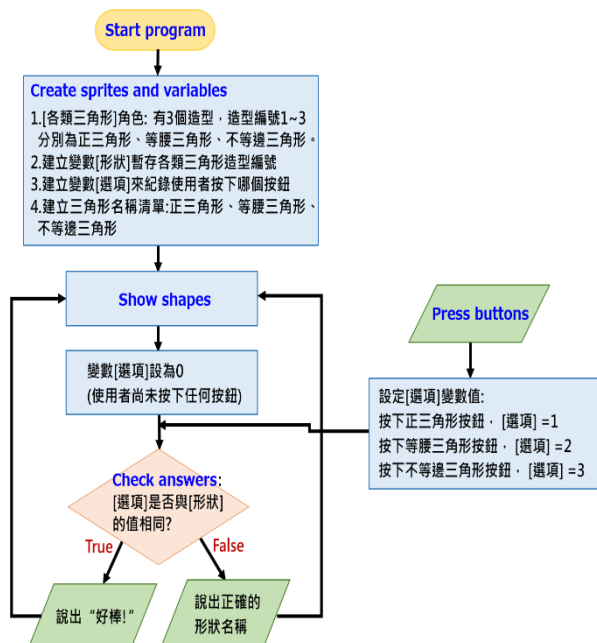


Figure 1. A subgoal-labeled flowchart

To ensure participants could solve the problems by analogy, the two worked examples differ only in contextual/surface features, while the procedural steps

remain similar. The two worked examples in the IE condition include in-code comments written by the instructor. The other two worked examples in the QE and FE conditions do not include in-code comments because participants will be required to complete that portion as part of the assignment. The two worked examples in the QE condition include eight guided questions to induce self-explanations (writing in-code comments). The two worked examples in the FE condition include a matched flowchart integrated with the same subgoal labels (see Figure 1). The subgoal labels in bold font include "start program," "create sprites and variables," "show shapes," "press buttons," and "check answers."

4.3. Measures

All measures will be web-based assessments and consist of (a) a pretest that evaluates participants' prior knowledge, (b) a posttest and a problem-solving programming task that measures the learning outcomes, (c) time-on-task during the problem-solving programming task, (d) cognitive load ratings that evaluate participants' experienced cognitive load during learning, and (e) the self-explanation task (in-code comments).

Both pretest and posttest are composed of ten multiple-choice questions that are designed to test the basic computational concepts of Scratch programming. The test items for both tests will be slightly modified (i.e., changing variable names, values, or sizes) to minimize the testing effect. The max time allowed for completing the test will be 10 min. One point will be awarded for every correct answer, with a max score of 10.

The transfer task is a problem-solving programming activity. Participants will be required to program a game to identify different shapes, including rectangles, parallelograms, triangles, trapezoids, circles, and sectors. They will receive a problem description and a sample run of the program and are tasked with constructing a complete program to solve the problem. The SVG graphics required for the program sprites will be provided in advance, and participants need to code each sprite. The program contains seven sprites: six for the answer buttons and one named Shapes, which contains the main script. The main script is awarded a total of 40 points if correctly coded. The other six sprites are awarded 10 points each if correctly coded. Thus, the max score for the correctness of the constructed programs is 100 points. Participants have a max of 40 min to complete this task.

The subjective cognitive load rating scale (Table 1) is adapted from Leppink et al. [11] and Morrison et al. [15]. Cognitive load during the learning phase will be measured with 13 items assessing IL (items 1-4), EL (items 5-8), and GL (items 9-13). Participants will rate

the items on a 10-point scale, with zero indicating *not at all the case* and 10 indicating *completely the case*.

The self-explanation process of writing in-code comments is only required for the experimental groups. In-code comments collected from the explanation task will be analyzed using the coding scheme by Vieira et al. [25] to identify the four commenting styles (i.e., unclear, basic, relevant, and detailed). This qualitative analysis aims to understand how participants engage with worked examples and how their self-explanation processes can impact their learning.

Table 1. Cognitive load measurement

Type	Corresponding items
Intrinsic	1. The content of this lesson was very complex. 2. The lesson covered program code that I perceived as very complex. 3. The lesson covered concepts and definitions that I perceived as very complex. 4. I invested great mental effort because of the complexity of this lesson.
Extraneous	5. The instructions and explanations during the lesson were very unclear. 6. The instructions and explanations during the lesson were full of unclear language. 7. The instructions and explanations during the lesson were, in terms of learning, very ineffective. 8. I invested great mental effort on unclear and ineffective instructions and explanations during the lesson.
Germane	9. This lesson really enhanced my understanding of the content covered. 10. This lesson really enhanced my knowledge and understanding of computing/programming. 11. This lesson really enhanced my understanding of the program code covered. 12. This lesson really enhanced my understanding of the concepts and definitions. 13. I invested great mental effort during this lesson to enhance my knowledge and understanding.

Note. Adapted from Leppink et al. [11] and Morrison et al. [15].

4.4. Procedures

We will experiment in the eighth week of the semester when participants begin to learn problem-solving programming by creating Scratch projects. Tallied with the course syllabus of the two classes, the experiment will be conducted in two sessions in the computer lab where participants normally attend computer-based classes. Participants will be randomly assigned to one of the three conditions in each session, with each participant working independently on a computer.

The experiment will consist of an example-based learning phase followed by test phases. Initially,

participants will receive brief instructions about the experiment's procedure. During the learning phase, participants are not allowed to leave the classroom or talk to others except to ask the instructor questions if they encounter problems. Time-on-task will be restricted in both the learning and test phases. Participants will be given 25 min to complete each example-based learning task. Until time expires, they are encouraged to review the learning materials or explore the Scratch programming environment. Following the learning phase, participants will have 10 min to complete the cognitive load assessment. Finally, they will be given 10 min to complete the posttest and 40 min to complete the problem-solving programming task.

5. Results and discussion (work in progress)

The data will be analyzed with one-way analyses of variance (ANOVA). There will be three conditions for comparisons. The dependent variables will be learning outcomes regarding the posttest and a problem-solving programming task, time-on-task during the problem-solving programming task, different types of cognitive load experienced during the learning phase, and the self-explanation task. Post-hoc tests will be conducted as follow-up analyses when there is a significant F test. Alpha will be set at 0.05 for all statistical tests. Effect sizes were reported using eta-squared (η^2), with values of .01, .06, and .14 indicating small, medium, and large effects, respectively [6].

This study is a work-in-progress project, and data will be collected in May 2025. By the time the conference is held in July, we will be able to report the results and findings of this study.

6. Conclusions

This study investigates how scaffolding strategies—guided questions and subgoal-labeled flowcharts—can enhance self-explanations and improve learning outcomes in problem-solving programming. By comparing different instructional conditions, we aim to identify effective approaches that reduce cognitive load and support novice programmers in developing deeper understanding and better programming problem-solving skills.

7. References

- [1] Atkinson, R.K., Derry, S.J., Renkl, A., and Wortham, D. (2000). Learning from examples: Instructional principles from the worked examples research. *Review of Educational Research*, 70(2), 181-214.

- [2] Bisra, K., Liu, Q., Nesbit, J.C., Salimi, F., and Winne, P.H. (2018). Inducing self-explanation: A meta-analysis. *Educational Psychology Review*, 30, 703-725.
- [3] Cabo, C. (2018, October). Effectiveness of flowcharting as a scaffolding tool to learn python. In 2018 IEEE Frontiers in Education Conference (FIE) (pp. 1-7). IEEE.
- [4] Catrambone, R. (1995). Aiding subgoal learning: Effects on transfer. *Journal of Educational Psychology*, 87, 5-17.
- [5] Catrambone, R. (1998). The subgoal learning model: Creating better examples so that students can solve novel problems. *Journal of Experimental Psychology: General*, 127, 355-376.
- [6] Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Erlbaum.
- [7] Crippen, K.J., and Earl, B.L. (2007). The impact of web-based worked examples and self-explanation on performance, problem solving, and self-efficacy. *Computers & Education*, 49(3), 809-821.
- [8] Fiorella, L., and Mayer, R.E. (2022). The Generative Activity Principle in Multimedia Learning. *The Cambridge Handbook of Multimedia Learning*, 339-350.
- [9] Garces, S., Vieira, C., Ravai, G., and Magana, A.J. (2023). Engaging students in active exploration of programming worked examples. *Education and Information Technologies*, 28(3), 2869-2886.
- [10] Kwon, K., and Jonassen, D.H. (2011). The influence of reflective self-explanations on problem-solving performance. *Journal of Educational Computing Research*, 44(3), 247-263.
- [11] Leppink, J., Paas, F., van Gog, T., van der Vleuten, C.P.M., and van Merriënboer, J.J.G. (2014). Effects of pairs of problems and examples on task performance and different types of cognitive load. *Learning and Instruction*, 30, 32-42.
- [12] Margulieux, L.E., and Catrambone, R. (2021). Scaffolding problem solving with learners' own self explanations of subgoals. *Journal of Computing in Higher Education*, 33, 499-523.
- [13] Marji, M. (2014). *Learn to program with Scratch: A visual introduction to programming with games, art, science, and math*. No Starch Press.
- [14] Mayer, R.E. (2021). Cognitive theory of multimedia learning. In R.E. Mayer, and L. Fiorella (Eds.), *The Cambridge handbook of multimedia learning* (3rd ed., pp. 57-72). Cambridge University Press.
- [15] Morrison, B.B., Dorn, B., and Guzdial, M. (2014, July). Measuring cognitive load in introductory CS: Adaptation of an instrument. In *Proceedings of the tenth annual conference on international computing education research* (pp. 131-138).
- [16] Pirolli, P., and Recker, M. (1994). Learning strategies and transfer in the domain of programming. *Cognition and Instruction*, 235-275.
- [17] Reed, S.K., and Bolstad, C.A. (1991). Use of examples and procedures in problem solving. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 17(4), 753.
- [18] Renkl, A. (2021). The worked example principle in multimedia learning. In R.E. Mayer, and L. Fiorella (Eds.), *The Cambridge handbook of multimedia learning* (3rd ed., pp. 231-240). Cambridge University Press.
- [19] Shute, V.J., Sun, C., and Asbell-Clarke, J. (2017). Demystifying computational thinking. *Educational Research Review*, 22, 142-158.
- [20] Smetsers-Weeda, R., and Smetsers, S. (2017, November). Problem solving and algorithmic development with flowcharts. In *Proceedings of the 12th Workshop on Primary and Secondary Computing Education*, 25-34.
- [21] Sweller, J., Ayres, P., and Kalyuga, S. (2011). *Cognitive load theory*. New York: Springer.
- [22] Sweller, J., van Merriënboer, J., and Paas, F. (2019). Cognitive architecture and instructional design: 20 years later. *Educational Psychology Review*, 31, 261-292.
- [23] Van Gog, T., Kester, L., and Paas, F. (2011). Effects of worked examples, example-problem, and problem-example pairs on novices' learning. *Contemporary Educational Psychology*, 36(3), 212-218.
- [24] Vieira, C., Magana, A.J., Falk, M.L., and Garcia, R.E. (2017). Writing in-code comments to self-explain in computational science and engineering education. *ACM Transactions on Computing Education (TOCE)*, 17(4), 1-21.
- [25] Vieira, C., Yan, J., and Magana, A.J. (2015). Exploring design characteristics of worked examples to support programming and algorithm design. *Journal of Computational Science Education*, 6(1), 2-15.
- [26] Vihavainen, A., Miller, C.S., and Settle, A. (2015, February). Benefits of self-explanation in introductory programming. In *Proceedings of the 46th ACM Technical Symposium on Computer Science Education* (pp. 284-289).
- [27] Wylie, R., and Chi, M.T.H. (2014). The self-explanation principle in multimedia learning. In R.E. Mayer (Ed.), *The Cambridge handbook of multimedia learning* (2nd ed., pp. 413-432). Cambridge University Press.
- [28] Zhang, J.H., Meng, B., Zou, L.C., Zhu, Y., and Hwang, G.J. (2023). Progressive flowchart development scaffolding to improve university students' computational thinking and programming self-efficacy. *Interactive Learning Environments*, 31(6), 3792-3809.

Coming Out Queer and Dis/Abled in Higher Education

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Abstract

Higher education functions on the premise of nondisabled and the dominant assumption of heterosexuality. There is a complex interplay between queer identity and invisible dis/ability that is embedded in all facets of higher education for queer dis/abled faculty. There is a need to be a strategic actor, balancing the complexities of identity, disability needs, and the embedded ableism and heteronormativity that are pillars of higher education. In the academy, as scholars and teachers, identity disclosure is a complicated web of intersecting 'outness', accompanied by continual calculations of when, where and how to make one's marginalized sexual identity visible, and the calculation of disability visibility and the structural need for disability support.

Visibility is often central to discussions on both disability and queerness. The examination of disclosure / coming out / being (in)visible functions as a focus for much of the literature on the experiences of queer and invisibly disabled faculty in higher education. The connection between nonvisible disabilities and queers has been explored both through the lens of queer studies (e.g., Samules, 2003) and disability studies (e.g., Sinecka, 2008). Becoming visible will always be an act that must be performed for both gay and invisibly disabled persons because we live in a world in which "nondisabled and heterosexuality are always already presumed unless otherwise stated" (Samuels, 2003, p. 235). For those who navigate both worlds, queer and disabled, there are overlaps, outliers and complications with each experience. The continual nature of becoming visible, out, disclosing one's true self is common to invisibilities of both the disability community and the gay community. This narrative presents, confronts, and challenges the experiences of faculty navigating the halls of higher education and seeks to interrogate what it means to teach across the spectrums of queerness and dis/ability, visibility and invisibility as a teacher and scholar in higher education.

Social Entrepreneurship Education Challenges and Opportunities: A Comparative Case Study Canada-European Union

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Abstract

This paper explores Social Entrepreneurship Education frameworks across four regions: Croatia, Slovenia, Manitoba, and Prince Edward Island. Using a comparative case study approach, it examines institutional support, research production, and educational programming. Findings reveal consistent pedagogical innovations across regions but significant divergence in content, sources of knowledge, and integration of policy and research, with European Union regions benefiting from structured support and Canadian regions emphasizing grassroots adaptation. The comparison between small and midsize regions within broader unions highlights the critical role of unified policy frameworks and regional innovation in advancing Social Entrepreneurship Education. Conclusions emphasize the need for balance between structured institutional strategies and context-specific innovation to scale social entrepreneurship globally.

From Awareness to Action: Exploring the Conscientization Experiences among Indigenous Teachers in Taiwan

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Abstract

In recent decades, Indigenous activist movements have pushed settler-colonial states to recognize Indigenous rights, address historical injustices and to pursue educational justice. In Taiwan, while state efforts to advance Indigenous education have increased, scholars note that its implementation often reflects dominant educational priorities - such as national competitiveness - rather than the goals of educational justice from Indigenous perspectives. As key agents of change, Indigenous teachers play a crucial role in transforming this landscape and their awareness and action is of critical importance. This study, through interviews and document analysis, aims to explore Indigenous teachers' conscientization experiences and uncover the core of their critical awakening. Four to six secondary school teachers who critically reflect on their reality and actively engage in transforming the unjust social structures through their educational work will be invited to participate in this study. By analysing experiences that initiate their conscientization, the evolving process, sustaining factors and wellsprings of conscientization, their critical understanding of situated reality and praxis for transforming the perceived reality, and impacts of conscientization, we seek to enhance critical consciousness among Indigenous teachers, empowering them in decolonizing and Indigenizing educational praxis. It is hoped that this research will contribute to a more humanizing and emancipatory educational future.

Keywords: critical consciousness, praxis, Indigenous teachers, Taiwan

1. Introduction

In recent decades, with the advancement of democratic societies and Indigenous activist movements, settler-colonial states worldwide have become increasingly aware of the Indigenous rights. In response to address historical injustice and colonial legacy, governments have enacted cultural, linguistic, and educational policies to safeguard the rights of Indigenous communities and promote multicultural policies and education as a means of empowering Indigenous peoples. In Taiwan, government has demonstrated substantial commitment to advancing

Indigenous education since the 1990s. Key legislative efforts include the enactment of the Education Act for Indigenous Peoples in 1998 and the Indigenous Languages Development Act in 2017. Additionally, more than a hundred Indigenous schools focused on the teaching and preserving Indigenous cultures and languages has been established [1]. In recent years, amendments made in 2019 to the Education Act for Indigenous Peoples expanded its scope beyond Indigenous students to include all teachers, students, and citizens, marking the formal beginning of an era of Indigenous Education for All.

However, upon examining the actual implementation of Indigenous education, some researchers argue that current operational logic of Indigenous education quietly aligns with the goals of modern education systems, which prioritize enhancing national competitiveness, rather than considering educational justice from the perspective of Indigenous peoples [2][3]. While Indigenous elites may have certain expectations for the education system, not all Indigenous teachers share the same vision. Many Indigenous teachers, influenced by the legacy of colonialism and the perpetuation of internal colonization [4][5][6], may have internalized the colonial worldview and fully accept the arrangement of schooling as a ladder for social mobility and actively encourage other Indigenous people to compete for advancement [4].

This divergence in perspectives creates significant differences between those who have internalized the dominant culture and those who, through conscientization, critically perceived the reality of oppression. The result of these divisions is a plurality of educational approaches. While diversity can be desirable in some contexts, it can also act as an obstacle when there is a need to unite around a shared goal. In the case of Indigenous education development, such internal dispersal of energies might cancel out efforts and prevent forward movement.

Indigenous education requires support and collaboration of both Indigenous communities as well as the dominant Han Chinese. However, due to the hegemonies at work in the current society and education system, non-Indigenous teachers often lack adequate understanding of the needs of Indigenous peoples and failed to provide substantial support. This makes Indigenous teachers the critical agents for

Indigenous education, and thus the conscientization of Indigenous teachers is of greatest importance. Only by critically understand themselves and the reality can they form coherent perspectives on Indigenous education and transform these perspectives into educational praxis directed toward common goals. However, how does the conscientization of Indigenous teachers occur? What lived experiences or environmental conditions provide the soil for fostering of critical consciousness? How do they transform their critical understanding of the reality into practical actions that overcome the limitations imposed by reality?

Existing research tends to focus separately on the lived experiences and educational practices of Indigenous teachers, with little attention paid to how conscientization among Indigenous teachers bridge the gap. Given the many unknowns surrounding the conscientization of Indigenous teachers, this study aims to:

1. Explore the lived experiences of conscientization among Indigenous teachers,
2. Examine the conscientization process among Indigenous teachers, and
3. Understand the impacts of Indigenous teachers' conscientization.

By retelling the participants' stories, revealing the realities they dwell in, and providing empirical insights into how conscientization occurs and is sustained, this research seeks to create opportunities to inspire more Indigenous educators to become active agents in exercising their autonomy in decolonization and Indigenization project.

2. Theoretical framework

This research draws upon critical pedagogy and decolonial lens. Critical pedagogy, which emphasizes on exposing the political dimensions of education, is highly concerned with uncovering the hidden politics disguised as neutrality and facilitating the emancipation project of the oppressed by opening pedagogical spaces to the possibility of resistance [7]. Indigenous teachers, who serve as a critical pedagogues, engage in conscientization that facilitate them to achieve the highest state of consciousness—critical consciousness. As their consciousness evolves, they critically interrogate the educational system which function as ideological state apparatuses and tools of colonialism, probe into the brutal colonial histories and its impacts on Indigenous communities, they seek to dismantle the monoepistemic and monocultural system of education on one hand, and carving out educational spaces that culturally affirm Indigenous peoples by emphasizing on validating and

including Indigenous perspectives and knowledges on the other hand [5][8].

Since critical pedagogy has been “reinvented” or “translated” [9] into different context throughout all these years, the conceptual meaning of conscientization has been adapted [10][11]. It is now commonly used to refer to individual's—regardless of their position in social relations—critical awareness of power relations operating in, on, and through different aspects of lives and of people's possibilities for transforming oppressive social relations. Together, praxis has been divorced from conscientization and researched separately as two distinct processes, resulting in the lament by some critical theorist that the revolutionary potentials of critical pedagogy have been domesticated.

The expanded meaning of conscientization has undoubtedly provided valuable opportunities for more researchers and practitioners to engage in critical pedagogy, however, this research has its focus on Indigenous peoples in Taiwan, which is generally considered by the mainstream society as marginalized group due to historical issues. Thus, we align ourselves with Freire's idea of conscientization and subsequent researcher such as Nikolakaki [12] and Roberts [10] who closely following his conception but advance the idea.

In this study, conscientization is understood as a process initiate and sustains by the interweaving of critical understanding of self, reality, and the relationship between the two, and praxis that transform the reality. Stemming from this critical understanding, the oppressed formed a strong belief in every individual is historical subjects capable of shaping history and gained a sense of collective solidarity through this understanding. Identifying themselves as one of the members of the oppressed, they then assumed responsibility to engage in praxis—the reconstructive action and critical reflection needed to create a more humanized living condition for all. Praxis, which transforms reality, generates a reshuffled-set of reality, that offers new perceptions and new reflections for individuals. The continuation of this cyclical process, along with the dialectical understanding of self and reality, leads to the gradual transition of one's state of consciousness from magical or naïve consciousness to critical consciousness, i.e., the evolution of consciousness.

3. Reflections on and implications from related studies in Taiwan

To build this research on previous study, a search across three databases: Taiwan Citation Index - Humanities and Social Sciences (TCI-HSS), the National Central Library Taiwan Periodical Literature,

and the National Digital Library of Theses and Dissertations in Taiwan using keywords including “Indigenous,” “teacher,” “life,” “practice,” “consciousness,” “awakening,” “awareness,” “perception,” and “subjectivity” were conducted. A total of 82 articles were retrieved and were categorized into seven themes based on their research focus. Among them, two categories—*Indigenous Teachers’ Life Studies* (n=21) and *Indigenous Teachers’ Educational Practices* (n=9)—align with the research objectives. The former mainly employs self-narrative inquiry or in-depth interview to explore issues such as resistance to injustice, formation of ethnic identity, and career development among Indigenous teachers, often embedding individuals’ lived experiences at different life stages within these narratives. The latter primarily investigates Indigenous teachers’ educational philosophies, curriculum practices, and culturally responsive teaching practices utilizing case study as research method.

A comprehensive review of existing research reveals that studies on identity issues and life trajectories (*Indigenous Teachers’ Life Studies*) often fail to explore how Indigenous teachers with distinct identities or lived experiences differ in their educational practices. While a few studies [13][14][15][16], examine the connections between lived experiences and educational practices, these studies fall short of clearly delineating the relationship between the two. Similarly, research on Indigenous teachers’ educational practices (*Indigenous Teachers’ Educational Practices*) rarely considers how teachers’ classroom practices are influenced by their personal histories and life contexts.

Thus, although much research has illuminated Indigenous teachers’ lived experiences and their efforts made in Indigenous education or, more broadly, education for social justice, some critical questions remain unanswered: What drives some teachers to engage in transformative actions that challenge structural constraints on Indigenous development and what hinders some teachers to take action? Put in a broader way: Why do Indigenous teachers’ practices differ?

Many researchers attempt to explain the engagement of these Indigenous teachers in Indigenous education through their strong ethnic identity, often assuming that identity naturally leads to subsequent transforming actions. For example, Chou [17] describes how she concealed her ethnic identity while attending schools in non-Indigenous regions, only to rediscover the value of Indigenous culture when she became a teacher in an Indigenous-focused school. This rediscovery allowed her to embrace her ethnic identity, appreciate Indigenous culture, and

encourage her students to do the same. However, does strong ethnic identification necessarily lead to emancipatory educational practices?

From Chang [18]’s study and her subsequent reflections, it becomes clear that while ethnic identity may trigger actions, identity alone is insufficient to drive transformative practices. A missing piece remains—the awakening of critical consciousness (i.e., conscientization). This process involves reflecting on one’s lived experiences to transcend personal struggles, recognizing how structural factors such as societal, cultural, economic, political, and historical forces have shaped one’s trajectory.

However, the conscientization of Indigenous teachers remains underexplored in existing research, in Taiwan leaving us without a clear understanding of how Indigenous teachers are motivated to engage in and sustain transformative actions. Despite this gap, the review of existing research offers the following valuable implications for this study:

1. Research Participants

Current studies demonstrate that ethnic background and the area where the Indigenous teachers were born and raised influence their lived experiences, and their birth cohort relates to the awakening of their critical consciousness. Additionally, the location of the school impacts how they are treated after entering the profession and therefore structured their educational practices. These shaping factors will be considered during the research participants’ invitation process.

2. Research Methods

While studies exploring teachers’ life trajectories, self-identity, and ethnic identity often utilize self-narratives, mutual narratives, or in-depth interviews, research on teacher practices frequently employs case studies, gathering data through interviews, observations, and document analysis. Given this study’s focus on conscientization experience among Indigenous teachers—a specific topic which relates closely to their lived experiences and educational practices—a multiple-case study involving a combination of in-depth interviews, informal interviews, and document analysis as data collection methods will be adopted.

3. Research Scope

Existing studies reveal that opportunities and catalysts for conscientization are influenced by their lived histories and immediate context such as classrooms, schools, communities. In-depth study with research participants will explore their experiences across the present, the past and the future on personal, professional, and community contexts,

analyzing how their awareness of social realities and practices for Indigenous education evolve over time.

4. Research design

To explore Indigenous teachers' experiences of conscientization in depth, this study adopts a qualitative embedded multiple-case study design. As conscientization is a process varies depending on individual's lived experiences, which in turn influenced by demographic factors such as their place of origin, ethnicity, and age, a multiple-case study allows for a more comprehensive exploration across diverse participants [19]. To examine the multifaceted nature of Indigenous teachers' experiences of conscientization, an embedded case study design that incorporates multiple units of analysis within each case is especially appropriate [20].

In this embedded multiple-case study, each individual Indigenous teacher serves as a primary unit of analysis, with each teacher representing a distinct case. Since conscientization is shaped by lived experience, the context of each case includes both the personal biography of the teacher and the broader sociopolitical and historical realities they navigate. Six embedded units of analysis facilitate in capturing different dimensions of conscientization: experiences that initiate conscientization, the evolving process of conscientization, sustaining factors and wellsprings of conscientization, critical understanding of situated reality and praxis for transforming the perceived reality, and impacts of Indigenous teachers' conscientization.

4.1. Research Procedure

To ensure a systematic and in-depth exploration of Indigenous teachers' conscientization experiences, we adopt a three-phase research procedure. In the first phase (preparation), we conducted 2 focus group interviews and 8 group interviews with a total of 19 secondary school Indigenous teachers to understand their experiences in promoting Indigenous education. We purposefully focused on secondary school teachers, as they typically exercise greater professional autonomy and pedagogical agency, enabling them to engage more fully in rehumanizing, decolonizing, and Indigenizing pedagogical practices.

In the second phase (data collection and case analysis), drawing from our initial understanding of the teachers we have interacted with, we are currently further inviting 4 to 6 teachers who demonstrate critical reflection on their identities, histories, and positionalities within systems of oppression and actively challenge unjust social structures through their educational work to participate in in-depth study

exploring their experiences of conscientization. The methods to gather data including interviews and document analysis.

In the third phase (cross-case analysis and write up), we will conduct cross-case analysis and synthesis, comparing and contrasting the emergent findings with existing literature and present the research findings in a comprehensive write-up.

4.2. Data collection

To gain an comprehensive understanding of Indigenous teachers' experiences of conscientization, we employ in-depth interviews as the primary method of data collection, supplemented by document analysis. Unlike structured interviews, which aim to extract data from participants, we employ conversational method [21], a more nuanced and artful approach. An interview outline, based on broadly conceived themes, will be prepared prior to each interview. However, the interview process will resemble what Schostak [22] describes as "interview", where researchers will choose to share personal experiences and reflections to build a trusting, mutual relationship with participants and to invite the exchange of stories. Since relationality is at the core of the conversational method, we will take on the role of a participant to engage in "collaborative storying" [23]. Through this collaborative process, a mutual relationship build on trust, openness, and truthfulness between the researcher and participants will be fostered and deepen.

Depending on the stories shared by participants, a wide range of documents may be collected, including photographs, videos, audios, social media posts, diaries, blogs, teaching materials, art and crafts. Since human beings use not only language and symbols but also objects to think [24], these objects often contain hidden information that cannot be expressed through language. Furthermore, what people say often differs from what they do [25]. Therefore, the study of objects may uncover contradictory voices and inconsistent interpretations, opening up opportunities for further dialogue.

4.3. Intended aspects for data analysis

To address the aims of this study, data analysis will begin with individual case analysis and follow by cross-case analysis and synthesis. Analytical aspects including:

- Triggering issues that initiate the process of conscientization,
- Narratives of marginalization, recognition of oppression, and reframing of such experiences

- Transformation actions and critical reflections,
- Evolving process of conscientization,
- External factors and wellsprings necessary for the sustaining conscientization over time, and
- Impacts of conscientization on personal, professional and community aspects.

4.4. Research ethics

Since this research is designed to be an ongoing, dynamic and recursive process that involve the joint construction of narration between the researcher and the participant, attention to the relationship between the two is essential. In this study, we will seek to establish and maintain a respectful, genuine, and reciprocal relationship with participants [26], prioritizing their well-being [27] by being more sensitive to cultural differences, being respectful for Indigenous culture practices and knowledges, and genuine in the relationship [28]. Specifically, we will foster this relationship through participating in ceremonies and visiting their community, reviewing consent forms before in-depth studies, discussing in mutually equitable relationship about “sharing knowledge” [26].

Furthermore, ongoing member checking will begin at an early stage of data collection. This practice not only foster trust, but also serves other important purposes. For instance, it offers us valuable opportunities to develop an empathic understanding of the participants’ stories and achieving a closer identification with the participants, and for the participants possess a higher degree of ownership in the emerging narrative that we co-construct.

5. Conclusion

Findings from the first phase revealed that the educational practices of Indigenous teachers are constrained by highly context-specific structural factors, such as school curriculum, administrative support and parental involvement. Beyond these constraints, some participant teachers revealed that schools may seem to support Indigenous education, however, they are only instrumentalizing Indigenous students by applying for funding designated for Indigenous education but failing to allocate the resources meaningfully to benefit Indigenous students.

Although these participants teachers faced challenges in implementing Indigenous education, they consistently demonstrated the capacity to carve out greater space for transforming educational practices within existing structures. During our interviews, many discussed the connection between

their pedagogical actions and their own personal growth and schooling experiences, revealing how they continuously critically reflecting on themselves to frame and reframe the purpose and direction of their work.

In her seminal work *Decolonizing Methodologies*, Māori anthropologist Linda Tuhiwai Smith asserts that research is often perceived as a “dirty word” by Indigenous communities [26]. This raises a critical question: how can we engage in research that is not seen as a “dirty word”, but “useful, Indigenous, friendly, and just” [26]? As we have recently begun the second-phase of our research, i.e., inviting research participants and conducting interviews, we seek to research *with* our participants by creating a dialogic space—one in which sharing is an open invitation, storytelling becomes a mutual learning process, and meaning-making is a collaborative endeavor.

We remain mindful that, as Smith reminds us, “Indigenous research is a humble and humbling activity” [26]. Accordingly, we are committed to continuously reflecting on both the research process and our own positionalities as the work unfolds. It is hope that this research will not be merely an intellectual project, but as a praxis.

6. References

- [1] IEIW (2025). List of Indigenous-focused school. <https://ieiw.k12ea.gov.tw/#1&gsc.tab=0>.
- [2] Chen, Y-S. (2012). Indigenous education: Lost in the national education system. *The Elementary Education Journal*, 59(1), 34-43.
- [3] Nesterova, Y. (2019). Teaching Indigenous children in Taiwan: Tensions, complexities and opportunities. *Global Studies of Childhood*, 9(2), 156-166. DOI: 10.1177/2043610619846349.
- [4] Lien, N. (2013). Decolonization of education: Generating the subjectivity of Indigenous education. *Taiwan: A Radical Quarterly in Social Studies*, 91, 1-31.
- [5] Nesterova, Y. (2023). Colonial legacies and the barriers to educational justice for Indigenous Peoples in Taiwan. *Comparative Education*. DOI: 10.1080/03050068.2023.2185355.
- [6] Wang, Q-L. (2009). “Decolonizing Methodology” and its application for research on Indigenous education. *Tzu-Chi University Journal of The Educational Research*, 5, 83-103.
- [7] Giroux, H. A. (2011). *On critical pedagogy*. Continuum.
- [8] Somby, H. M., & Olsen, T. A. (2022). Inclusion as indigenisation? Sámi perspectives in teacher

education. *International Journal of Inclusive Education*, 1-15. DOI: 10.1080/13603116.2022.2127495.

[9] Lampert, M. (2016). North American critical pedagogy. In M. A. Peters (Ed.), *Encyclopedia of educational philosophy and theory*. Springer.

[10] Roberts, P. (2000). Education, literacy, and humanization: Exploring the work of Paulo Freire. Retrieved from <https://legacy.abc-clio.com/reader.aspx?isbn=9780313000706&id=20004DD6-137>.

[11] Villanueva, C. & O'Sullivan, C. (2019). Analyzing the degree of consensus in current academic literature on critical pedagogy. *Scenario*, 2019(2). DOI: 10.33178/scenario.13.2.6

[12] Nikolakaki, M. (2012). Critical pedagogy in the new dark ages: Challenges and possibilities: An introduction. *Counterpoints*, 422, 3-31.

[13] Chou, S-Z. (2000). *Quest for the ancestral spirit: The life journey of Indigenous youth teachers* [Unpublished master's thesis]. Hua-Shih College of Education.

[14] Lin, H-P. (2000). *Transforming challenges into opportunities: The life, actions, and practices of an Indigenous teacher* [Unpublished master's thesis]. National Dong Hwa University.

[15] Lin, L-R. (2011). *Glory and pride of Pinuyumayan: A narrative study on the professional development of an Indigenous female elementary school teacher* [Unpublished master's thesis]. Taipei University of Education.

[16] Pan, Y-M. (2011). *"Hope against all odds": A self-narrative study of an Indigenous elementary school teacher* [Unpublished master's thesis]. National Taichung University of Education.

[17] Chou, Y-H. (2020). *"We are all the same after all": A narrative inquiry into the self-identity of Indigenous teachers* [Unpublished master's thesis]. National Taichung University of Education.

[18] Chang, S-C. (2015). Making sense of aboriginal educare-givers' identities. *Journal of Educational Practice and Research*, 28(1), 61-98.

[19] Yin, R. K. (2003). *Case study research: Design and methods*. (3rd ed.). SAGE.

[20] Scholz, R. W., & Tietje, O. (2002). Embedded case study methods: Integrating quantitative and qualitative knowledge. SAGE. DOI: 10.4135/9781412984027.n2.

[21] Kovach, M. (2010). Conversational method in Indigenous research. *First Peoples Child & Family Review*, 5(1), 40-48.

[22] Schostak, J. (2006). *Interviewing and representation in qualitative research*. Open University Press.

[23] Bishop, R. (1996, June 15-22). Collaborative storytelling: Meeting Indigenous peoples' desires for self-determination in research [Paper presentation]. World Indigenous People's Conference, New Mexico.

[24] Prior, L. (2003). *Using Documents in Social Research*. Sage.

[25] Hodder, I. (2000). The interpretation of documents and material culture. In N. K. Denzin, & Y. S. Lincoln, (Eds.), *Handbook of Qualitative Research (2nd Ed.)* (pp. 703-715). Sage.

[26] Smith, L. T. (2021). *Decolonizing methodologies: Research and Indigenous peoples* (3rd ed.). Zed Books.

[27] Atkinson, R. (2012). The life story interview as a mutually equitable relationship. In J. F. Gubrium, J. A. Holstein, A. B. Marvasti, & K. D. McKinney (Eds.), *The SAGE handbook of interview research: The complexity of the craft* (pp. 115-128). Sage.

[28] Kovach, M. (2016). Doing Indigenous methodologies: A letter to a research class. In N. Denzin, & Y. Lincoln (Eds.), *The SAGE handbook of qualitative research (5th Ed.)* (pp. 214-234). Sage Publications.

Session 11: Learning/Teaching Methodologies and Inclusive Education

Title: Timing of Feedback and Retrieval Practice: A Laboratory Study with EFL Students
Author: Sameer Aljabri

Title: Role Overload and Negative Affect in University Students with ADHD: The Mediating Role of Coping Self-efficacy
Authors: Julia Baran-Polansky, Julia Petrovic, Jessica Mettler, Nancy L. Heath

Title: Building Self-Confidence for Students via Oral Exams for More Authentication
Author: Sriram Ananthan

Title: Toward Justice-Sensitive Oriented Indigenous Education for All: Incorporating Indigenous Perspectives into Inclusive Curriculum Knowledge Construction
Author: Hsiao-Lan (Sharon) Chen

Timing of Feedback and Retrieval Practice: A Laboratory Study with EFL Students

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Abstract

The aim of this empirical laboratory study was to investigate the effect of immediate and delayed feedback on retrieval practice among EFL learners using short answer tests administered at three different time points: immediately, one week later, and one month later. It aimed to answer the following research questions: (1) Does providing feedback enhance long-term retention by Saudi EFL learners? (2) Which type of feedback—immediate or delayed—affects EFL learners' long-term memory retention when short-answer tests are used? (3) If a positive effect is observed, is it still noticeable after one month?

1. Introduction

Empirical investigations in both laboratory and classroom settings have demonstrated the superiority of retrieval practice over restudying for long-term retention (Agarwal et al., 2021; Aljabri, 2024; Clark and Svinicki, 2014; McDaniel and Little, 2019; Roediger and Karpicke, 2006; Rummer et al., 2019; Yang et al., 2021). Although restudying may be more effective for short-term retention, the literature consistently supports the superior long-term benefits of retrieval practice for enduring learning. One of the factors that affect retrieval practice and significantly influence its effectiveness in learning contexts is feedback (Adesope et al., 2017; Rowland, 2014).

Research into the effect of feedback provision and its timing during retrieval practice has produced contradictory findings. Some studies indicate that delayed feedback yields better results (e.g. Cassinelli, 2015), while others argue for the superiority of immediate feedback (e.g. Li, 2020). Additionally, certain studies indicate that there is no substantial difference in long-term retention outcomes between immediate and delayed feedback (Rummer et al., 2019). To the best of my knowledge, no study has examined this issue with Saudi EFL (English as a Foreign Language) students. This study aims to examine the effects of both immediate and delayed feedback on retrieval practice using prose passages among EFL students.

2. Phase 1

In phase 1, for the Repeated Studying group, participants accessed an online presentation that included the reading passage and distractor tasks. They read the passage displayed for 10 minutes and then had a 5-minute mathematical distractor task. This process was repeated four times. For the Repeated Testing-no feedback group, participants first read a passage for 10 minutes, followed by a 5-minute distractor task. They then completed three test trials, each consisting of a 15-item short-answer test, with a distractor task occurring between each test. During each trial, participants had 1 minute to write their answer for each question before the next question appeared. No feedback was given during these test trials.

The Repeated Testing-immediate feedback group followed a process similar to the Repeated Testing-no feedback group, with the key difference being the addition of immediate feedback. This feedback consisted of the correct answers being provided after each question. At the end of each 1-minute period allocated for answering a question, the correct answer was displayed for 10 seconds before proceeding to the next question. This immediate feedback was provided for all three test trials.

The Repeated Testing-delayed feedback group followed the same procedure as the Repeated Testing-immediate feedback group, but with feedback provided at the end of the test trials. After completing each test trial, participants were shown the correct answers for 150 seconds, with each answer displayed for 10 seconds.

Phase 2

In Phase 2, participants completed an immediate test featuring 15 questions presented in a randomized order. Each question was displayed for 1 minute, during which participants recorded their answers. Following each question, a blank screen was shown for 10 seconds before proceeding to the next question.

Phase 3

In Phase 3, participants returned for an unexpected one-week delayed test. They were

presented with an online presentation containing the 15-item short-answer test, displayed in a different order from previous tests. Each question was presented for 1 minute, followed by a 10-second blank screen. In Phase 4, participants returned one month later for an unexpected second delayed test. Similar to the one-week delayed test, the questions were presented in a different order, and participants had 1 minute to answer each question. Figure 1 below shows the four learning conditions and the three phases.

4. Conclusion

Results revealed that retrieval practice without feedback outperformed repeated studying in the one-month delayed test. Both immediate and delayed feedback groups outperforming the no-feedback and restudying groups. Moreover, immediate feedback was found to be more effective than delayed feedback in enhancing long-term retention. These findings emphasize the importance of providing timely feedback to optimize retrieval practice and improve learning outcomes in EFL contexts.

5. References

- [1] Agarwal, P. K., Nunes, L. D., & Blunt, J. R. (2021). Retrieval practice consistently benefits student learning: A systematic review of applied research in schools and classrooms. *Educational Psychology Review*, 33(4), 1409–1453. <https://doi.org/10.1007/s10648-021-09595-9>.
- [2] Aljabri, S. (2024). Investigating the effect of retrieval practice on EFL students' retention of prose passages: Repeated testing versus studying. *World Journal of English Language*, 14(5), 303–312. DOI: 10.5430/wjel.v14n5p303.
- [3] Clark, D. A., & Svinicki, M. D. (2014). The effect of retrieval on post-task enjoyment of studying. *Educational Psychology Review*, 27(1), 51–67. DOI: 10.1007/s10648-014-9272-4.
- [4] McDaniel, M. A., & Little, J. L. (2019). Multiple-choice and short-answer quizzing on equal footing in the classroom: Potential indirect effects of testing. In J. Dunlosky & K. A. Rawson (Eds.), *The Cambridge handbook of cognition and education* (pp. 480–499). Cambridge University Press. DOI: 10.1017/9781108235631.020.
- [5] Roediger, H. L., & Karpicke, J. D. (2006). Test-enhanced learning: Taking memory tests improves long-term retention. *Psychological Science*, 17(3), 249–255.
- [6] Rummer, R., Schweppe, J., & Schwede, A. (2019). Open-book vs. closed-book tests in university classes: A field experiment. *Frontiers in Psychology*, 10, Article 463. DOI: 10.3389/fpsyg.2019.00463.
- [7] Yang, C., Luo, L., Vadillo, M., Yu, R., & Shanks, D. R. (2021). Testing (quizzing) boosts classroom learning: A systematic and meta-analytic review. *Psychological Bulletin*, 147(4), 399–435. DOI: 10.1037/bul0000309.
- [8] Adesope, O. O., Trevisan, D. A., & Sundararajan, N. (2017). Rethinking the use of tests: A meta-analysis of practice testing. *Review of Educational Research*, 87(3), 659–701. DOI: 10.3102/0034654316689306.
- [9] Rowland, C. A. (2014). The effect of testing versus restudy on retention: A meta-analytic review of the testing effect. *Psychological Bulletin*, 140(6), 1432–1463. DOI: 10.1037/a0037559.
- [10] Cassinelli, J. L. (2015). The testing effect in institutional video safety training: A comparison of testing, pretesting and the influence of feedback in long term retention [Master's thesis, Leiden University].
- [11] Li, S. (2020). What is the ideal time to provide corrective feedback? Replication of Li Z., Ellis (2016) and Arroyo, Yilmaz (2018). *Language Teaching*, 53(1), 96–108. DOI: 10.1017/S026144481800040X.

Role Overload and Negative Affect in University Students with ADHD: The Mediating role of Coping Self-efficacy

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Abstract

Understanding and effectively responding to the unique support needs of neurodiverse students, such as students with attention deficit hyperactivity disorder (ADHD), is a key priority for university student services. For instance, role overload (i.e., feeling overwhelmed and unable to meet the demands of one's roles and responsibilities) is commonly reported by university students as an impediment to their well-being and may especially impact students with ADHD, who are particularly susceptible to difficulties managing the multifaceted demands of university. However, the relationship between role overload and well-being among university students with ADHD, including its potential mediators, remains unknown. This study thus explored the mediating roles of (1) attention control and (2) coping self-efficacy in the relationship between role overload and negative affect (an index of well-being) among this population. University students with ADHD (n=129; Mage=23.41; 75.2% women) completed online measures of role overload, attention control, coping self-efficacy, and negative affect. Results from mediation analyses revealed that attention control did not mediate the significant positive relationship between role overload and negative affect, whereas coping self-efficacy did, suggesting that students' confidence in their ability to cope with stressors may be a protective factor for the emotional strain associated with role overload. Promoting coping self-efficacy in university students with ADHD (e.g., through evidence-based coping skills instruction) may therefore have utility in student services' resilience-building efforts for neurodiverse students.

Building Self-Confidence for Students via Oral Exams for More Authentication

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Abstract

In the era of digital education and rising concerns around academic integrity, oral examinations are re-emerging as a powerful tool for authentic student assessment. This presentation explores how integrating oral exams into post-secondary education not only deters academic dishonesty but also fosters significant improvements in student self-confidence and communication skills.

Drawing from classroom-based case studies and practical teaching experiences, this paper examines the pedagogical value of oral assessments in diverse learning environments. It outlines how structured, conversational evaluations compel students to engage deeply with course content, articulate their understanding clearly, and develop critical thinking in real time. Unlike traditional written assessments, oral exams reduce opportunities for plagiarism or the misuse of generative AI tools, thereby ensuring a more genuine reflection of student capability.

Furthermore, oral exams encourage students - especially those from multilingual or non-traditional backgrounds - to express their ideas, receive immediate feedback, and gain confidence in professional dialogue. These benefits align with current goals in higher education to promote inclusivity, lifelong learning, and real-world readiness.

This session will also provide a roadmap for educators interested in implementing oral exams, including assessment design, rubrics, and methods for ensuring consistency and fairness. Preliminary findings from a survey conducted among business students in Canada suggest a positive shift in student engagement, confidence, and satisfaction when oral exams are integrated into course evaluation.

By positioning oral examinations as both an assessment and a developmental tool, this presentation advocates for a broader institutional shift towards assessments that are as much about learning and growth as they are about grading.

Toward Justice-Sensitive Oriented Indigenous Education for All: Incorporating Indigenous Perspectives into Inclusive Curriculum Knowledge Construction

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Abstract

To promote historical justice and educational justice for Indigenous peoples in post-colonial societies, it is important to incorporate Indigenous knowledge, perspectives, and historical narratives into school curriculum, not only for enacting inclusive education but also for implementing justice-sensitive pedagogy for social justice in curriculum change. Over the past decades, in Taiwan, there have been endeavors to support the construction of Indigenous knowledge systems, and the newly reformed national Curriculum Guidelines have incorporated some historical and cultural perspectives of Indigenous peoples. However, the content and supporting mechanisms are not quite relevant, and the goal of promoting historical justice and educational justice for Indigenous peoples has not been fully understood and implemented. With the attempt to explore and develop collaboratively feasible plans for justice-sensitive oriented Indigenous education for all, this study conducted focus group interviews and individual interviews to learn from Indigenous education leaders, scholars, and practitioners about their experiences in Indigenous education and their aspirations for incorporating Indigenous perspectives into school curriculum for justice-sensitive inclusive education. Based on the learning from 46 Indigenous participants and 14 non-Indigenous participants, the preliminary findings are very insightful and constructive, which can serve as a foundation for further development of justice-sensitive pedagogy and inclusive curriculum for promoting Indigenous Education for All.

Keywords: inclusive education, Indigenous Education for All, Indigenous perspective, justice-sensitive pedagogy

1. Introduction

In the pursuit of promoting historical justice and educational justice for Indigenous peoples in post-colonial societies, many countries around the globe have actively incorporated Indigenous knowledge, perspectives, and historical narratives into school curriculum. Not only increasing efforts have given to

the enactment of inclusive education that helps resist the colonality of knowledge, of power, and of being [1], [2], [3], but also increasing advocacies have been placed on “justice-sensitive pedagogy for social justice” as a vital theme in curriculum change and teacher education [4], [5], [6]. However, in order to provide a basis for enabling dialogues on the conceptualization of justice-sensitive pedagogy and practice for inclusive Indigenous Education for All, it is indispensable to articulate the recognition of existential realities of oppression, repression, domination, and exclusion and to accentuate the recognition of alternative Indigenous forms of knowledge [7]. Also, it may necessarily involve “the work of decoloniality,” as pointed out by [3], to dismantle the relations of power and conceptions of knowledge that foment the reproduction of mainstream values, and as addressed by [7], to enable constructive dialogues for equitable inclusive education from cultural diversity and cognitive justice perspectives without qualifying standards of western hegemonic discourse of thought and practice.

In line with such a global trend, in Taiwan, the government has developed a powerful policy and legal framework to protect Indigenous rights and development over the past decades, and there have been endeavors to support the construction of Indigenous knowledge systems. However, in view of the fact that although the newly reformed 2019 Curriculum Guidelines has incorporated some historical and cultural perspectives of Indigenous peoples, the content and supporting mechanisms are not quite relevant, and the goal of promoting historical justice and educational justice for Indigenous peoples has not been fully understood and implemented. According to [8], the education provided in schools has always been limited to the dominant Han Chinese culture, and the institutional structure has not changed to respond to the learning needs of Indigenous students. Further, most Han teachers do not know how to teach properly the content about Indigenous culture and history being presented in the textbooks, nor how to deal appropriately with inequity, stereotype, or microaggression issues related to Indigenous peoples. There are still many underlying political, cultural, social, school environment, and other influencing factors need to be clarified and resolved. Therefore, it

is imperative to explore feasible approaches and suitable inclusive curriculum knowledge construction that will help enhance historically and culturally sensitive knowledge systems of Indigenous peoples. Also, it is vital to involve both Indigenous and non-Indigenous teachers to be attended to the concerns of historical justice and educational justice of Indigenous peoples, and thereby promoting justice-sensitive oriented inclusive curriculum and teaching practices of Indigenous Education for All.

This study, as the beginning exploration stage of a three-year research project, aims to explore and to sort out the experiences of and aspirations from Indigenous scholars, experts, and educators regarding their endeavors in promoting and constructing Indigenous knowledge systems. It is intended that the findings and outcomes from this stage can serve as a foundation for the further stages of collaborative development of feasible plans for inclusive curriculum, justice-sensitive pedagogy, and teacher empowerment programs with Indigenous perspectives and aspirations. Based on this, the purposes of the first-year study include:

- (1) To understand the perspectives and aspirations of Indigenous education leaders and practitioners regarding the historical justice and educational justice for Indigenous peoples
- (2) To understand Indigenous scholars' and practitioners' expectations for and experiences in constructing Indigenous knowledge systems and to collect the resources they use and create in the process
- (3) To analyze and to sort out the Indigenous peoples' histories, cultural perspectives, knowledge contents, and ways of learning that can be historically, culturally, and cognitively sensitive incorporated into school curriculum for inclusive Indigenous education.

2. Research methods and data sources

Based on the research purposes, this first-year study (2024/8/1~2025/7/31) was designed to conduct focus group interviews and individual in-depth interviews with Indigenous educators, leaders, and academics. Firstly, with the attempt to understand the perspectives, aspirations, and experiences of Indigenous education leaders, advocates, and academics, six focus group interviews and three in-depth individual interviews have been conducted. Altogether, 32 participants were interviewed, including 15 Indigenous scholars/academics, 12 Indigenous school leaders and experienced teachers, and 5 Indigenous culture promoters from 13 different tribes in different parts of Taiwan. Then, followed up with the attempt to understand the experiences and expectations of educational practitioners involved in Indigenous Student Programs, visitations to 12

secondary schools in different parts of Taiwan were arranged along with 11 group interviews and 1 individual interview were conducted. Altogether 28 secondary teachers were interviewed, including 14 Indigenous teachers and 14 non-Indigenous teachers.

Each interview lasted for two hours. The interviews were conducted in Chinese and the interviews were audio-recorded with written consent of the participants. Each interview had been transcribed verbatim in English. Grounded theory approach was used in data analysis of this study. While deductive coding and theme development were used, the data analysis was largely inductive with themes emerging from the data. After each interview was transcribed and analyzed, the results of preliminary analysis were sent to the participants for member check and their reflective responses were collected for amendment.

3. Tentative analysis and discussion

Since promoting justice-sensitive education for Indigenous peoples must be linked to thinking on issues related to educational justice for Indigenous peoples, the analysis and discussion will focus on how Indigenous education leaders and practitioners assess the accomplishment of their Indigenous knowledge construction and what Indigenous knowledge, culture, perspectives, and historical narratives should be incorporated into school curriculum. What expectations, concerns, and suggestions they have in mind about the intellectual sovereignty of Indigenous peoples and the politics of Indigenous representation in textbooks.

Concerning the barriers to educational justice for Indigenous peoples in Taiwan [9], the analysis and discussion will also delve into how scholars' Indigenous knowledge construction projects and resources can be transformed and integrated into school curricula to allow all students, both Indigenous and non-Indigenous students, being able to learn the knowledge and viewpoints of Indigenous peoples; and how Indigenous education practitioners' teaching experiences and pedagogical practices in Indigenous communities can be transformed and implemented in general schools to allow all students, both Indigenous and non-Indigenous, having the opportunities to appreciate different ways of knowing and to learn with the cognitive approaches they are good at.

Based on the analysis of the experiences and aspirations shared by the Indigenous education promoters and practitioners, the possible challenges and barriers as well as promises and opportunities of applying justice-sensitive approach toward Indigenous Education for All will also be addressed. Then, considerations and suggestions will be provided,

not only for the next stages of this study but also for the pursuit for a more just education for all.

4. Conclusion

There are many valuable topics and resources of Indigenous cultural and natural knowledge being identified and developed; however, they must be further transformed and integrated into school curriculum to allow all students, both Indigenous and non-Indigenous, to learn and to appreciate the worldviews and perspectives of Indigenous peoples. It is important to go beyond the superficial coverage of Indigenous content and extract the essential meaning and values of Indigenous culture and knowledge systems. Also, it is necessary to make dialectical connections with the mainstream Western knowledge in school curriculum and to reflect critically on the differences and the commonalities between Indigenous and Western knowledge systems. In order to effectively and thoughtfully integrate Indigenous perspectives into school curricula and foster culture-awareness and justice-sensitive learning, Indigenous and non-Indigenous teachers need to learn and collaborate together. Only then can the relational pedagogical practices be mutually exercised and the aspirations for Indigenous education for ALL be truly realized.

With the intention to develop justice-sensitive oriented inclusive curriculum that incorporate Indigenous perspectives, the findings of this study may help build empathic understanding and mutual collaborations between Indigenous and non-Indigenous teachers and meet the learning needs of both Indigenous and non-Indigenous students. It is hoped that an increased sense of participation and more proactive pedagogical practices will happen in various regions and schools in Taiwan and other countries.

5. References

- [1] Muchenje, F. (2017) Cognitive justice and Indigenous knowledge systems in the postcolonial classroom. In E. Shizha, & N. Makuvaza, (Eds.) *Rethinking postcolonial education in Sub Saharan Africa in the 21st Century: Post Millennium Development Goals* (pp. 69-84). Sense Publishers.
- [2] Nishina, A., Nishina, A., Lewis, J. A., Bellmore, A., & Witkow, M. R. (2019). Ethnic diversity and inclusive school environments. *Educational Psychologist*, 54(4), 306-321. DOI: 10.1080/00461520.2019.1633923.
- [3] Walton, E. (2018). Decolonising (through) inclusive education? *Educational Research for Social Change*, 7, 31-45. DOI: 10.17159/2221-4070/2018/v7i0a3.
- [4] Cochran-Smith, M. (2010). Toward a theory of teacher education for social justice. In A. Hargreaves, A. Lieberman, M. Fullan, D. Hopkins (Eds.), *Second international handbook of educational change. Springer international handbooks of education* (vol. 23) (pp. 445-467). Springer, Dordrecht. DOI: 10.1007/978-90-481-2660-6_27.
- [5] Davies, L. (2017). Justice-sensitive education: The implications of transitional justice mechanisms for teaching and learning. *Comparative Education*, 53(3), 333-350. DOI: 10.1080/03050068.2017.1317999.
- [6] Parkinson, C. & Jones, T. (2018). Aboriginal people's aspirations and the Australian curriculum: A critical analysis. *Educational Research for Policy and Practice*, 18, 75-97.
- [7] Makoelle, T. (2014). Cognitive justice: A road map for equitable inclusive learning environments. *International Journal of Education and Research*, 2(7), 505-518.
- [8] Couch, D., Nesterova, Y. & Nguyen, H. (2024) Examining non-Indigenous teacher perceptions of Indigenous students in Taiwan through a Strategic Relational Approach. *Asia Pacific Education Review*, 25, 255-266. DOI: 10.1007/s12564-023-09830-8.
- [9] Nesterova, Y. (2023). Colonial legacies and the barriers to educational justice for Indigenous Peoples in Taiwan. *Comparative Education*. DOI: 10.1080/03050068.2023.212185355.

Session 12: Global Issues In Education and Research

Title: Beyond Borders: Socioeconomic Impacts of Nepali Students' Pursuit of Higher Education Abroad

Author: Durga Prasad Neupane

Title: Slavery Positivism in the Evolution of Selected Genres of African Music

Author: Sheyi Ezekiel Kehnnny

Title: Knocked out Teeth: Mishandling of Accidental Injuries on Campus

Author: Suping Yang

Title: Endemic of Violence and Child Labour during COVID-19 - A Narrative Case Study on the Effective Well-being Strategies for Building Resilience among Public School Going Learners in Karachi

Author: Salima Moosa Sadruddin Sewani

Beyond Borders: Socioeconomic Impacts of Nepali Students' Pursuit of Higher Education Abroad

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Abstract

This study investigates the socioeconomic impact of Nepali students pursuing higher education abroad. Through semi-structured interviews with 20 students and 20 parents, it explores the motivations, experiences, and aspirations of those involved in this educational migration. The research aims to understand the factors influencing students' decisions to study abroad, the challenges they encounter, and the potential benefits for both the individual and Nepal. Findings reveal key push and pull factors, including limited educational opportunities in Nepal, perceived better career prospects abroad, and parental aspirations for their children's success. The study highlights the economic burden on families, the social implications of extended absence, and the potential for skill transfer and knowledge exchange upon return. Based on these findings, the paper recommends targeted scholarships, career counseling, and capacity building initiatives to maximize the benefits of student mobility for Nepal's development.

Slavery Positivism in the Evolution of Selected Genres of African Music

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Abstract

Slavery has been associated with various demerits so much that they have overshadowed some good elements derived from creative activities that are expressed by slaves. The evolution of some features in genres of African music and usages of their unique elements can be attributed to the creative characters and impulses of some of the slaves. Consequently, this study sees to explicate the extent to which creative musical skills displayed by slaves have influenced and heralded the evolution of Genres of African music such as Reggae, Highlife, Afro jazz, Juju etc. This investigation utilises qualitative method of collecting and presenting data through the use of library. Results of this study would be anchored on those conditional situations that culminated with the creative elements in the selected genres of African music. It is therefore recommended that, the creativity in music of all regions be viewed in line with emotions that are associated with slavery.

Knocked out Teeth: Mishandling of Accidental Injuries on Campus

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Abstract

Campus accidental injuries refer to unexpected bodily harm occurring to students at school. Improper handling not only endangers students' physical and mental health and disrupts the learning atmosphere but also challenges school credibility and parent-school trust, potentially triggering legal disputes and public backlash. This study examines a tooth avulsion incident at X Middle School. Through five phases—"emergence of the incident, responsibility determination, conflict escalation, investigation, and post-incident reflection"—it reveals loopholes in the school's safety management exposed by the accident and depicts the management challenges posed by such injuries. This case aims to enhance comprehension of campus accidents and stimulate thinking about safety management practices.

Keywords: Campus accidents, middle school students, emergency response

1. Introduction

Accidental injuries on campus refer to unexpected physical harm incidents that occur during students' school hours. If mishandled, these incidents endanger students' physical and mental health, strain the campus learning atmosphere, undermine the school's credibility and the trust between parents and the school, and trigger legal disputes and public controversies. The handling of a tooth injury accident at X Middle School has drawn attention, exposing its safety management loopholes. This case presents the entire process of accident handling through the stages of "the emergence of the turmoil - the determination of liability - the escalation of conflicts - the initiation of an investigation - post-event reflection", highlighting the challenges of accidental injuries on campus to school safety management and facilitating learners' in-depth understanding and critical thinking.

2. Knowledge System

2.1. Background of Campus Accidental Injury Incidents

2.1.1. New Orientation and Risks in Physical Education Courses. Under the guidance of the 2022

Physical Education Curriculum Standards, physical education classes have become more diverse in form but also hotspots for accidental injuries, posing difficulties for school management. Given that students represent the future and the hope of families, any mismanagement of accidents has far-reaching consequences.

2.1.2. Elements and Types of Accident Determination. Determining whether an incident is a campus accidental injury requires considering two factors: whether it occurs on campus and whether it is unexpected. Types include injuries caused by students to themselves or others, those caused by schools or teachers to students, and those caused by natural factors. Accidents with students as the main responsible parties are complex due to multiple liability subjects, prone to disputes, and affecting the interests of all parties, the school's reputation, and students' psychology.

2.1.3. Regulatory Requirements and Practical Dilemmas. The Ministry of Education stipulates that schools should strengthen safety education, improve safety mechanisms, and provide timely assistance to the injured. However, some schools lack emergency response capabilities due to ineffective emergency mechanisms, insufficient professional qualities of personnel, and perfunctory training.

2.2. Analysis of the Accident Handling Process

2.2.1. The Outbreak of the Turmoil (A Revenge-induced Tooth Injury Accident in Physical Education Class. During the push-up exercise in a physical education class, the smaller student was deliberately "pressed" by the larger student and retaliated, causing the larger student's head to hit the ground and teeth to be damaged. Teacher W panicked and failed to provide timely assistance or investigate the cause, delaying the golden rescue period. When the parents arrived, they lost control, and the scene was chaotic, increasing the risk of secondary harm to the student.

2.2.2. Difficulties in Determining Liability. From a legal perspective, the guardian of the smaller student is liable for the negligent injury; the larger student's

fault can reduce the liability of the smaller student; and Teacher W's failure to fulfill safety management obligations, implement protection and supervision, and provide timely treatment makes the school liable for compensation. This reflects the common problems of teachers' lack of emergency knowledge and the school's weak management awareness.

2.2.3. The Escalation of Conflicts. During the negotiation of compensation, parents had serious differences, and the inappropriate remarks of Teacher Y exacerbated the situation, leading to the breakdown of mediation. After police intervention, liability was determined based on fault: 30% for the school, 50% for the smaller student's guardian, and 20% for the larger student. Teacher W was punished. The principal thus reflected on the causes of teachers' lack of emergency response capabilities and launched an investigation.

2.2.4. Investigation of Teachers' Emergency Response Capabilities. Interviews with eight physical education teachers showed diverse views on liability determination, most were confused about accident handling, and many regarded safety training as useless. Some teachers reduced dangerous activities to avoid disputes, exposing weaknesses such as weak emergency handling capabilities, lack of responsibility and safety awareness, and low training effectiveness.

2.2.5. In-depth Reflection and Measures. The principal organized a seminar for teachers to discuss countermeasures. Emphasize that safety education should strengthen teachers' risk perception; emergency response plans should be customized and practical; training should focus on practice; safety management policies must be implemented; prevention and handling should be coordinated, and accidents should be handled fairly and in accordance with regulations to protect the interests of all parties. The principal also identified loopholes such as the school's emphasis on grades over safety, ineffective resource allocation, and failure to update and evaluate the management system, and was determined to reconstruct the safety management system. Including clarifying goals and tasks, standardizing systems and processes, training and assessing teachers, cultivating a safety culture, and using big data for supervision and evaluation to comprehensively enhance campus safety.

3. Conclusion

The prevention and handling of campus accidental injuries are the core of school safety management, with prevention being the top priority requiring the full attention and implementation of school administrators. A sound management mechanism can

standardize processes and enhance protection capabilities, with the key lying in strengthening teachers' risk prevention and control and practical skills. When handling accidents, administrators should collaborate with teachers to formulate feasible plans and solve practical problems to ensure the smooth progress of emergency management. In short, campus safety depends on the joint efforts of multiple parties. Only by improving the mechanism and enhancing teachers' capabilities can a solid safety barrier for the campus be built to escort students' growth.

4. References

- [1] Tang, R. Y. (2020). Responses and Handling Procedures for Campus Accidental Injury Incidents. *Jiangsu Education*, 55, 2-6.
- [2] Xu, L. J. (2010). *Campus Safety and Crisis Management*. China Renmin University Press.
- [3] Yu, X. J., Ma, X. P., & Fan, X. Y. (2010). *Campus Security Prevention Guide*. China Legal Publishing House.
- [4] Zhang, H., Liu, Y., & Liu, Y. (2017). *Theories and Methods of Emergency Decision Support for Sudden Accidents*. Science Press.
- [5] Xu, M. Y. (2016). Preliminary Discussion on the Prevention Mechanism and Legal Responses to Campus Accidental Injury Incidents. *Legal Vision*, 17, 165-166.

Endemic of Violence and Child Labour during COVID-19 - A Narrative Case Study on the Effective Well-being Strategies for Building Resilience among Public School Going Learners in Karachi

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Abstract

This paper reflects on the tribulations faced by the public school-going learners in Karachi during COVID-19. It also sheds light on the innovative pilot strategies that we used to support their education during the closure of the school. Through the reflective narrative case study approach, fellow teachers first gathered a few stories from learners and parents living in their neighbourhoods. They reported cases of child labour, slavery, and early marriages. We then discussed, planned, and piloted strategies to teach and support learners in grades 5 to 8 during COVID-19. We prepared educational packs that included educational games, assignments, and an easy-to-use guidebook. We also offered phone-based academic counselling to learners. Strategies like taking parents and community leaders into confidence, and offering free vocational education, medical checkups, and medicines to parents and learners worked successfully. Around 17 girl children and 32 male children, who were engaged in child labour during COVID-19, returned to their routine education. Throughout the process, the role of community leaders was pertinent. Our contextual education model for marginalized children and parents can be used by other educational institutions during an uncertain time.

Keywords: *child labour, violence, COVID-19, education, marginalized, well-being, public school learners, innovative pilot strategy, resilience*

1. Introduction

Violence and child labour are the most brutal forms of children's rights violations that were documented during COVID-19 (Corsi, 2021; UNICEF, 2021a; United Nations, 2020; United Nations, 2021). Globally, around 160 million children (as of 2020) are working in hazardous conditions. It is predicted that the number could rise to 168.9 million by the end of 2022 due to

COVID-19. South Asia has seen steady progress in child labour cases, with a marked increase of females in forced labour activities (International Labour Organisation and United Nations Children's Fund, 2021; Idris, 2020).

Pakistan is an advocate of child rights. Article 11.3 of the Constitution of Pakistan states, "No child below the age of fourteen years shall be engaged in any factory or mine or any hazardous employment". The Child Employment Act of 1991 also protects children from child labour.¹ Pakistan is also a signatory to global conventions like the United Nations Convention on the Rights of the Child (UNCRC). Despite this, cases of child labour are mounting with time. The most documented reasons for child labour include economic inequality and low literacy rate (SPARC, 2019; United Nations Children's Fund and Wafaqi Mohtasib (Ombudsman's) Secretariat, 2015; Zafar et al., 2016; Zaidi et al., 2013).

Around 3.3 million children are deprived of their childhood in Pakistan due to child labour (UNICEF, 2021b). Children work in a hazardous environment, like working in a factory, forced domestic work, and child pornography. These illicit activities have resulted in brutal consequences. It has also affected their mental health and education. Thus, child labour is a never-ending scourge, which is magnifying with time due to weak interventions.

COVID-19 has severely affected the routine educational practices of children belonging to vulnerable groups and marginalized communities. It has also forced many children to participate in child labour activities. After the school closure, some parents, living in extreme poverty, opted to send their children to work to make ends meet. Kaur and Byard (2021) highlighted unemployment, lack of parental education, families engaged in labour-intensive occupations, and the lowest household income as reasons behind the ruthless parental decision. The study conducted by Ahad et al. (2021) reported a high spike in maltreatment, like violent

¹ https://na.gov.pk/uploads/documents/1335242011_887.pdf

parental behaviour and domestic violence, during COVID-19. It is predicted that these children will not return to their academic life. One of the reports added, “School closures during lockdowns add to the risks, especially for children in vulnerable situations. When children leave school and enter paid employment, it can be very difficult for them to resume their education” (International Labour Organisation and United Nations Children’s Fund, 2021).

It is pertinent to highlight that many Pakistani children belonging to marginalized communities routinely work in parallel with acquiring education to support their family members. But due to the added financial burden during COVID-19 and the closure of schools, a good number of children were compelled to work full-time without their consent. These children were also exposed to harmful social practices. UNICEF and UNESCO (2021) documented, “Harmful social norms became more prevalent across the region as household financial insecurity increased cases of child labour and early marriage” (p.20). It is unlikely that children working full-time will return to a routine educational life. Agha et al. (2020) expressed, “There is a grave concern that many children may not return to schools as economic hardship may have caused many students to be involved in labour. Moreover, the increased strain on resources may also widen gender inequalities in education as households may favour boys’ education over girls” (p.28).

Narratives of children on the impact of child labour on their education and mental well-being during COVID-19 are not chronicled in Pakistan.

I have been actively engaged in reflective teaching practices for the past twenty years. My prime focus has always been to inculcate positive values among children and to support their mental well-being. For the past five years, as the principal of one of the public sector schools, I have been striving to improve their lives through innovative and integrative approaches. During COVID-19, when the schools were closed, I was unable to reach parents and children for the first three months. My qualms grew with time. I was worried about their future. I decided to connect with students and visit neighbourhoods with other teachers. This study was conducted to gather narratives through the lens of affected learners, understand their needs, pilot innovative strategies to teach and support the education of learners, and assess their impact on their well-being.

Research Questions

- What are the challenges faced by the public school-going learners in Karachi during COVID-19?

- How do innovative pilot strategies support the education of public school-going learners during the closure of the school?

2. Research Design

I have taken a reflective narrative case study approach. It helps collect current realities from individuals about life events (Baron and McNeal, 2019; Sondag et al., 2020). 132 students from grades 5 to 8, studying at one of the public sector schools in Karachi, Pakistan, are taken as samples, selected through convenience sampling. Data is gathered through interviews with parents and children. For ethical considerations, I adapted the British Educational Research Association (BERA) framework for ethical guidelines.

2.1. Data Analysis: My Reflective Narrative

I have been serving as a principal and a senior teacher at one of the oldest public schools in Karachi, Pakistan, for the last five years. Most of the students are from marginalized and disadvantaged communities. Most parents are employed in low-wage jobs, for example, a sweeper, a cobbler, a car mechanic, a plumber, a maid, or a vegetable seller. Some are unemployed and actively involved in drug addiction. I also learned that most of the children are engaged in part-time child labour activities like working as a cobbler, selling goods in the street, and being a maid. It was challenging for me to motivate parents to curb child labour practice, but it was possible to motivate parents to send their children to school. Back in 2016, around 1000 students were enrolled in my school from grades 1 to 10, but only about 100 children used to attend school each day. However, I encouraged a good number of parents to send their children to school regularly for some time. I also financially supported some parents in many ways. Parents’ teacher meetings and get-together events helped me to understand their mindset and stay in touch with them. All these helped increase the attendance ratio from 100 to 500. But the increase in attendance was not adequate. To inculcate human rights values among learners, I initiated a children’s rights club at my school. I also organized fundraising campaigns with colleagues and established an institutional library.

3. Scenario during COVID-19

When COVID-19 hit Pakistan, it badly affected the education system. Due to the closure of schools, many private schools shifted to online education, but the public-school learners suffered the most, as the government failed to offer a feasible solution to support

the education of marginalized children, who lack access to digital devices and internet connections. Reports underlined technological barriers and lack of teachers' preparedness as factors for learning gaps during school closures (Geven and Hasan, 2021; UNICEF, 2021c). The government introduced Tele-School programs to make the most out of television, but its impact is not chronicled.

For more than three months, my school learners were out of contact. The worrisome situation motivated me to learn about their well-being. I wanted to understand learners' ordeals through their lens and take steps to support their education in the best possible ways within the availability of limited resources.

3.1. First Phase

During the first phase, seven teachers from my school decided to gather narratives from the learners, who were enrolled in our school and living in their neighbourhood. I also joined them. The torments that were gathered during visits were jaw-dropping. We gathered seventeen heart-wrenching stories that echoed learners' miseries. Reflecting on children's stories, they had a desire to learn and a wish to pursue their dreams. Most of them expressed to resume their education, but only had textbooks, and no education support or guidance during the lockdown. Some of them also expressed their fears and hopelessness.

Miseries and Fear due to Child Labour

A few parents robbed childhood by engaging children in child labour activities. One of the students was found in a miserable condition. He informed how he was forced to work from early morning till night as a slave at one of the brick kiln factories. His hands were covered with cuts and scars. He vented out his fear of losing his dream of becoming a doctor. He sighed and begged:

"I don't want to work in the factory... My wish is to become a doctor... The seniors at the factory treated me very badly. I love my parents, but my future is unpredictable. I am unsure if I can continue my education again... help me! ... I promise I will study with dedication..."

A few of the girl students reported that they were forced to work as maids. They also reported incidents of physical and verbal abuse. Contrary, a few were compelled to work and support their family members. One of the female students narrated:

"I am working as a maid with my mother... She has not forced me to work. I like working because I have a responsibility to feed my ill father and my younger

brother... Due to school closure, I was free at home, so I thought, why not help my mother?"

We could not reach all the learners due to the unavailability of home addresses and the lockdown situation, but no cases of child pornography, forced begging, and sex trafficking were reported. However, one of the learners hinted:

"I have seen ABC begging people on the streets."

Children were at risk of neglect and child abuse during the COVID pandemic, as it has brought significant changes in parental behaviour due to stress (Abramson, 2021). We also met parents during home visits. Many female parents were enthusiastic to send their children to school after COVID-19, but were worried about their financial stability. Most of them lost their jobs and were living from hand to mouth. The financial scheme introduced by the government was not adequate. We also learned from the neighbours at one of the locations that two girls were the victims of child marriage, while some other children were also trapped in domestic violence. One of the parents revealed:

"My daughter was at home for months. When the schools were opened, I witnessed hope in her eyes... Now she sells toys with her father, who wants her to join the toy business... I can see misery in her eyes, but I am helpless".

3.2. Second Phase- Intervention

I arranged a meeting with fellow teachers and discussed how best we can support the education of these children to avoid further academic loss. I decided to stop this peril. I took ownership to educate children. I first held several group meetings with parents and community leaders, and later arranged two sessions for them about the significance of education and well-being. The community leaders played a significant role in motivating most of the parents to allow their children to continue their education from home.

An Innovative Strategy

With the support of teaching colleagues, I presented incentives to parents, for example, teaching them vocational education like sewing, baking, basic mobile phone operation, and English communication (once a week); arranged free medical check-ups and basic health and hygiene kits; and offered free counselling sessions. These activities propelled consistent interaction with parents that helped us to stay in the loop with children's activities and academic participation. Most of the parents who initially resisted their children continuing their

education from home agreed to cooperate. To ease some financial burden, I connected a few poor parents with social institutions that provided them with free ration bags every month. I also offered jobs to three unemployed parents. They were allowed to put up a food stall in school during break times after the school reopened. I also hired one of the parents as a sweeper.

After taking my parents into confidence, I offered free training to my fellow teachers for a week. We then prepared emergency educational packs that included assignments, notes, and an easy-to-use guidebook. I specially designed games to empower children about human rights values. My friends and fellows initiated crowdfunding to print these packages for children. We also offered low-cost technology alternatives like free academic help to children via local mobile phone calls. Every week, when teachers visited different areas to conduct a vocational training session, the learners were asked to submit their educational packs to the teachers and to take the second package. For four months, we continuously conducted this pilot study. Throughout the journey, we also faced challenges, like a few parents refusing to continue their education. Some of the strategies, like educating parents in parallel with children, worked, while others did not. It made me learn many things from trials and errors. Around 17 girl children and 32 male children, who were engaged in child labour during COVID-19, returned to their routine education during the closure of the school, and that we count as a triumph.

4. Reality Check

Schools reopened on August 30, 2021. Most of the students have returned to educational institutions, while some have not. Those who are back are filled with joy and are working with more zeal to embark upon their future. These days, we are setting up free computer classes for parents and teachers with the support of philanthropists. We consider parents as our allies and still offer them support in the best possible way. Today, my school is a role model for other institutions in the community with the highest enrollment ratio. We are still striving to motivate those parents whose children did not return and may need our help.

5. Recommendations

We recommend that the government of Pakistan prepare an educational plan for public school-going learners to deal with uncertain times. We also propose that other educational institutions take ownership and support their children in the best possible ways. The potential of using low-cost technology like mobile phones, radio, and TV for meeting educational needs

during uncertain times must be explored. For parents, a literacy program must be initiated. For mental well-being, a social counselling unit must be set up by all educational institutions.

6. Conclusion

The endemic of violence and child labour during COVID-19 has badly affected the well-being of learners. With proper planning and ownership, institutions can propose sustainable plans to avoid the academic loss of marginalized learners. Our contextual education model for marginalized children and parents can be used by other educational institutions during an uncertain time.

7. References

- [1] Abramson, A. (2021). The impact of COVID-19 on parental burnout. *American Psychological Association*, 52(7), 36. <https://www.apa.org/monitor/2021/10/cover-parental-burnout> (Access Date: 7 January 2025).
- [2] Ahad, M. A., Parry, Y. K., and Willis, E. (2020). Spillover trends of child labour during the Coronavirus crisis-An unnoticed wake-up call. *Frontiers in Public Health*, 8, 488. DOI:10.3389/fpubh.2020.00488.
- [3] Agha, R., Qaisrani, A., Mughal, M., and Asif, S. (2020). COVID-19 and disaster vulnerability in Pakistan: A human rights-based analysis. UNDP and Ministry of Human Rights, Government of Pakistan. <http://www.mohr.gov.pk/SiteImage/Misc/files/COVID-19%20and%20Human%20Rights%20Taskforce%20Report%20-%20FINAL%20edit.pdf> (Access Date: 9 January 2025).
- [4] Baron, A., and McNeal, K. (2019). Case study methodology in higher education. *IGI Global*. DOI: 10.4018/978-1-5225-9429-1.
- [5] Corsi, M. (2021, November 3). The failure to tackle violence against children during COVID-19 and the recovery. <https://www.unicef.org/eap/stories/failure-tackle-violence-against-children-during-covid-19-and-recovery> (Access Date: 17 January 2025).
- [6] Geven, K., Hasan, A. (2020). Learning losses in Pakistan due to COVID-19 school closures: A technical note on simulation results. *The World Bank*. <https://openknowledge.worldbank.org/handle/10986/34659> (Access Date: 28 January 2025).
- [7] Idris, I. (2020). Impact of COVID-19 on child labour in South Asia. *Knowledge, evidence and learning for development*. <https://gsdrc.org/publications/impact-of-covid-19-on-child-labour-in-south-asia/> (Access Date: 3 February 2025).
- [8] International Labour Organization and United Nations Children's Fund. (2021). Child labour- Global estimates 2020, trends and the road forward. <https://www.ilo.org/ipcc>

/Informationresources/WCMS_800278/lang--en/index.htm
(Access Date: 8 February 2025).

[9] Kaur, N. and Byard, R. W. (2021). Prevalence and Potential consequences of child labour in India and the possible impact of COVID-19- a contemporary overview. *Med Sci Law*, 61(3), DOI: 10.1177/0025802421993364.

[10] SPARC. (2019). Child labour. <https://sparcpk.org/images/SOPC2020/CL.pdf> (Access Date: 9 February 2025).

[11] Sonday, A., Ramugondo, E., and Kathard, H. (2020). Case Study and Narrative Inquiry as Merged Methodologies: A Critical Narrative Perspective. *International Journal of Qualitative Research*. DOI: 10.1177%2F160940692093788 0.

[12] UNICEF. (2021). Child Protection. <https://www.unicef.org/pakistan/child-protection-0> (Access Date: 24 February 2025).

[13] United Nations. (2020). Violence against children and adolescents in the time of COVID-19. https://www.cepal.org/sites/default/files/publication/files/46486/S2000610_en.pdf (Access Date: 26 February 2025).

[14] UNICEF. (2021a). Child protection risks during COVID-19. https://reliefweb.int/sites/reliefweb.int/files/resources/child_protection_risks_during_covid-19.pdf (Access Date: 2 March 2025).

[15] United Nations. (2021b). Impact of coronavirus disease on different manifestations of sale and sexual exploitation of children. <https://reliefweb.int/report/world/impact-coronavirus-disease-different-manifestations-sale-and-sexual-exploitation> (Access Date: 7 January 2025).

[16] UNICEF. (2021c). Brief on learning continuity amidst COVID-19 school closures in Pakistan. <https://www.unicef.org/pakistan/media/3761/file/Pakistan%20Brief%20on%20learning%20continuity%20amidst%20COVID19.pdf> (Access Date: 17 February 2025).

[17] United Nations Children's Fund and Wafaqi Mohtasib (Ombudsman's) Secretariat (2015). The state of children in Pakistan. <https://mohtasib.gov.pk/SiteImage/Downloads/WMS%20Committee%20report/SOCP.pdf> (Access Date: 5 March 2025).

[18] UNICEF and UNESCO. (2021). Situation analysis on the effects of and responses to COVID-19 on the education sector in Asia- Pakistan case study. United Nations Children's Fund and United Nations Educational, Scientific and Cultural Organization.

[19] Zafar, Z., Sarwar, I., and Haider, S.I. (2016). Socio-economic and political causes of child labor: The case of Pakistan. *Global Political Review*, 1(1), 32-43. <https://www.gprjournal.com/jadmin/Auther/31rvIolA2LALJouq9hkR/PccnIG7vwK.pdf> (Access Date: 15 March 2025).

[20] Zaidi, N., Javed, N., and Khan, M.S. (2013). Child labour in Pakistan - A tip of an iceberg. *J Postgrad Med Inst*, 27(3), 285-289. <http://www.shram.org/uploadFiles/20180330103457.pdf> (Access Date: 21 March 2025).

Session 13: Primary and Secondary Education

Title: Developing Digital Literacy in Early Childhood: A Framework for Curriculum Integration in Kindergarten to Grade 2

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Title: Managing Physical Activity Intensity in Children Aged 9–11 Through Smart Technologies

Authors: Asta Sarkauskienė, Olga Kuvaldina

Title: Effects of Reciprocal Peer-Tutoring Strategy on Students Interest and Achievement in Senior Secondary School Physics in Abia State

Authors: P.C. Agommuoh, P.A. Ekeoha, U.N. Akanwa

Title: School Choice, Symbolic Capital, and Reputation in Urban Secondary Schools

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Developing Digital Literacy in Early Childhood: A Framework for Curriculum Integration in Kindergarten to Grade 2

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Abstract

The digitization of childhood has overpowered the development of learning solutions for safeguarding young students. Comprehensive digital literacy education is put off until later in elementary school, thus children becoming unable to critically and safely learn in online environments. This imbalance raises questions about the right of children to digital protection, empowerment, and informed participation. This research sees digital literacy as a key component of educational justice, and investigates how early and developmentally appropriate digital education can act as a protection against exploitation, misinformation, and inequitable access to digital citizenship. There is a need for systemic change in teacher education, curriculum policy, and family support policy to guarantee that all children, regardless of background, are prepared to navigate, question, and guide their digital lives responsibly and ethically. As the digital world increasingly reflects and determines children's identity, relationships, and futures, early education must be utilized to address this urgent need.

1. Introduction

Given how young children are using digital devices, there have been major concerns regarding how education about digital literacy should evolve to meet the needs of young learners. While many programs have been implemented for high school and upper elementary students, younger children are already navigating digital environments, often without structured guidance. Reported from the Centers for Disease Control and Prevention (CDC), children from the ages of 8-10 years old have an average daily hour use of six hours, 11-14 year olds with nine hours, and 15-18 year olds with a high average of seven and a ½ hours (Legner, 2024). A survey conducted by PEW Research Center before COVID 19 highlights how 60% of parents with children younger than 12 began engaging with a smartphone before 5, and 31% interacting with a phone under 2 (Auxier et al., 2020). I'm quite sure that anyone reading this paper can look towards a new youngling in their family and find their rate of

media or digital understanding at an advanced rate – or even at a concerning level. My personal experience comes from watching my cousin at a year old already needing to use their devices for more than 6 hours a day and observing their humor and communication styles develop and become shaped by early internet exposure, highlighting how digital interaction is shaping cognitive and social development from an early age. The Canadian Pediatric Society's literature review discusses the potential risks for development by exposure to screens finding that language delay, cognitive development, and decreased focused attention (Ponti, 2022). From this, it is an urgent area of study to understand how digital literacy education should be structured for younger learners to prevent the negative exposure or misuse of digital environments. My research will try to contribute to a growing discussion towards handling digital literacy, digital media interaction and digital use with Early Childhood education. In ways that many researchers have developed their own initiatives to create programs and educational frameworks to teach responsible digital use, the hope is to develop a framework and basic curriculum to be either implemented as its own course or a cross-sectional integration within all the different subjects provided at the kindergarten to grade 2 level education. Research will be conducted to find specific needs within the classroom and how to implement the curriculum effectively throughout all the ECEC levels – prioritizing consecutive developmental learning and safety in a rapidly evolving digital environment.

2. Literature Review

2.1. Definitions mentioned in Digital Literacy Research

Gilster (1997) first coined the concept of digital literacy to refer to a person's range of abilities that allowed them to be equipped with the knowledge to access, edit and manage digital information, analyze online resources and services, and interact with digital spaces. UNESCO expands on these definitions in their Global Framework of Reference on Digital Literacy

Skills, describing digital literacy as a person's ability to effectively use digital devices, interpret digital resources and texts, and apply the skills gained from digital literacy across various domains, including education and work. These constant changing definitions showcase the complexity of digital literacy and its increasing importance in early childhood education.

2.2. Children's Digital Media Use and Its Implications

The increased accessibility of digital devices has significantly impacted early childhood experiences with technology. Almost all young children everywhere in the world have access to digital media, backed with Pew Research Center estimating that 97% of U.S. children between zero and eight years old have access to smartphones, while 75% have access to tablets (Turco, Lesaux, and Jones, 2023). Referenced by Turco et al. (2023), similar patterns are seen internationally, such as digital media access among young children in China starting the age of 3, and the widespread use of tablets at the age of 3-4 in European countries such as Sweden, Belgium, and the Netherlands (Gou and Dezuanni, 2018; Holloway et al., 2013). Research has also indicated that despite the digital divide due to different socioeconomic situations (access to computers and home high-speed internet access), people have more access to mobile devices as decreased expenses in mobile media have assisted in making digital accessibility a reality in lower-income households (Turco et al., 2023). Parental education levels have also played a part in their children's use of social media, finding that if children under 12 have their own smartphones, they would have their own access to social media accounts, such as TikTok and Snapchat (Pew Research Center, 2020). Differences in parental attitudes towards digital use during early childhood in families reflect the requirement for clearer guidelines and informed digital literacy education for the sake of children's alarmingly early start in the digital world. These differences are seen in parents who think of digital devices and media use as a convenient way of educational enrichment, while others worry about excessive screen time and exposure to objectionable material (Fu et al., 2024). The most common concern for parents with children under the age of 12 are the possible encounters of inappropriate content (73%), as well as what is being advertised to them (68%), and what is being recommended to them on YouTube or social media apps (Pew 2020).

A primary focus of current early childhood digital media use studies is the impact digital media use has on early literacy skills. While there is some evidence that digital use can support early literacy areas, such as letter-sound awareness and name writing (Neumann, 2014, as cited in Turco et al., 2023), others

also refer to dangers, for example, negative correlations between screen use and language development during the early years (McArthur et al., 2021; Dore et al., 2020, as cited in Turco et al., 2023). Current research has primarily concentrated on how often children are on their devices or on media. Rideout and Robb (2020, cited in Turco et al., 2023) highlights in their research that – on average – preschool children spend an average of 2 hours and 39 minutes per day on screen media, however, the contribution of digital exposure to literacy and cognitive development still needs to be studied.

Proper implementation of technology within early childhood environments is seen as the best way to enhance cognition and literacy skill development, especially with the support of parent and teacher facilitation (Kaumbulu, 2011; Munawar et al., 2021). Aside from literacy, concerns related to children's readiness for online interaction have been brought up, particularly within school settings. Teachers voice out concerns about children's readiness to socially, emotionally interact in online settings, and that it is impossible to ensure that there would be a completely appropriate collaborative online space for children (Hagerman and Neisary, 2024). Exposure to fast-paces, violent, or inappropriate content have shown possible negative impacts on children's executive function due to the inability of young children to distinguish everyday reality from what happens on screen – leading to negative impacts in children's emotional regulation and social interactions (CPS, 2022).

Moreover, studies on children's use of social media reveal that children are not being taught about the significance of privacy policies, data mining, and digital footprints (Donelle et al., 2021). Post-COVID-19 pandemic there have been significant findings which have definitely accelerated children's reliance on technology for learning and entertainment, with an emphasis on the need for formal digital literacy training to prepare children adequately for healthy technology use (Haryanto et al., 2022).

2.3. Digital Literacy among Children: Current Initiatives and Past Developments

As digital media use continues to shape children's lives, there have been many new discoveries of different literacies that coexist and intersect with one another. Aside from basic technology skills, digital literacy nowadays also entails critical dimensions such as information literacy, media literacy, and recently, data literacy (Ilomäki et al., 2023). Ilomäki et al. (2023) and Haryanto et al. (2022) both discuss the interdependence of digital use and critical thinking, as well as education of the potential danger of digital engagement. This includes the problem of the contribution of digital media to disinformation

(e.g., misinformation or fake news) and the debates on the use of social media, empowerment or exploitation (Ilomäki et al., 2023). Additionally, teaching children to manage their online personas - both their own and those of others - is an essential aspect that should be implemented in the educational curricula to implement learning social skills in the digital environment (Ilomäki et al., 2023). On the other hand, other teachers debate the privacy and appropriateness underneath the guise of a teacher student relationship engaged in teaching, sharing, and constructing online personas (Fu et al., 2024).

Current initiatives have increasingly recognized the important role played by parents and family settings in influencing the digital literacy of children. As stated by Donelle et al. (2021), parents' guidance and modeling significantly influence safe and responsible digital practices given the fact that family relationships and contexts play an imperative role in how children use technology and social media. This acknowledgment has been mirrored in educational policies, particularly in Canada, where the COVID-19 pandemic has accelerated the incorporation of digital literacy into elementary school syllabuses (Donelle et al., 2021). Educators are now able to incorporate key concepts of digital literacy within the tasks and activities they do on a regular basis, for instance, narrative writing, equipping children with the essential skills from an early stage.

In addition, more educational frameworks and programs have been developed to support digital literacy instruction. An international example is seen in Singapore's government presenting a cyber wellness curriculum that teaches three principles for responsible digital use: respect, safe and responsible use, and positive peer influence (Munawar et al., 2021). The program not only encourages students to critically feel and think about their own digital interactions, but also to act in ways that promote a safe and positive online environment. On top of that, there has been research done on educational games and apps designed to teach cybersecurity, which have proved to be effective as a digital tool for learning by making players go through hands-on experiences reinforcing important digital safety skills (Munawar et al., 2021). Together, all of these programs and frameworks show multiple ways to approach the development of digital literacy, from school curriculums to engaging apps and games for educating. Furthermore, Buchan et al. 's (2024) systematic review of existing programs, with emphasis on computer science, data science, and coding, identified several program features in youth digital literacy programs that can help students with technical skills. Buchan et al. (2024) designed their program based on the Digital Literacy Framework for Grades 10–12 from the British Columbia Ministry of Education and Child Care (2022), which is digital fluency, digital safety and privacy, ethics and

empathy, and consumer awareness. It is expected that assessment tools possess these qualities to teach students to go online in the correct way and in a secure environment through assessing students' skills in determining fundamental digital literacy to more sophisticated skills, including identifying attempts at phishing or comprehending terms of service (Buchan et al., 2024). Buchan et al. (2024) also refers to Media Smarts' program "Use, Understand, Create" as a more comprehensive tool to address digital competences alongside media literacy, ethics, and privacy concerns, but the question remains if educators have the training and infrastructure to implement such multi-faceted curricula convincingly (Buchan et al., 2024).

2.4. Digital Literacy Strategies: Recommendations for Improvement

2.4.1. Teacher Preparedness and Challenges:

Teachers' readiness is among the biggest obstacles to successful integration of digital literacy into schools. Hagerman and Neisary (2024) indicated that it is not surprising for teachers to lack the capability to teach students crucial online assessment skills as they have not undergone training. A common theme throughout the literature is that professional development designed to make teachers more comfortable and capable of incorporating technology into their practice is needed (Shively and Palilonis, 2018). Since digital literacy is being increasingly integrated into core subjects such as maths, social studies, and science, it is necessary that digital literacy should not be taught as an independent subject but as part of the curriculum (Shively and Palilonis, 2018).

Insufficient teacher professional development to teach digital literacy was also an issue discussed by Haryanto et al. (2022), who emphasized the role teachers and parents have to play in the development of children's digital literacy. The study identified that parents, in particular, can help in the cultivation of critical thinking through demonstrating to children how to interact with digital media, which can be complemented by appropriate school-based interventions. Munawar et al. (2021) also asserted the importance of the school-family collaborative approach and assumed that a comprehensive cyber wellness education program involving both parents and teachers has an important role in the effective acquisition of digital literacy.

2.4.2. Successful Curriculum Design and Future Implementation Recommendations:

To address the gaps that have been identified in current digital literacy education, several researchers suggest an integrated, cross-curricular approach.

Shively and Palilonis (2018) recommend that digital literacy must be implemented into the school

curriculum on a subject and grade level basis, but it would require planning, teacher training, and continuous professional development, as Walters et al. (2019) argue that there must be a digital citizenship curriculum specifically to ensure students embrace appropriate online behavior. Besides, as asserted by Munawar et al. (2021), the utilization of interactive technology like learning applications and e-stories at an early level can stimulate children's motivation, critical thinking ability, and language. To this end, kindergarten and primary schools are the starting points in establishing digital literacy habits and attitudes, and age-related digital literacy lessons are a requirement facilitating ethical and responsible technology usage at an early level.

3. Research Questions

In light of the research done and above discussion, my work aims to contribute to the rapid development of children's digital media interaction, and combat how to manage and interact with digital devices within the school curriculum. My research questions will be organized to investigate one big area:

Implementations into ECEC Classrooms

- What age should digital literacy education begin to develop skills for online safety and misinformation detection?
- What more can schools do to teach students to navigate digital media and device use?
- What is appropriate for children from each grade level to learn about digital and media literacy?
- To what extent can teachers or early childhood educators get involved in the children's ability to learn, manage, and navigate digital literacy/media?
- Do we integrate the parents/guardians into curriculum design for learning to continue at home?

The questions listed above will involve engaging with, evaluation of, current research, curriculums, and frameworks provided world-wide (focusing on Canada), and examine the different areas being targeted by the different school boards and provincial governments.

4. Methodology

Due to the lack of empirical research available that directly explores digital literacy education specifically for children in Kindergarten to Grade 2, my research will primarily be conducted through a qualitative research design through analysis of

documents and comparisons of curriculums. A qualitative research design approach will allow for identifying gaps, themes, and trends in existing educational frameworks, and to effectively construct an informed and developmentally appropriate curriculum model. Through official documents, existing datasets, and educational policies, this study will critically evaluate the current state of digital literacy within Canadian early childhood education and suggest areas for improvement.

The research process will primarily consist of a non-interventionist document analysis of different sets of curriculums and digital literacy frameworks implemented in Canada, diving deeper into specific school boards in British Columbia, Ontario, and Québec, which represent a vast range of educational models across Canada. Through research in Ministry of Education publications, official school board documentation, and digital literacy policies as advised; the goal is to find aspects to improve or to create a cohesive framework/curriculum design that would benefit all ECEC institutes. In order to understand and enhance the findings, curriculums and programs seen across the world, such as Singapore's "Cyber Wellness Curriculum," and Media Smart's "Use, Understand, Create" will be used to provide insights into how various educational systems are introducing digital literacy skills into primary education and offer possible strategies. The research will also include content analysis research of digital literacy-related outcomes and learning objectives across core subjects in curriculums, assessing how digital literacy is represented across subject areas like language arts, science, and social studies—also indicating where digital literacy can be implemented and how. Key things that I will be looking for in each curricula are: discussion of digital safety and privacy outcomes, student engagement with digital devices, critical thinking, and strategies to involve parents/guardians. A rubric framework will be developed to analytically evaluate each curriculum's scope—ranging from developmental appropriateness, ethical considerations, and the integration of cross-curricular digital competencies.

Additionally, as I would like to integrate the personal experiences and impacts that children may have by having access to digital devices and media, my research would use autoethnographic reflections and anecdotal observations of digital practices of children in home or informal learning spaces (e.g., personal observations of family members' or peers' use of devices). These reflections will offer a way to show how early and informal exposure to digital media may shape learning development and underscore the need for formal, school-based digital literacy education. The main result will be represented on the construction of a foundational digital literacy curriculum that would be implemented from Kindergarten to Grade 2. My proposed framework

will emphasize intersectionality across subjects, more integration with ICT education, and early intervention principles. The curriculum should reflect consecutive developmental learning, beginning with foundational digital habits (e.g., time management and safety) in Kindergarten—aligning to recommended screen time for children under 4— and progressing to advanced concepts, such as recognizing misinformation or understanding digital footprints in Grade 2. The proposal will be aligned with existing educational policies and priority, and developmental benchmarks to ensure realistic and appropriate implementation in early learning settings.

5. Significance of Research

It is essential that school systems integrate and expand digital literacy programs in order to give more support to younger children based on their increasing exposure to digital environments at an earlier age. While programs are available for older students, there is a real need to have these programs integrated for younger children, involving parents /or guardians, curriculum writers, and boards of education. Schools must adapt to the rapid development of children, driven by their access to the internet and social media. As digital media has a growing influence on cognitive and social development from an early age, data sovereignty is a consideration, where children's digital footprints are safeguarded in a more connected world. It is clear that society must start acting now to combat inappropriate or negative use of digital devices by providing the education needed for children to navigate through a world that heavily relies on digital devices and screen use. By linking curriculum development to the needs of children and involving parents/guardians in spearheading safe use, we can guarantee responsible and informed use of technology from the start, ultimately guiding children towards a healthy and secure online future. Through this research, I hope that it creates more people to become aware and recognize the risks that early use of digital devices brings for children and prioritize interventions by implementing strategies at home and in their educational institutes.

6. References

- [1] Auxier, B., Anderson, M., Perrin, A., Turner, E. (2020, July 28). Parenting Children in the Age of Screens. Pew Research Center. chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.pewresearch.org/internet/wp-content/uploads/sites/9/2020/07/P_I_2020.07.28_kids-and-screens_FINAL.pdf (Access Date: 3 March 2025).
- [2] Buchan, M. C., Bhawra, J., and Katapally, T. R. (2024). Navigating the digital world: Development of an evidencebased digital literacy program and assessment tool for youth. *Smart Learning Environments*, 11(1), 1–13. DOI: 10.1186/s40561-024-00122-6
- [3] Donelle, L., Facca, D., Burke, S., Hiebert, B., Bender, E., and Ling, S. (2021). Exploring Canadian children's social media use, digital literacy, and quality of life: Pilot cross-sectional survey study. *JMIR Formative Research*, 5(5), e18771. DOI: 10.2196/18771.
- [4] Fu, Y., Johnson, N. J., Liu, M., Vandendort, T. B., Robertson, R. K., and Hartwick, H. T. (2024). An exploration of the post-pandemic profiles and predictors of children's digital literacy and multimodal practices in Canada. *Early Child Development and Care*, 1–18. DOI: 10.1080/03004430.2024.1810642.
- [5] Gilster, P. (1997). *Digital literacy*. Wiley.
- [6] Hagerman, M. S., and Neisary, S. (2024). Digital literacies learning needs in rural Ontario elementary schools: Teacher insights. *Canadian Journal of Education*, 47(2), 522+. <https://journalhosting.ucalgary.ca/index.php/cje-rce/article/view/43316> (Access Date: 6 March 2025).
- [7] Haryanto, H., Ghufro, A., Suyantiningsih, S., and Kumala, F. N. (2022). The correlation between digital literacy and parents' roles towards elementary school students' critical thinking. *Cypriot Journal of Educational Sciences*, 17(3), 828–839. DOI: 10.18844/cjes.v17i3.7049.
- [8] Hyman, A., Stewart, K., Jamin, A. M., Lauscher, H. N., Stacy, E., Kasten, G., and Ho, K. (2020). Testing a schoolbased program to promote digital health literacy and healthy lifestyle behaviours in intermediate elementary students: The Learning for Life program. *Preventive Medicine Reports*, 19, 101149. DOI: 10.1016/j.pmedr.2020.101149.
- [9] Ilomäki, L., Lakkala, M., Kallunki, V., Mundy, D., Romero, M., Romeu, T., and Gouseti, A. (2023). Critical digital literacies at school level: A systematic review. *Review of Education (Oxford)*, 11(3), e3425. DOI: 10.1002/rev3.3425.
- [10] Kaumbulu, B. M. (2011). *Effective technology integration for digital literacy development in kindergarten through second grade* (Doctoral dissertation, Walden University). ProQuest Dissertations Publishing.
- [11] Legner, L. (2024). Kids' screen time: How much is too much?. *OSF HealthCare*. <https://www.osfhealthcare.org/blog/kids-screen-time-how-much-is-too-much/> (Access Date: 10 March 2025).
- [12] Mediasmarts. (n.d.). What is digital citizenship? Mediasmarts. <https://mediasmarts.ca/digital-medialiteracy/general-information/digital-media-literacyfundamentals/what-digital-citizenship> (Access Date: 14 March 2025).
- [13] Mediasmarts. (n.d.). Digital Media Literacy Framework - Grades K-3. Mediasmarts. <https://mediasmarts.ca/teacher-resources/digital-media-literacyframework/digital-media-literacy-framework-grades-k-3> (Access Date: 19 March 2025).
- [14] Munawar, M., Fakhrudin, F., Rodiyah, R., and Prihatin, T. (2021). Digital literacy curriculum management in kindergarten. *Cypriot Journal of Educational Sciences*,

16(5), 2115–2136. DOI: 10.18844/cjes.v16i5.6240.

[15] MD. Ponti, M. (2022, November 24). Screen time and preschool children: Promoting health and development in a digital world. Canadian Paediatric Society. <https://cps.ca/en/documents/position/screen-time-and-preschoolchildren#ref105> (Access Date: 9 April 2025).

[16] Shively, K., and Palilonis, J. (2018). Curriculum development: Preservice teachers' perceptions of design thinking for understanding digital literacy as a curricular framework. *Journal of Education*, 198(3), 202–214. DOI: 10.1177/0022057418811128.

[17] Turco, R. G., Lesaux, N. K., and Jones, S. M. (2023). Home literacy in the digital era: The role of mobile screen media frequency in a U.S. state. *British Journal of Educational Technology*, 54(2), 513–526. DOI: 10.1111/bjet.13235 .

[18] UNESCO. (2018). The global framework of reference on digital literacy skills for indicator 4.4.1. <https://uis.unesco.org/sites/default/files/documents/ip51-globalframework-reference-digital-literacy-skills-2018-en.pdf> (Access Date: 11 April 2025).

[19] Walters, M. G., Gee, D., and Mohammed, S. (2019). A literature review: Digital citizenship and the elementary educator. *International Journal of Technology in Education (IJTE)*, 2(1), 1–21. <https://www.ijte.net/index.php/ijte/article/view/123> (Access Date: 17 April 2025).

Managing Physical Activity Intensity in Children Aged 9–11 Through Smart Technologies

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Abstract

Physical activity (PA) is vital for children's health and development, yet global trends reveal declining activity levels. Smart technologies provide innovative solutions to monitor and promote PA intensity among children. This study evaluated the use of smart technologies in managing PA intensity for children aged 9–11 years during extracurricular activities. Data were analyzed from 632 children (329 girls, 323 boys) in the "Move and Know" project. Children wore Polar Pacer heart rate monitors during non-formal physical education (NFPE) sessions to track heart rate (HR) and classify PA into intensity zones. The average session duration was 57.10 ± 3.40 minutes, with a mean HR of 134.47 ± 15.40 bpm. Moderate-intensity zones accounted for most activity time, while vigorous-intensity zones were less represented. The "Move and Know" project effectively engages children in PA, meeting global intensity recommendations. Its integration into education can promote healthier lifestyles, warranting further research on long-term impacts.

Keywords: Physical activity, children, heart rate, heart rate monitor

1. Introduction

Physical activity (PA) is a critical component of healthy childhood development, influencing physical fitness, cognitive function, and overall well-being. However, global trends indicate a concerning decline in the physical activity levels of children, often attributed to increased screen time, urbanization, and sedentary lifestyles [1], [2], [3], [4], [5]. The advent of smart technologies offers new opportunities to tackle this challenge. A wide range of devices could encourage consistent physical activity. Despite their growing adoption, the effectiveness of these technologies in promoting physical activity intensity among children remains underexplored. [6], [7], [8], [9]

Physical activity is gaining increasing attention as a viable and potentially effective approach to prevent and treat a range of mental health problems in both adults, children and young people. [10], [11], [12]

That is why the issue of children's physical activity remains highly relevant. Youth physical activity behaviours are influenced by many sectors of society, including families, community organizations, health care providers, faith-based institutions, government agencies, the media, and schools. Involvement of all sectors is needed to increase youth physical activity. However, schools play an especially important role. [4], [13] The health benefits derived from physical activity are influenced by factors such as the frequency, intensity, duration, and type of exercise. Among these, exercise intensity is the most challenging to quantify, yet it plays a crucial role in determining the health advantages, particularly the cardiovascular improvements, achieved through regular physical activity.

According to recommendations from the World Health Organization, achieving an average of 60 min per day of moderate-to-vigorous intensity physical activity (MVPA) provides children with a wide variety of health benefits. [14]

The "Childhood Obesity: A Plan for Action" states that children and young people should achieve the recommended 60 minutes of physical activity daily through 30 minutes during the school day and 30 minutes outside of school [15]. Association for Physical Education recommends that students spend 50–80% of their physical education time in moderate-to-vigorous intensity [16].

Unfortunately, most children and adolescents globally have low levels of MVPA and do not meet the previous WHO recommendations (i.e., achieving at least 60 min MVPA daily) ([17], [18], [19], [20]). The Health Behaviour in School-aged Children study reported that only 24% of 11-year-old children and 19% of 13-year-old children are meeting the recommended physical activity - at least 60 minutes of MVPA daily [21]

The aim of the present study was to explore and evaluate the application of smart technologies in monitoring, managing, and promoting the intensity of physical activity among children aged 9–11 years. The authors relied solely on heart rate measurements to estimate daily physical activity in children, an indirect method that assumes a linear relationship between heart rate and oxygen uptake [22], [23].

2. Material and Methods

The project "Move and Know" (No. SRF-FAV-2022-1-0096) is implemented during the 2022-2025 academic years. Activities are conducted using an interactive wall "Move and Know," during non-formal physical education (NFPE) sessions following regular school lessons. Each Klaipeda city (Lithuania) public schools received a written invitation to participate, together with a general information about project. With the school's principals, that decided to participate in the project, an agreement for participation in the project was signed. Parents' consent was also obtained for their children's participation in the project. A schedule of activities was created.

Healthy children without health abnormalities and who had good health during participation took part in the project. They used to come to the Klaipeda University sport hall, where an interactive wall "Move and Know" was installed and NFPE was held.

In this study, we analyze data from January to May 2024. Eleven groups of children aged 9 to 11 years ($M = 9.93$, $SD = 0.29$) from public schools in Klaipeda, Lithuania, participated in the project. Their participation ranged from 1 to 6 sessions. In total, data from 632 children (329 girls, 323 boys) were analyzed.

Information on nationality, age, sex, height, weight and participation in NFPE were collected. The majority of the study participants (97.6%) were Lithuanian citizens.

The sample included 48.9% of girls. 51.0% of 9–11-year-old children participated in sports, i.e., attended NFPE at school or out of school after lessons. Height and weight were measured with participants having bare feet and wearing light under-clothes. Height was measured to the nearest 1 mm and weight to the nearest 0.05 kg using a standard beam balance with a stadiometer (SECA 709; Germany).

All participants wore Polar Pacer wrist heart rate (HR) monitors to track heart rate. The pulse monitors provided variables such as mean HR, maximum HR (HRmax), total physical activity time, and time spent in each HR zone.

This technology allowed the tracking of HR in 5-second intervals for each participant in real-time. The heart rate monitors provided variables including mean HR, maximum HR (HRmax), total time of physical activity, and time spent in each HR zone (i.e., Zone 1 - very light: 50–60% of HRmax; Zone 2 - light: 60–70% of HRmax; Zone 3 - moderate: 70–80% of HRmax; Zone 4 - hard: 80–90% of HRmax; Zone 5 - very hard: 90–100% of HRmax). HRmax was determined using the standard formula: 220 minus the individual's age.

The Association for Physical Education (2015) [16] that at least 50% of the total time spent in formal and non-formal physical education should be devoted

to moderate to vigorous physical activity. According to the World Health Organization (2023) [24], physical activity exceeding 50% of HRmax is classified as moderate to vigorous intensity.

Before starting the research, the profile of each child was created with the Polar Team App, including information about age, gender, height, weight. All children wore a heart rate monitor during the NFPE. Data recording began when the teachers would officially start the activity and stopped at the end.

Descriptive data are presented as means (M) and standard deviations (SD). Independent t test and Mann-Whitney U test was used to examine test differences between two independent groups. Analyses were performed with the IBM SPSS Statistics for Windows, version 26.0. P value < 0.05 denoted statistical significance.

3. Results

There was a statistically significant ($p < 0.05$) difference in height and weight between girls and boys. Girls were taller (147.26 ± 8.4 cm.) than boys (145.88 ± 7.22 cm.), and the latter weighed more (41.55 kg. ± 10.14) than girls (39.62 ± 9.78 kg.).

The average duration of the activities was 57.10 ± 3.40 minutes. The mean HR was 134.47 ± 15.40 bpm, with a maximum HR of 172.46 ± 16.72 bpm. The outcomes of time spent in different physical activity zones are shown in Figure 1. Analysis of load distribution across intensity zones revealed that most of the NFPE time was spent in Zone 1 (19.43 ± 12.51 minutes), Zone 2 (20.24 ± 8.36 minutes), and Zone 3 (11.53 ± 9.13 minutes). Zones 4 and 5, representing vigorous-intensity physical activity, accounted for shorter durations. Specifically, children spent 4.19 ± 6.45 minutes in Zone 4 and 0.38 ± 2.30 minutes in Zone 5.

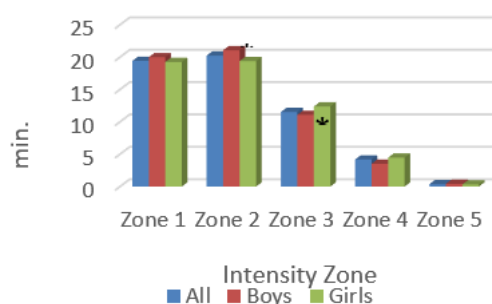


Figure 1. Time Spent in Different Physical Activity Zones

* $p < 0.05$

The results indicated that boys ($M = 21.07 \pm 8.26$ minutes) spent significantly more time in Zone 2 than girls ($M = 19.39 \pm 8.44$ minutes), $p < 0.05$. Girls spent significantly more time in Zone 3 than boys ($M = 12.39 \pm 9.37$ minutes) than boys ($M = 11.08$

± 8.45 minutes), $p < 0.05$. No other significant gender differences were observed in physical activity intensity.

The percentage expression of mean HR, maximum HR, and time spent in each HR zone for girls, boys, and all study participants is presented in Table 1.

Table 1. Heart Rate Values in Relation to Children's Gender

HR	Boys (n=323)	Girls (n=309)	All (n=632)
	Mean (sd)	Mean (sd)	Mean (sd)
HR _{average} (%)	64.02 (7.02)	64.83(6.82)	64.41 (6.93)
HR _{max} (%)	82.12 (8.99)	82.72 (8.05)	82.42 (8.54)
Zone 1 (%)	35.27 (21.66)	34.08 (23.54)	34.68 (22.59)
Zone 2 (%)	37.15 (14.59)*	34.28 (14.84)	35.74 (14.78)
Zone 3 (%)	19.47 (15.15)	22.15 (16.74)*	20.78(16.00)
Zone 4 (%)	6.76 (11.01)	8.38 (12.35)	7.55 (11.70)
Zone 5 (%)	1.26 (5.02)	1.04 (3.53)	1.15 (4.35)

* $p < 0.05$

4. Discussion

In this study, a system for monitoring the intensity of physical activity among children aged 9–11 during extracurricular activities was implemented. The findings demonstrated that the proposed technological system serves as an effective tool for assessing activity levels and contributes to enhancing children's overall engagement in physical activity.

The results obtained support the hypothesis that smart technologies can encourage children to engage more actively in physical exercises, aligning with previous studies [6], [7], [8], [9].

However, our system introduces a novel approach by combining automated activity data collection with gamification elements that motivate children to achieve specific goals. This approach is also significant for understanding the relationship between physical activity and the development of motivation for a healthy lifestyle.

Authors who conducted a systematic review and meta-analysis of the effectiveness of extracurricular interventions aimed at promoting physical activity levels and/or reducing sedentary behavior in children found that these interventions demonstrate varying degrees of effectiveness, low accuracy, significant inconsistency, and high heterogeneity. They emphasized the need for more reliable evaluations of the impact of extracurricular physical activity [25], [26].

One of the limitations of this study is the relatively small sample size ($n=632$), which restricts the generalizability of the findings to a broader population. Additionally, the monitoring period lasted

only five months, and participants attended between one and six sessions, making it difficult to assess the long-term impact of the system.

The proposed monitoring system can be implemented in schools as a tool to enhance children's engagement in physical activity. Its integration into the educational process has the potential to promote a healthy lifestyle among children. Future research should focus on expanding the sample size and examining the system's impact on long-term physical activity levels.

5. Conclusion

The study demonstrated that smart technologies like the interactive wall "Move and Know" effectively engaged children in physical activity. Furthermore, the intensity of the activities aligned with recommended guidelines, as more than 50% of the physical activity time during non-formal physical education was classified as moderate to vigorous intensity.

6. References

- [1] Skurvydas, A., Lisinskiene, A., Majauskiene, D., Valanciene, D., Dadeliene, R., Istomina, N., Sarkauskiene, A., and Buciuinas, G. (2022). What types of exercise are best for emotional intelligence and logical thinking? *International Journal of Environmental Research and Public Health*, 19(16), 10076.. DOI: 10.3390/ijerph191610076.
- [2] Anker, E. A., Bøe Sture, S. E., Hystad, S. W., and Kodal, A. (2024). The effect of physical activity on anxiety symptoms among children and adolescents with mental health disorders: a research brief. *Frontiers in Psychiatry*, 15, 1254050. DOI: 10.3389/fpsy.2024.1254050.
- [3] Armstrong, N., and Bray, S. (1991). Physical activity patterns are defined by continuous heart rate monitoring. *Archives of Disease in Childhood*, 66(2), 245–247. DOI: 10.1136/adc.66.2.245.
- [4] Hu, D., Zhou, S., Crowley-McHattan, Z. J., and Liu, Z. (2021). Factors that influence participation in physical activity in school-aged children and adolescents: A systematic review from the social ecological model perspective. *International Journal of Environmental Research and Public Health*, 18(6), 3147. DOI: 10.3390/ijerph18063147.
- [5] Alvarez-Pitti, J., Casajús-Mallén, J. A., Leis-Trabazo, R., Lucía, A., López de Lara, D., Moreno-Aznar, L. A., and Rodríguez-Martínez, G. (2020). Exercise as medicine in chronic diseases during childhood and adolescence. *Anales de Pediatría (English Edition)*, 92(3), 173.e1–173.e8. DOI: 10.1016/j.anpede.2020.01.001.
- [6] Direito, A., Carraça, E., Rawstorn, J., Whittaker, R., and Maddison, R. (2017). mHealth technologies to influence physical activity and sedentary behaviors: Behavior change techniques, systematic review and meta-analysis of

randomized controlled trials. *Annals of Behavioral Medicine*, 51(2), 226–239. DOI: 10.1007/s12160-016-9846-0.

[7] Matthews, J., Win, K. T., Oinas-Kukkonen, H., and Freeman, M. (2016). Persuasive technology in mobile applications promoting physical activity: A systematic review. *Journal of Medical Systems*, 40(3), 72. DOI: 10.1007/s10916-015-0425-x.

[8] Nasruddin, N. I. N., Murphy, J., and Armstrong, M. E. G. (2023). Physical activity surveillance in children and adolescents using smartphone technology: Systematic review. *JMIR Pediatrics and Parenting*, 6, e42461. DOI: 10.2196/42461.

[9] Gulap, M. T., Roşa, A. C., and Mihaiu, C. (2024). Optimising physical training in DanceSport by using HIIT training and smart devices for monitoring physical activity. *Brain (Bacau)*, 15(4), 170. DOI: 10.70594/brain/15.4/13.

[10] Aylett, E., Small, N., and Bower, P. (2018). Exercise in the treatment of clinical anxiety in general practice: A systematic review and meta-analysis. *BMC Health Services Research*, 18(1), 559. DOI: 10.1186/s12913-018-3313-5.

[11] Carter, T., Pascoe, M., Bastounis, A., Morres, I. D., Callaghan, P., and Parker, A. G. (2021). The effect of physical activity on anxiety in children and young people: A systematic review and meta-analysis. *Journal of Affective Disorders*, 285, 10–21. DOI: 10.1016/j.jad.2021.02.026.

[12] Pascoe, M., Bailey, A. P., Craike, M., Carter, T., Patten, R., Stepto, N., and Parker, A. G. (2020). Physical activity and exercise in youth mental health promotion: A scoping review. *BMJ Open Sport and Exercise Medicine*, 6(1), e000677. DOI: 10.1136/bmjsem-2019-000677.

[13] Webster, C. A. (2023). The comprehensive school physical activity program: An invited review. *American Journal of Lifestyle Medicine*, 17(6), 762–774. DOI: 10.1177/15598276221093543.

[14] World Health Organization. (2020). WHO guidelines on physical activity and sedentary behaviour. <https://www.who.int/publications/i/item/9789240015128> (Access Date: 5 January, 2025).

[15] Department of Health and Social Care. (2018). Childhood obesity: A plan for action, chapter 2. <https://assets.publishing.service.gov.uk/media/5b30a40de5274a55c78cef32/childhood-obesity-a-plan-for-action-chapter-2.pdf> (Access Date: 5 January, 2025).

[16] Association for Physical Education. (2023). Health position paper. <https://www.pescholar.com/wp-content/uploads/2023/02/Association-for-Physical-Education-Health-Position-paper.pdf> (Access Date: 5 January, 2025).

[17] Chaput, J.-P., Willumsen, J., Bull, F., and Katzmarzyk, P. T. (2020). 2020 WHO guidelines on physical activity and sedentary behaviour for children and adolescents aged 5–17 years: Summary of the evidence. *International Journal of Behavioral Nutrition and Physical Activity*, 17(1), 141. DOI: 10.1186/s12966-020-01037-z.

[18] Steene-Johannessen, J., Hansen, B. H., Dalene, K. E., Kolle, E., Northstone, K., Møller, N. C., Gracia-Marco, L., Froberg, K., Anderssen, S. A., Wedderkopp, N., Sardinha, L. B., Ekelund, U., van Sluijs, E. M. F., Cardon, G., Page, A., Reilly, J. J., Cooper, A. R., Andersen, L. B., Riddoch, C., ... Brage, S. (2020). Variations in accelerometry measured physical activity and sedentary time across Europe: Harmonized analyses of 47,497 children and adolescents. *International Journal of Behavioral Nutrition and Physical Activity*, 17(1), 38. DOI: 10.1186/s12966-020-00930-x.

[19] Reilly, J., Aubert, S., Brazo-Sayavera, J., Liu, Y., Cagas, J., and Tremblay, M. S. (2022). Surveillance to improve physical activity of children and adolescents. *Bulletin of the World Health Organization*, 100(12), 815–824. DOI: 10.2471/BLT.22.288569.

[20] Marzi, I., Demetriou, Y., Reimers, A. K., Liersch, S., Lämmerhofer, M., and Bucksch, J. (2022). Monitoring of physical activity promotion in children and adolescents in the EU: Current status and future perspectives. *European Journal of Public Health*, 32(1), 95–104. DOI: 10.1093/eurpub/ckab193.

[21] Inchley, J., Currie, D., Budisavljevic, S., Torsheim, T., Jästad, A., Cosma, A., ... and Barnekow, V. (Eds.). (2020). Spotlight on adolescent health and well-being: Findings from the 2017/2018 Health Behaviour in School-aged Children (HBSC) survey in Europe and Canada (Vol. 1: Key findings). WHO Regional Office for Europe. <https://iris.who.int/handle/10665/332104> (Access Date: 5 January, 2025).

[22] Rowlands, A. V., Eston, R. G., and Ingledew, D. K. (1997). Measurement of physical activity in children with particular reference to the use of heart rate and pedometry. *Sports Medicine*, 24(4), 258–272. DOI: 10.2165/00007256-199724040-00004.

[23] McManus, A. M., Masters, R. S. W., Laukkanen, R. M. T., Yu, C. C. W., Sit, C. H. P., and Ling, F. C. M. (2008). Using heart-rate feedback to increase physical activity in children. *Preventive Medicine*, 47(4), 402–408. DOI: 10.1016/j.ypmed.2008.06.001.

[24] Mears, R., and Jago, R. (2016). Effectiveness of after-school interventions at increasing moderate-to-vigorous physical activity levels in 5- to 18-year olds: A systematic review and meta-analysis. *British Journal of Sports Medicine*, 50(21), 1315–1324. DOI: 10.1136/bjsports-2015-094976.

[25] Jones, M., Defever, E., Letsinger, A., Steele, J., and Mackintosh, K. A. (2020). A mixed-studies systematic review and meta-analysis of school-based interventions to promote physical activity and/or reduce sedentary time in children. *Journal of Sport and Health Science*, 9(1), 3–17. DOI: 10.1016/j.jshs.2019.06.009.

Effects of Reciprocal Peer-Tutoring Strategy on Students Interest and Achievement in Senior Secondary School Physics in Abia State

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Abstract

Quasi-experimental design was employed in this study to investigate the effect of reciprocal peer tutoring strategy on students' interest and achievement in senior secondary school physics in Umuahia North Local Government Area of Abia State. A sample of 103 SS2 physics students drawn from four intact classes was selected for the study. This comprised of 53 (36 males and 17 females) students randomly assigned to the control group and 50 (32 males and 18 females) students for the reciprocal peer tutoring group. Four research questions and four null hypotheses tested at 0.05 level of significance guided the study. The instruments for data collection were Measure of Physics Students' Interest Scale (MPSIS) and Physics Achievement Test ((PAT) developed by the researcher and were face and content validated by experts in the subject. The reliability of the instruments was established using test retest method for MPSIS and Kuder Richardson formula 21 (K-R21) for PAT and the reliability coefficients obtained as 0.82 and 0.79 respectively. Mean and Standard Deviation were used to answer the research questions while Analysis of Covariance (ANCOVA) was used to test the hypotheses at 0.05 level of significance. The result showed that the mean interest and achievement scores of the physics students were higher when taught physics using reciprocal peer tutoring strategy than using the lecture method. The result also showed that the male students' mean interest and achievement scores were higher than their female counterparts when taught Physics using reciprocal peer tutoring strategy than when taught Physics using lecture method. There was a significant difference in the mean interest and achievement scores of students in physics when taught physics using reciprocal peer tutoring, and lecture method, there was a significant difference in the mean interest scores of male and female students in Physics when taught Physics using reciprocal peer tutoring and lecture method. Based on the findings it was recommended that reciprocal peer tutoring strategy should be incorporated in the physics curriculum to supplement existing methodologies in order to enhance students' interest and achievement in

Physics.

Keywords: Physics, Reciprocal Peer Tutoring, Interest, Academic Achievement

1. Introduction

Education at all levels brings about acquisition of honour in the society, good jobs and increase in financial standing (Ojukwu, 2016). For nations to be relevant in the fostering of rapid human and national development, their education sector must be very functional and productive. This is because a functional and productive education system remains a tool that can be used to eradicate poverty, generate employment, and avert crises amongst others.

To achieve sustainable human and socio-economic development of Nigeria through a functional and productive education system, the Nigeria education system adopted the 9-3-4 system of education. This 9-3-4 system of education which took effect from 2006, has the first nine years of basic and compulsory education up to the Junior Secondary School three level, three years in the Senior Secondary School and four years of Tertiary Institutions (Uwaifo and Uddin, 2009). These three levels of education play significant role in human and socio-economic development. Secondary education is very imperative and plays a prominent role towards National development and manpower training. Hence to achieve these goals at the Senior Secondary School level, many subjects are offered and grouped into the Sciences, Arts, Vocational, Social Sciences and Commercial (Nlebem, 2011).

Physics is one of the science subjects taught in senior secondary schools in Nigeria. Physics performs some vital roles which helps in dealing with those fundamental questions on the structure of matter and interaction of elementary constituent of nature that are susceptible to experimental investigation and theoretical inquiry (Oluwasegun, Ohwofosirai and Emagbetere, 2015). The word physics has been derived from the Latin word *Physica*, which means natural thing. Physics can also be defined as a science

that deals with matter and energy and their interactions in the fields of mechanics, acoustics, optics, heat, electricity, magnetism, radiation, atomic structure and nuclear phenomena (Okoro, 2018). A good knowledge of Physics is a pre-requisite for the study of physical sciences (Physics, Chemistry, Computer Sciences and Geology) and engineering courses like Electrical/Electronic, Electrical, Computer, Civil, Mechatronics, amongst others. The importance of Physics cannot be overemphasized and this has given rise to the objectives of Physics as stipulated in the Physics Curriculum which include to generate interest in Physics and to provide a solid foundation for everyday living, develop basic technological skills, foster the desire and ability to be accurate to a degree relevant to the problem at hand, to provide necessary Physics background for further education and to stimulate and encourage creativity in Physics (Eze and Ugwuanyi, 2013).

Students' interest in the study of a particular subject and academic achievement is a good indices of how well the objectives of that particular course have been achieved. Interest is described as the things that one likes, the tendencies to like, to seek and to engage in certain kinds of activities (Tella, Adika and Toyoba, 2008). The term interest is used interchangeably with aspirations. Interest reflects an individual's emotional dispositions towards a particular subject or course content (Ewumi, 2010). Interest of students' in a particular subject is developed first, which then motivates the student to perform well academically. No wonder Goolsby (2013), asserts that interest of students in the learning of particular subject will influence his/her academic achievement in that subject. In other words interest comes first before academic achievement; hence interest stimulates students' academic achievement in particular subjects.

Academic achievement can be explained as the progress made by a student towards a set goal of acquiring educational skills, materials and knowledge. It is achievement in academics rather than general acquisition of knowledge in a non-academic setting. Academic achievement serves as a crucial factor that enables individuals to pursue higher education. The level of educational qualifications attained by an individual significantly impacts their career trajectory following their education. Given the societal and personal significance of academic success, it has become a focal point for extensive research among scholars.

Students' academic achievement in Physics in Abia State has not been very encouraging. This can be seen in the result of students who took West African Senior Secondary School Certificate Examination in Abia State where 41.7% of the total number of students who entered for Physics made A1-C6 in 2013, while 33% of the students made AI-C6 in NECO. In 2014, 30.70% made AI-C6 in WASSCE as

28.7% made A1-C6 in NECO. In 2015, 41.10% of the students made A1-C6 in West African Senior Secondary School Certificate Examination (WASSCE) and 39.7% of the students made A1-C6 in NECO. In 2016, there was an increase in the academic performance as 42.6% made A1-C6 in West African Senior School Certificate Examination and 40.8% of the students made AI-C6 in NECO (Abia State Secondary Education Management Board, 2018).

Physics as one of the science subjects has remained one of the most difficult subjects in the school curriculum (NERDC, 2004). This difficulty has resulted to students' declining interest in the subject. The declining interest of students in Physics at both the internal and external examination conducted by both the West African Examination Council (WAEC) and National Examination Council (NECO) could be attributed to a lot of factors such as lack of conducive environment, poor teaching methods, attitude to their job, lack of interest of students in learning Physics, students time management amongst others. To this extent, Njoku, Nwagbo and Ugwuanyi (2020), believes that the falling level of academic performance of students in Physics is attributable to teachers' non-use of verbal reinforcement strategy. It is pertinent here to use instructional strategies that can arouse students' interest. One of such strategies is the Peer tutoring strategy.

Peer tutoring is a method of instruction that involves students teaching fellow students, a system of instruction in which learners help each other and learn by teaching. Peer-tutoring is an instructional strategy that consists of student partnerships, linking high-achieving students with low-achieving students or those with comparable achievement, for structured reading and study sessions (Adekoya and Olatoye, 2011). Explaining further, Adonu, Nwagbo, Ugwuanyi and Okeke (2021) defined peer tutoring as an instructional strategy that partners students to help one another learn material, reinforce skills or practice a learned task. According to Akay (2011), peer-tutoring is systematic, peer-mediated teaching strategies.

We have many types of Peer tutoring but two types that are mostly used are the class-wide peer tutoring and the reciprocal peer tutoring (Horvath, 2011). In class-wide peer tutoring, every student in the class belongs to a group and has the opportunity to get one-on-one help while students in a group alternate roles in reciprocal peer tutoring. There are however intra-variations for these approaches. The focus of the present study is on the Reciprocal Peer Tutoring (RPT). In Reciprocal Peer Tutoring (RPT), students are assembled in groups of two or more and are trained to work together on a specific academic task. The students work together to prompt, monitor, and evaluate each other, while working towards group goals. The ideal process of Reciprocal Peer Tutoring

(RPT) was to pair students throughout the term, as the process will aid students to provide facilitating processes for each other.

Lack of interest in the learning of Physics which has resulted in poor academic achievement of students in Physics could be attributed to the teaching methods adopted by the Physics teachers. It is therefore necessary to investigate the effect of Reciprocal Peer Tutoring learning strategy on the students' interest and academic achievement in Physics. The major purpose of the study was to investigate the effect of reciprocal peer tutoring strategy on senior secondary school students interest and academic achievement in Physics and to determine how gender moderate this effect.

2. Research Questions

The following research questions were posed to guide the study.

- What is the mean interest score of the secondary school students in physics when taught using peer tutoring strategy and lecture methods?
- What are the mean achievement scores of the secondary school students in physics when taught using peer tutoring strategy and lecture method?
- What is the mean interest score of the secondary school male and female students in physics when taught using peer tutoring strategy?
- What are the mean achievement scores of the secondary school male and female students in physics when taught using peer tutoring strategy?

3. Hypotheses

The following null hypotheses tested at 0.05 level of significance guided the study.

H_0^1 :

There is no significant difference in the mean interest scores of students taught physics using reciprocal peer tutoring strategy and lecture method.

H_0^2 :

There is no significant difference in the mean achievement scores of students taught physics using reciprocal peer tutoring strategy and lecture method.

H_0^3 :

There is no significant difference in the mean interest scores of male and female students taught Physics using reciprocal peer tutoring.

H_0^4 :

There is no significant difference in the mean achievement scores of the male and female students taught Physics using reciprocal peer tutoring strategy.

4. Method

The study adopted pretest-posttest quasi-experimental research design to investigate the effect of reciprocal peer tutoring strategy on students' interest and achievement in senior secondary school physics in Umuahia North Local Government Area of Abia State. A sample of 103 SS2 physics students drawn from four intact classes were selected for the study. This comprised of 53 (36 males and 17 females) students randomly assigned to the control group and 50 (32 males and 18 females) students for the reciprocal peer tutoring group. Four research questions and four null hypotheses tested at 0.05 level of significance guided the study. The instruments for data collection were Measure of Physics Students' Interest Scale (MPSIS) and Physics Achievement Test ((PAT) developed by the researcher and were face and content validated by experts in the subject. The reliability of the instruments was established using test-retest method for MPSIS and Kuder Richardson formula 21 (K-R21) for PAT and the reliability coefficients obtained as 0.82 and 0.79 respectively. Mean and Standard Deviation were used to answer the research questions while Analysis of Covariance (ANCOVA) was used to test the hypotheses at 0.05 level of significance.

5. Results

Research Question 1

What are the mean interest scores of secondary school students in physics when taught using reciprocal peer tutoring strategy and lecture method?

Table 1. Mean and standard deviation interest scores of students taught physics using reciprocal peer tutoring strategy and lecture method

Variable	N	Pretest		Posttest		Mean Interest	
		X	SD	X	SD		Gain
Reciprocal Peer Tutoring	50	39.02	4.78	52.65	5.34		13.63
Lecture Method	53	39.01	4.65	43.37	4.82		4.36

Where N= Number of respondents, X= mean, SD= Standard deviation

Table 1 showed that students taught physics using reciprocal peer-tutoring strategy had an interest pre-test mean score of 39.02 with a standard deviation of 4.78 and an interest post-test mean of 52.65 with a

standard deviation of 5.34. The difference between the pre-test and post-test interest mean for the peer-tutoring group was 13.63. For students taught with lecture method, their interest pre-test mean score is 39.01 with a standard deviation of 4.65 and post-test mean score is 43.37 with a standard deviation of 4.82 which results to a mean gain of 4.36. However, for each of the groups, the post-test interest mean scores were greater than the pre-test interest means scores with the students taught physics using reciprocal peer-tutoring strategy having a higher interest mean gain. This result shows that reciprocal peer-tutoring strategy increases students' interest more than lecture method. This also means that learning strategy may have some effects on students' interest in physics.

Hypothesis 1

There is no significant difference in the mean interest scores of students taught physics using reciprocal peer-tutoring strategy and lecture method.

Table 2. Analysis of covariance (ANCOVA) of students' interest in Physics when taught using reciprocal peer-tutoring strategy and lecture method

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	4223.851 ^a	3	1407.950	43.651	.000
Intercept	5626.527	1	5626.527	174.440	.000
PRE-TEST	722.855	1	722.855	22.411	.000
Strategies*	3471.680	2	1735.840	53.816	.000
Error	7612.133	100	32.255		
TOTAL	564988.000	103			
Corrected Total	11835.983	102			

a. R Squared = .357 (Adjusted R Squared = .349)

The result in Table 2 shows that with respect to the interest mean scores of students taught physics using reciprocal peer tutoring strategy and lecture method, an F-ratio of 53.816 was obtained with associated exact probability value of .000.

Since the associated probability (.000) was less than 0.05 set as level of significance, the null hypothesis (H_0^1) which stated that there is no significant difference in the mean interest score of students taught physics using reciprocal peer tutoring strategy and lecture method is rejected. Thus, inference drawn is that there was a significant difference in the mean interest score of students taught physics using reciprocal peer tutoring strategy and lecture method with those taught with reciprocal peer tutoring having a higher interest mean gain.

Research Question 2

What are the mean achievement scores of the secondary school students in physics when taught using peer tutoring strategy and lecture method?

Table 3. Mean Achievement and standard deviation scores of students taught physics using reciprocal peer tutoring strategy and lecture method

Variable	Pre-test			Post-test		Mean Achievement Gain
	N	X	SD	X	SD	
Reciprocal peer tutoring	50	38.12	13.50	65.34	15.77	27.22
Lecture method	53	34.98	11.86	51.62	13.24	16.64

Where N= Number of respondents, X= mean, SD= Standard deviation

The Table above showed that physics students that were taught physics with reciprocal peer tutoring strategy had 38.12 and 13.50 as their pre-test achievement mean score and standard deviation scores respectively and also an achievement mean posttest score and standard deviation score of 65.34 and 15.77 respectively thereby having an achievement mean gain of 27.22. The table also showed that physics students that were taught physics with lecture method had an achievement mean score of 3.98 in their pre-test and a standard deviation score of 11.86 while in the posttest they had an achievement mean score of 51.62 with 13.24 as their standard deviation score resulting to an achievement mean gain of 16.64. It is observed that the achievement mean scores in the post test for each of the groups is greater than the achievement means scores for the pretest. The table also showed that the students taught physics using reciprocal peer tutoring strategy had a higher achievement mean gain. The implication of this is that reciprocal peer tutoring strategy helped the students to achieve a higher achievement in physics than lecture method.

Hypotheses 2

There is no significant difference in the mean achievement scores of students taught physics using reciprocal peer tutoring strategy and lecture method.

Table 4: Analysis of covariance of students' achievement means scores in physics when taught using reciprocal peer tutoring and lecture method

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	15814.218 ^a	3	5271	30.142	.000
Intercept	43600.707	1	43600.707	249.306	.000
PRE-TEST	7643.145	1	7643.145	43.703	.000
Strategies*	6547.779	2	3273.890	18.720	.000
Error	41273.715	100	174.889		
TOTAL	906272.000	103			
Corrected Total	57087.933	102			

a. R Squared = .277 (Adjusted R Squared = .268)

The Table above showed an F-ratio of 18.720 and a probability value of .000 for the physics students' achievement mean scores when taught physics using

reciprocal peer tutoring strategy and lecture method. 0.05 which is the set significant level is greater than the probability (.000) meaning that the null hypothesis of no significant difference in the achievement mean score of physics students taught physics with reciprocal peer tutoring method and lecture method is rejected. Therefore a significant difference exists in the achievement mean scores of physics students taught physics with reciprocal peer tutoring method and lecture method. Physics students taught physics under reciprocal peer tutoring had a higher achievement mean gain. The implication of this is that the reciprocal peer tutoring method enhanced students' achievement better than the lecture method.

Research Question 3

What are the mean interest scores of the secondary school male and female students in physics when taught using peer tutoring strategy?

Table 5. Mean and standard deviation of interest scores of male and female students taught physics using reciprocal peer tutoring strategy

Learning Strategies		Gender		Pre-test		Post-test		Interest Mean Gain
N	SD	X	SD	X	SD	X	SD	
Reciprocal peer tutoring		Male	32	38.76	5.09	55.26	5.15	16.5
		Female	18	39.23	5.15	50.55	4.54	11.32

Where N= Number of respondents, X= mean, SD= Standard deviation

Table 5 showed that male students taught physics using reciprocal peer tutoring strategy had pre-test interest mean score of 38.76 with standard deviation of 5.09 and post- test interest mean score of 55.26 with standard deviation of 5.15 giving an interest mean gain of 16.5. The female students taught physics with reciprocal peer tutoring had pre-test and post-test mean scores of 39.23 and 50.55 respectively with standard deviation of 5.15 and 4.54 respectively giving an interest mean gain of 11.32. This shows that the male students taught physics using reciprocal peer tutoring strategy seem to have higher interest than their female counterparts taught using the same strategy. This result shows that gender seems to have some effects on students' interest in physics when taught using reciprocal peer tutoring strategy.

Hypotheses 3

There is no significant difference in the mean interest scores of male and female students taught physics using reciprocal peer tutoring

The result in Table 6 shows that with respect to the interest mean scores of male and female students taught physics using reciprocal peer tutoring, an F-

ratio of 19.553 was obtained with associated exact probability value of .000, since the associated Probability (.000) was less than 0.05 set as level of

Table 6. Analysis of covariance of male and female students' interest means scores in physics when taught using reciprocal peer tutoring

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	502.157 ^a	2	251.078	10.853	.000
Intercept	4210.973	1	4210.973	182.029	.000
PRE-TEST	36.036	1	36.036	1.558	.216
GENDER	425.324	1	425.324	19.553	.000
Error	1896.949	47	23.134		
TOTAL	238100.00	50			
Corrected Total	2399.106	49			

a. R Squared = .209 (Adjusted R Squared = .190)

significance, the null hypothesis (H_0^2) which stated that there is no significant difference in the mean interest score of male and female students taught physics using reciprocal peer tutoring was rejected. Thus, inference drawn is that there was a significant difference in the mean interest score of male and female students taught physics using reciprocal peer tutoring strategy. This indicated that gender is a significant factor affecting students' interest toward physics when taught using reciprocal peer tutoring strategy.

Research Question 4

What are the mean achievement scores of the secondary school male and female students in physics when taught using peer tutoring strategy?

Table 7. Mean Achievement scores and standard deviation scores of male and female students taught physics with reciprocal peer tutoring strategy

Learning Strategies		Gender		Pre-test		Post-test		Mean Achievement Gain
N	SD	X	SD	X	SD	X	SD	
Reciprocal peer tutoring		Male	32	38.23	13.80	67.94	16.31	29.71
		Female	18	38.04	13.40	62.65	15.49	24.61

Where N= Number of respondents, X= mean, SD= Standard deviation

Table 7 showed that the male physics students that were taught physics with reciprocal peer tutoring strategy had a pre-test achievement mean score of 38.23 and 13.80 as their standard deviation score; 67.94 posttest achievement mean score and 16.31 standard deviation score thereby having an achievement mean gain of 29.71 while their female counterparts taught with the same method had pre-test of 38.04 with 13.40 as standard deviation; 62.65 posttest achievement mean score and 15.49 as standard deviation thereby having an achievement mean gain of 24.61. This result above indicated that

reciprocal peer tutoring enhanced the understanding of the male students better than their female counterparts since the male students had a higher achievement mean score than their female counterparts.

Hypothesis 4

There is no significant difference in the mean interest scores of male and female students taught physics using reciprocal peer tutoring

Table 8. Analysis of covariance of male and female students' interest means scores in physics when taught using reciprocal peer tutoring

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	502.157 ^a	2	251.078	10.853	.000
Intercept	4210.973	1	4210.973	182.029	.000
PRE-TEST	36.036	1	36.036	1.558	.216
GENDER	425.324	1	425.324	19.553	.000
Error	1896.949	47	23.134		
TOTAL	238100.00	50			
Corrected Total	2399.106	49			

a. R Squared = .209 (Adjusted R Squared = .190)

The result in Table 8 shows that with respect to the achievement mean scores of male and female students taught physics using reciprocal peer tutoring, an F-ratio of 19.553 was obtained with associated exact probability value of .000. Since the associated probability (.000) was less than 0.05 set as level of significance, the null hypothesis (H_0^2) which stated that there is no significant difference in the mean interest score of male and female students taught physics using reciprocal peer tutoring was rejected. Thus, inference drawn is that there was significant difference in the mean achievement scores of male and female students taught physics using reciprocal peer tutoring strategy. This indicated that gender is a significant factor affecting students' interest toward physics when taught using reciprocal peer tutoring strategy.

6. Discussion

Results in Table 1 show that reciprocal peer tutoring strategy increases students' interest more than lecture method. This also means that learning strategy may have some effects on students' interest in physics. The corresponding hypothesis on Table 2 shows that with respect to the mean interest scores of students taught physics using reciprocal peer tutoring and lecture method, an F-ratio of 53.816 was obtained with associated exact probability value of .000. Since the associated probability (.000) was less than 0.05 set as level of significance, the null hypothesis (H_0^1) which stated that there is no significant difference in the mean interest score of students taught physics

using reciprocal peer tutoring and lecture method is rejected. Thus, there was a significant difference in the mean interest scores of students taught physics using reciprocal peer tutoring and lecture method with those taught with reciprocal peer tutoring having a higher interest mean gain. This shows that reciprocal peer tutoring strategy increased students' interest in physics more than lecture method. This finding is in agreement with the findings of Uroko (2010), who observed that reciprocal peer tutoring strategy significantly improved the interest of students in reading comprehension of senior secondary school students. Supporting this finding, Akay (2011), indicated that peer instruction method has significant positive effects on students' achievement and attitude towards mathematics. These finding could be attributed to the fact that reciprocal peer tutoring strategy uses skills such as predicting, clarifying, questioning and summarizing, which potentially help students to understand what they read which could also enhance their interest in the study of physics.

The result in Table 3 showed that physics students taught with reciprocal peer tutoring strategy had a higher achievement mean scores than those taught with lecture methods. This was further buttressed by the corresponding hypothesis in Table 4 where the null hypothesis of no significant difference in the mean achievement scores of physics students taught physics with reciprocal peer tutoring and lecture methods was rejected meaning that a significant difference exists in the achievement mean scores of physics students taught physics with reciprocal peer tutoring and lecture methods with those taught physics using reciprocal strategy having a higher achievement mean gain.

The result in Table 5 showed that the male students' taught physics using reciprocal peer tutoring strategy seem to have higher interest in physics than their female counterparts taught using the same strategy. The confirmatory result in Table 6 shows that with respect to the mean interest scores of male and female students taught physics using reciprocal peer tutoring, an F-ratio of 19.553 was obtained with associated exact probability value of .000. Since the associated probability (.000) was less than 0.05 set as level of significance, the null hypothesis (H_0^3) which stated that there is no significant difference in the mean interest score of male and female students taught physics using reciprocal peer tutoring was rejected. This indicated that gender is a significant factor affecting students' interest toward physics when taught using reciprocal peer tutoring. This finding is contrary to the findings of Uroko (2010) who stated that significant difference does not exist on the student's interest and self-efficacy in reading comprehension of students based on the reciprocal peer tutoring strategy. On the other hand findings of Okoro (2018) reported that gender directly influence reading interest. Okoro (2018) was quick to point out

however, that closer scrutiny of those instances where boys displayed a greater interest in reading than girls revealed that the reading interest was not characterized by the volume of the material to read, but rather on the type of materials read. In the present study interest of male and female students differ significantly with the male students having higher interest than the female.

Result in Table 7 shows that the male students' taught physics using peer tutoring strategy seem to have higher mean achievement scores than their female counterparts taught using the same strategy. This result shows that gender seem to have some effects on students' academic achievement in physics when taught using reciprocal peer tutoring strategy. Also, the confirmatory hypothesis in Table 8 showed that there was a significant difference in the mean achievement scores of male and female students taught physics using reciprocal peer tutoring strategy which implies that gender is a significant factor affecting students' academic achievement toward physics when taught using reciprocal peer tutoring strategy. This finding disagrees with the finding of Okereke and Ugwuegbulam (2014) who reported that students teaching one another help to reduce the gender gap that existed between male and female students in Basic science. This result agrees with the findings of Danjuma (2015) who stated that difference exists in academic achievement of male and female in chemistry, that male students show more interest than female.

7. Conclusion

A significant difference was observed in the mean interest and achievement scores of students taught physics using reciprocal peer tutoring strategy and lecture method with those taught with reciprocal peer-tutoring having a higher interest and achievement mean gains than those taught with the lecture method. There was also a significant difference in the mean interest and achievement scores of male and female students taught physics using Reciprocal peer tutoring with male students having higher mean interest and achievement gains than their female counterparts which implies that gender is a significant factor affecting students' interest and academic achievement toward physics when taught using reciprocal peer tutoring.

8. Recommendations

Based on the findings of the study, the following recommendations were made:

- i. Physics teachers should be taught how to utilize the peer tutoring learning strategy in the teaching and learning process of Physics since it has been found to improve the interest and academic

achievement of students in Physics.

- ii. Reciprocal peer tutoring strategies should be incorporated in the physics curriculum to supplement existing methodologies in order to enhance students' interest and academic achievement in Physics.

9. References

- Adekoya, Y.M., and Olatoye, R.A. (2011). Effect of demonstration, peer-tutoring, and lecture teaching strategies on senior secondary school students' achievement in an aspect of agricultural science. *The Pacific Journal of Science and Technology*, 12(1), 320-332.
- Adonu, C.J., Nwagbo, C.R., Ugwuanyi, C.S., and Okeke, C.I.O. (2021). Improving Students' Achievement and Retention in Biology using Flipped Classroom and Power point Instructional Approaches: Implication for Physics Teaching. *International Journal of Psychosocial Rehabilitation*, 25(2), 234-247.
- Akay, G. (2011). The effect of peer instruction method on the 8th grade students' mathematics achievement in transformation geometry and attitudes towards mathematics. Unpublished master's thesis, Middle East Technical University, Institute of Science and Technology, Ankara.
- Danjuma, S. G. (2015). Problems Militating against the Teaching of Integrated Science and students' Achievement in Taraba State Junior Secondary School. Unpublished Master's Thesis, Abuja: National Open University of Nigeria
- Ezeh, S.I. and Ugwuanyi, C.C. (2013). Transformation of mathematics education programme. A step towards the attainment of vision 20:2020 Abacus. *Journal of Mathematical Association of Nigeria*, 38(1), 75-82.
- Ewumi, A. N. (2010). Gender and socio-economic status as correlates of students' academic achievement in senior secondary schools. <http://eujournal.org/index.php/esj/article/download/72/76>. Falch
- Goolsby, L. (2013). *School Interest*. Boston: Allyn and Bacon.
- Horvath, K. (2011). *Effects of Peer Tutoring on students achievement*. Ohio: Ronard Publishers Ltd.
- Nlebem, F.J. (2011). Predictive validity of mock SSCE scores on senior school certificate of biology in Umuahia education zone of Abia state. Unpublished M.Sc Thesis. Abia State university. Uturu.
- Njoku, M.I.A., Nwagbo, C.R., and Ugwuanyi, C.S. (2020). Effects of Peer Tutoring and Peer-Led Team Learning on Students' Achievement in Biology. *International Journal of Database Theory and Application(IJDTA)*, 13(1), 1-10. DOI:10.33832/ijdt.2020.13.1.01

Ojukwu, M. O. (2016). Perception of students on causes of poor performance in chemistry in external examinations in Umuhia North Local Government of Abia State. *International Journal of Education and Literacy Studies*, 4(1), 67-73

Okereke, C. and Ugwuegbulam. (2014). Effect of competitive learning strategy on secondary school students' learning outcome; implication for counseling developing country studies (online) www.iiste.org.

Okoro, A.U. (2018). Impact of creativity fostering behaviour on students' academic achievement and interest in Nigeria. Unpublished Ph.D Thesis. University of Nigeria Nsukka

Tella, A., Tella, A., Adika, L. O., and Toyobo, M. O. (2008). Relationship among demographic variables and pupils' reasoning ability. *Electronic Journal of Research in Educational Psychology*, 6(3), 709 –728.

Uroko, J. E(2010). Effects Of Reciprocal Peer Tutoring on Achievement, Interest And Perceived Self-Efficacy in Reading Comprehension of Senior Secondary School Students In Enugu State, Nigeria. A Thesis Submitted In Fulfillment of The Requirement For The Award of The Degree of Doctor of Philosophy In Educational Psychology. Department of Educational Foundations University of Nigeria, Nsukka.

Uwaifo, V. O. and Uddin, P.S.O. (2009), Transition from the 6-3-3-4 to the 9-3-4 System of Education in Nigeria: An Assessment of Its Implementation on Technology Subjects. *Studies on Home and Community Science*, 3(2), 81-86.

West African Examination Council (2018). Senior School Certificate Examination, Chief Examiners report. WAEC.

School Choice, Symbolic Capital, and Reputation in Urban Secondary Schools

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Abstract

This study explores the impact of open catchment policies on public school choice within an urban school board, focusing on the role of school reputation in influencing enrollment patterns. Over 25 years, some schools have become overcrowded, while others face closure due to low numbers. Contributing factors for the uneven enrollment are explored. Using a comparative case study of two high schools—one with declining enrollment and another with a surge—the research examines how school reputation, shaped by symbolic capital and social networks, influences parental decisions. Semi-structured interviews with stakeholders reveal that parents prioritize social capital over formal information and often choose schools based on the school's reputation, speaking to as many as 30 neighbours and friends before making their decision. As well, parents seem to choose schools aligned with their worldviews. Some choose a school for pragmatic reasons - such as distance from home, specialized programmes, etc, while others may choose a school based on their beliefs about the types of students that go to the school, either choosing or avoiding the school based on their perceptions of local politics. The findings contribute to school choice literature by highlighting the critical role of reputation in urban educational setting, implications for school choice policies, and its consequences for enrollment.

1. Introduction

Toronto's secondary school landscape has undergone significant changes over the past few decades. Demographic shifts—including an aging population, the elimination of Grade 13 (OAC), and the outward movement of young families to suburban and exurban areas—have contributed to declining enrollment across the city. Compounding these changes is Ontario's publicly funded Catholic system, which is open to all high school students, further fragmenting the student population. In this climate, enrollment has become highly uneven, creating a "buyer's market" where students and families have more school choice, and schools must compete for enrollment.

The optional attendance policy implemented in 1999 was likely influenced by the global neoliberal trend toward market-driven education reform in the late 1990s. In Toronto, it has had significant consequences to enrollments in schools, and has created a competitive environment where some schools thrive and others falter. Uneven enrollment has real consequences because the provincial funding model ties financial support to student numbers, meaning schools with lower enrollment receive fewer resources. As a result, some schools gain reputations as top-tier institutions, while others develop stigmatized identities.

Looking particularly at the context of urban Toronto high schools, the under-enrollment of certain schools is a significant research problem. Currently, several Toronto high schools have very low enrollments and will either need to close or amalgamate in the future. Two secondary schools have closed in recent years, while another two amalgamated with disastrous results. In recent policy documents, it would appear that many more will close as the school board tries to "right size" secondary schools and make each school have a population of about 1000 (2020, 2021). However, this is not simply a geographical problem, as low enrollment is not consistent across the city. While many schools have low enrollments, some schools are very popular and oversubscribed. It would appear that other mechanisms than geography are behind the uneven enrollments, as the well-populated secondary schools also tend to have popular specialized programmes and/or be located in upscale neighborhoods (Yoon et al, 2020). This is a significant educational problem, as low enrollment has negative consequences for students, since the provincial staffing model is based on the number of students in the school. Hence, the smaller the school, the less teachers can be employed and the fewer high school courses may be offered. Students are simply not able to take very many courses at smaller high schools, as they do not have the staff to provide them. Students at smaller high schools may have fewer options for athletic teams and clubs as well. A negative cycle is then created, where students will avoid small high schools in favour of large ones, thus enrollment suffers further. In summary, given that the school board has a) open

catchment policies and b) many programs of choice spread among different schools, parents are free to choose schools. A “buyer’s market” of schools gets created. Therefore, threats to future enrolments come not simply from age demographics of schools’ immediate catchment, but also from their relative popularity; within an array of school choices, some schools get chosen more than others. This study is framed by Pierre Bourdieu’s theory of capital, particularly focusing on symbolic, social, and cultural capital. It aims to answer key questions:

- How do schools acquire or lose symbolic capital?
- How do parents perceive and act on school reputations?
- What role do social and cultural capital play in accessing school-related information?

This research is significant because there is little to no academic work specifically addressing school choice and reputation in Toronto. By focusing on two schools with similar socioeconomic demographics but differing reputations and enrollment figures, this study explores the dynamics and consequences of school choice in an urban “buyer’s market.”

2. Literature Review

The literature on school choice reveals a polarized debate. Proponents argue that choice raises standards, improves access to quality education, and provides options for disadvantaged families. Influential thinkers like Milton Friedman and Chubb and Moe frame choice as a mechanism for improving school performance through competition.

Critics counter that school choice fosters stratification, exacerbates social inequality, and promotes racial and socioeconomic segregation. They caution against the application of market principles to education, arguing that schools should uphold collective values, not just compete for enrollment.

Reputation plays a crucial role in school choice. Ball and Vincent [6] describe “grapevine knowledge” as informal, peer-shared assessments of schools. Others, like Fombrun (1996), frame reputation within institutional theory, highlighting the influence of physical conditions, safety, academic offerings, and demographic composition. Symbolic capital—how a school is perceived in terms of prestige—emerges as a key factor in parental decision-making.

Bourdieu’s forms of capital—symbolic, social, cultural, and economic—are interrelated and provide a useful lens for understanding how parents choose schools. Cultural capital refers to knowledge and skills that influence educational choices, while social capital involves the networks and relationships that provide access to information. Prior studies (Lareau,

Ball, Hamlin) have demonstrated that middle-class families tend to have more of both, giving them an advantage in school selection.

3. Methods

The study is qualitative and uses a case study methodology. The researcher’s positionality—as a member of the local school community—helped shape the design and scope of the project. Data triangulation ensured reliability, drawing from interviews, field observations, school board data, and publicly available resources. Participants were recruited from two Toronto secondary schools: TDA, a school with increasing symbolic capital and enrollment, and Hawthorn, a school with declining enrollment and a more contested reputation. Ethical protocols were followed throughout, and care was taken to ensure data trustworthiness and transparency. Analysis was conducted both within and across cases to draw meaningful comparisons.

4. Case Study: TDA

TDA (The Downtown Academy) has emerged as a school of choice in recent years. Its enrollment has grown exponentially, and it boasts a diverse student population. The rise in TDA’s symbolic capital appears to be driven by perceptions of safety, strong academic programming, and an inclusive culture.

Semi-structured interviews were conducted on the TDA community partners: parents, staff and senior staff. Three main findings emerged. First, TDA’s symbolic capital has been steadily increasing due to its evolving reputation and programming. Second, parents are highly responsive to school reputation and act on their perceptions in making enrollment decisions.

Third, social capital was a more influential resource than cultural capital in parental decision-making, with families relying heavily on word-of-mouth and peer networks rather than formal sources of information.

5. Case Study: Hawthorn Collegiate

Hawthorn Collegiate presents a contrasting picture. Its enrollment has steadily declined since 2001 and dipped sharply following controversy surrounding a program proposal. Although the school is located in a pleasant neighborhood and has a diverse student body, it has struggled with a negative reputation from the neighbours that live directly south of the school. Recently, its reputation is improving, partially due to word of mouth information on Facebook and in local neighborhood chatter. Findings reveal that, first, Hawthorn’s symbolic capital is also rising, but the valuation fluctuates due to multiple,

sometimes conflicting, factors. Second, many families choose Hawthorn not because of its reputation but despite it, and some are actively working to change public perceptions in grass-root movements such as social media. Third, parents and teachers engage in practices of capitalization (leveraging achievements), valuation (ascribing prestige to certain programs or practices), and adaptation (adjusting to prevailing norms) to enhance the school's image and functionality.

6. Conclusion

This study uses Bourdieu's theory of capital to understand how symbolic capital accumulates or diminishes and how social and cultural capital influence school choice in Toronto. It offers the first academic look into how these forces play out in a city where declining enrollment has turned education into a buyer's market.

Several conclusions can be drawn from this study. First, school reputation significantly impacts enrollment, and reputations are not always grounded in empirical realities. Second, social capital plays a crucial role in how families gather information and make decisions.

Third, some families may be avoiding schools due to racism, (as often thought by Hawthorn parents) but, as well, because they are uncomfortable with politicized discourse about race.

7. Implications

The findings suggest that programs with clear value—like French Immersion, Advanced Placement, or robust extracurricular offerings—can enhance a school's symbolic capital. This study highlights the importance of understanding how educational reputation forms, spreads, and influences family decisions. While recent policy efforts have been made to restrict school choice, such as the Secondary Program Review and the Student Interest Program Policy, the reality is that families have grown accustomed to selecting schools based on reputation, program offerings, and informal networks. The trend is unlikely to reverse without a major system overhaul. Finally, this study invites further study into the relationship between symbolic capital and academic outcomes, as well as how educational policy can respond to an increasingly competitive and unequal educational landscape.

8. References

- [1] Addo, E., and Li, J. (2020). Count of Students Attending a School by Sending School 2020—2021 Attending School.
- [2] Alphonso, C. (2018, October 26). Moratorium on closing half-empty schools comes with high costs, Ontario

boards say. The Globe and Mail.

- [3] Bader, M. D. M., Lareau, A., and Evans, S. A. (2019). Talk on the Playground: The Neighborhood Context of School Choice. *City & Community*, 18(2), 483–508. DOI: 10.1111/CICO.12410.
- [4] Badri, M., and Mohaidat, J. (2014). Antecedents of parent-based school reputation and loyalty: An international application. *International Journal of Educational Management*, 28(6), 635–654. DOI:10.1108/IJEM-06-2013-0098
- [5] Ball, S. J. (2003). *Class Strategies and the Education Market: The Middle Classes and Social Advantage*. Routledge.
- [6] Ball, S. J., and Vincent, C. (1998). "I Heard It on the Grapevine": "Hot" Knowledge and School Choice. *British Journal of Sociology of Education*, 19(3), 377–400.
- [7] Ball, S. J., Bowe, R., and Gewirtz, S. (1995). Circuits of Schooling: A Sociological Exploration of Parental Choice of School in Social Class Contexts. *The Sociological Review*, 43(1), 52–78. DOI:10.1111/j.1467-954X.1995.tb02478.x
- [8] Ball, S. J., Bowe, R., and Gewirtz, S. (1996). School choice, social class and distinction: The realization of social advantage in education. *Journal of Education Policy*, 11(1), 89–112.
- Bosetti, L. and Gereluk, D. (2016). *Understanding School Choice in Canada*. University of Toronto Press. <https://utorontopress.com/ca/understanding-school-choice-in-canada-3> (Access Date: 21 May 2024).
- Bosetti, L., Pelt, D., and Allison, D. (2017). The changing landscape of school choice in Canada: From pluralism to parental preference? *Education Policy Analysis Archives*, 25, 38. DOI:10.14507/epaa.25.2685.
- Bourdieu, Pierre. (1986). "The Forms of Capital." In *Handbook of Theory and Research for the Sociology of Education* (pp. 241–258). Greenwood Press.
- Bowe, R., Gewirtz, S., and Ball, S. J. (1994). Captured by the Discourse? Issues and Concerns Researching "Parental Choice." *British Journal of Sociology of Education*, 15(1), 63–78.
- Blumberg and Daum. (2022, May 24). Opinion: school board's specialized program policy review: Mediocrity cannot be our best solution. The Globe and Mail. <https://www.theglobeandmail.com/opinion/article-school-boards-specialized-program-policy-review-mediocrity-cannot-be-our-best/> (Access Date: May 29, 2022).
- Data and Maps- Toronto Police Service. (n.d.). Retrieved June 2, 2022, from <https://www.tps.ca/data-maps/>
- Davies S, Rizk J. (2018). The Three Generations of Cultural Capital Research: A Narrative Review. *Review of Educational Research*. 2018;88(3):331-365. DOI: 10.3102/0034654317748423

Fombrun, C.J. (1996) *Reputation: Realizing Value from the Corporate Image*. Cambridge, Mass.: Harvard Business School Press.

Kunin, Jason. (2016, December 9). Opinion | Alternative Attendance is killing neighbourhood schools.<https://www.thestar.com/opinion/commentary/2016/12/09/optional-attendance-is-killing-neighbourhood-schools.html> (Access Date: February 15, 2024).

Lareau, A. (2000). *Home advantage: Social class and parental intervention in elementary education*. Rowman & Littlefield Publishers.

Oplatka, I., and Nupar, I. (2012). The Components and Determinants of School Reputation: Insights from Parents' Voices. *Education and Society*, 30(1), 37–52. DOI: 10.7459/es/30.1.04.

Saporito, S., and Lareau, A. (1999). School Selection as a Process: The Multiple Dimensions of Race in Framing Educational Choice. *Social Problems*, 46(3), 418–439.

Session 14: Learning / Teaching Methodologies and Curriculum

Title: A Transdisciplinary Approach to Social Entrepreneurship Education
Author: Tatjana Brkic

Title: The Impact of E-learning and Electronic Simulation System on Motivating Students of College of Health Science toward Enhancing their Academic and Clinical Performance
Author: Sirajo Muhammad

Title: Evaluating Food and Beverage Experiential Learning in Hospitality Education: A Case Study with Mixed Method Survey and Data Analysis
Author: Iuliia Gromykhlova

A Transdisciplinary Approach to Social Entrepreneurship Education

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Abstract

The study introduces a research approach needed to develop a globally applicable model for Social Entrepreneurship Education (SEE), focused on enabling the simultaneous generation of social and economic outcomes, a concept referred to in the research as dual value creation. Although the importance of SEE is increasingly recognised by scholars and international organisations, existing models remain fragmented, lacking an interdisciplinary theoretical and applied knowledge base. The study adopts the Interdisciplinary Research Process (IRP) proposed by Repko and Szostak [1], integrating lived experience gained through global SEE delivery across four continents. The research presented in this paper brings together an international academic literature review, transdisciplinary perspectives, and insights derived from the implementation of an innovative SEE model, the Global Social Innovation Labs, involving learners from twelve universities across North and South America, Asia, and Europe. The study identified critical gaps in the SEE knowledge base, including the absence of a structured interdisciplinary content base required to support dual value creation, and the limited integration of practitioner perspectives in curriculum design. In response to these findings, the paper proposes a research pathway grounded in interdisciplinary approaches and enriched by transdisciplinary perspectives, validated through real-world application, with the aim of generating a cohesive and context-responsive SEE knowledge base. The study concludes by highlighting the need for sustained collaboration between academic and practitioner communities.

References

- [1] Repko, A., & Szostak, R. (2025). *Interdisciplinary Research: Process and Theory* (5th ed.). SAGE Publications Inc.

The Impact of E-learning and Electronic Simulation System on Motivating Students of College of Health Science toward Enhancing their Academic and Clinical Performance

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Abstract

E-Learning and electronic simulation system is a key strategy in the course of medical higher education to improve the performance of students in theory and clinical outcomes. It is a medical educational process that stimulates student motivation thereby enhanced class and clinical outcomes. it seeks to empower students with the impetus necessary for continual development and up-to-date skills and knowledge alongside competency in the wake of pandemic and economic downturn. In Nigeria, the COVID-19 pandemic and other socio-economic factors necessitated adoption of e-Learning systems to ensure efficiency and uninterrupted academic approaches in the high education system. This study intends to remedy these problems by analysing the impact of e-Learning and electronic simulation systems on student motivation and outcomes. A mixed-method approach was used in the data collection and analysis. In addition to data being gathered via questionnaires distributed to 398 students; there was face to face interview for in-depth case study analysis through open questions that were qualitatively analyzed using open coding, The results of the study indicated that student's confidence, satisfaction and practical skills improved following application of e-Learning and electronic simulation system. The study conclude that application of computerized and electronic manikins or models for practical demonstration as well as use of slides and other visual aids helps to meet learning needs of students thereby enhancing learning.

Evaluating Food and Beverage Experiential Learning in Hospitality Education: A Case Study with Mixed Method Survey and Data Analysis

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Abstract

Experiential learning (EXPL), as noted in Kolb's Theory, should integrate practical knowledge in theory through hands-on and reflective learning experiences. Traditional assessments (multiple choice questions, report writing definition and concepts memorizing) in hospitality education may fail to develop industry-related skills, such as decision-making, teamwork, and customer service. This study investigates how Food and Beverage Experiential Learning (F&B EXPL), including Active Learning (decision-making), Service Learning (charity fundraiser), and Role-Playing (customer service simulations), strengthens students' self-efficacy (engagement, confidence, and professional skills), and as a result affecting academic performance.

Despite considerable research on individual experiential learning, there is a significant gap in analyzing its combined application within undergraduate hospitality education, particularly in F&B management courses. At the same time, numerous studies examine experiential methods, but limited research relates their effect on student self-efficacy in F&B education. This study addresses this gap by evaluating structured F&B EXPL's impact in a hospitality context (Fundraiser event for BC Children's Hospital).

Using a case study methodology incorporating qualitative and quantitative survey analysis, this research compares traditional examination outcomes (3 batches - 108 students) with F&B experiential learning outcomes (4 batches - 144 students).

To gather the data for the research, F&B management course students participated in a student-organized event with the goal to raise funds for BC Children's Hospital. Participants were assigned specific departmental roles including marketing, purchasing, accounting, F&B production, and customer service (cashiers & counter attendants) based on students skill set and preferences. After the event, the success of student comprehension of the course learning outcomes was assessed through instructor feedback, post-event reflections, and mixed method survey analysis of 70 students. For comparative analysis, the study took into account grades from traditional examination batches (108 students) and compared these with grades from F&B EXPL batches (144 students). In total, this comprehensive approach included the analysis of 252 student grades and 70 survey responses, allowing for sound evaluation of the event impact on student self-efficacy and academic performance.

Findings highlighted that F&B EXPL participants demonstrated higher self-efficacy and academic performance compared to the traditional examination group. The integration of active learning, service learning, and role-playing within F&B EXPL strengthened decision-making capabilities, teamwork skills, and customer service adaptability. However, the research faced some limitations, such as single-institution data collection, time and sample size limitations, as it was narrowed down to a F&B management course.

Theoretical implications were addressed through the extension of Bandura's Theory of Motivation by confirming self-efficacy as a mediating factor between F&B EXPL and improvement in academic performance. Results highlighted the critical role of confidence-building in hospitality education, noting how combined F&B EXPL experiences enhance student performance.

Industry implications encompassed the development of a service-based learning model that cultivates problem-solving abilities, leadership qualities, and customer service skills for the future workforce. The integration of holistic F&B EXPL activities

into curricula better prepared students for real-world hospitality environments. This research conclusively evaluated F&B EXPL's effectiveness in enhancing both self-efficacy and academic performance in hospitality education.

Session 15: Higher Education

Title: Exploring the Importance of Content and Digital Technologies for Environmental Education in Higher Education

Author: Dejan Zemljak

Title: Peer Tutoring in Open-access Higher Education: Evidence of its Effectiveness in Belgian French-speaking Universities

Authors: Antoine Platteau, Philippe Emplit, Dorothée Baillet, Catherine Dehon

Title: Managing the Universities for Greater Efficiency in the Era of Society 5.0. the Policy Imperative for Nigeria

Authors: Simeon Adebayo Oladipo, Jacob Alabi Adeyanju

Exploring the Importance of Content and Digital Technologies for Environmental Education in Higher Education

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Abstract

Environmental awareness and related fields are becoming extremely important. More and more attention is being paid to these fields in education. In combination with technological development, it is important to consider what the current state of learning about environmental awareness is and what trends will be in the future. The paper explores the attitude of university students towards environmental issues and determines to what extent these contents are included in their study process, what their wishes are for further learning about these topics, and what importance they attribute to digital technologies in learning about environmental awareness. The research showed that students are mostly satisfied with the amount of content on environmental awareness during their studies, and they also consider the field to be important for their future career path. On the other hand, they do not attach much importance to technology, and do not consider digital technologies important for learning about environmental awareness topics.

1. Introduction

Recently, environmental problems and environmental awareness have been given more and more importance. The actions of society have important consequences for human health, ecosystems and the environment in general [1]. The European Union has therefore launched the European Climate Change Programme (ECCP), a package of policy measures to limit global warming. On the other hand, the 2030 Agenda of the United Nations, developed by the United Nations, brings together 17 Sustainable Development Goals (SDGs) and 169 sub-goals, which represent the target we want to reach to achieve sustainability. The agenda covers issues as diverse as poverty, hunger, health, education, environmental degradation, etc. It emphasises that these issues are inextricably linked and must only be tackled together and in a holistic manner. The main challenge here is to achieve a more integrated approach to sustainable development, involving new frameworks for managing systemic change [2].

Positive actions by individuals in environmental action must not only be the result of legal conditions but must be rooted in the individual's intrinsic values.

Behavioral attitudes and awareness have therefore become important factors in determining environmental awareness and sustainable development of the individual and society [1]. This leads us to conclude that motivation can act as an important force to personalise such behavior, prior to legal conditions. Education can play an important role in this regard. One of the benefits of education is that it helps to enlighten the individual's mind and thinking. This means that the individual becomes able to think, feel and act in a way that contributes to the success and satisfaction of the individual and also has an impact on the wider society, so that in this way the individual can contribute to the betterment of the community or society. Education can be defined as the coordinated exchange of knowledge and experience, where teaching is the transfer of skills from teacher to learner [3]. This can be assumed for any learning content, including environmental awareness content. This implies that education also has an important role to play in environmental awareness learning at all levels. For this reason, researchers have paid more attention to environmental education (EE), which focuses on topics related to the environment and its issues [4]. EE is a lifelong process that leads to a change in society's awareness of environmental problems. In doing so, EE helps us to change the awareness of the wider community of people who are aware of the environment and their role and the consequences of their actions, leading to a higher level of awareness through individuals taking responsibility for the environment. EE leads to empowerment, making individuals responsible and competent at three levels. The first level is the knowledge that individuals need about the environment in order to understand it and our impact on it, the second level is the skills that represent the means to approach the challenges of environmental awareness, and the third level are the values that represent the goals that we as individuals and as a society want to achieve in the field of environmental awareness [5].

However, we should not ignore the fact that education is becoming more personalised, which also leads to changes in EE. New approaches in education, which can be based on digital technologies, have a key role to play in this. These technologies can stimulate students' interest, increase their motivation to learn

and enable them to capture experiences from both local and distant environments. Moreover, information can be gathered or shared with a wider audience, ensuring that knowledge is disseminated to individuals from other backgrounds. Digital technologies present new ways of educating and engaging learners in issues of environmental awareness [6]. Digital technologies can also make a positive contribution to environmental education, as some studies have shown [7], [8].

Appropriate education (content, methods and forms of work, approach, etc.) leads to the acquisition of lasting environmental attitudes. Such an individual is therefore able to take an active part in protecting the environment. For education to be even more effective, we must be aware that education alone, in the sense of information, is not enough. Education must influence the behavior of the individual, triggering a change in consciousness and building a sense of responsibility. This can also be learnt from the individual's own experience, so it makes sense to base such education on life situations and to start at a younger age [9]. Although it makes sense to implement EE with younger age groups of students, older age groups, such as university students, should not be neglected. Especially if these are students who are training to become teachers and who will soon take on the role of those who teach and influence students. It is in this context that we have therefore developed a study to explore university students' attitudes towards environmental awareness and to find out to what extent these topics are included in their studies, what their aspirations for involvement are and how they see the role of digital technology in this.

2. Research problem and research questions

The research conducted by Kerneža and Zemljak [10] focuses on the inclusion of environmental topics in the study programmes of Slovenian universities and concludes that environmental topics are mostly present only within the content of specific courses and are not integrated as one of the key elements of the educational process. There is a need for greater integration of environmental awareness topics in study programmes to provide students, including future teachers, with the relevant knowledge and skills in this field. These findings are worrying and underline the need for a systematic approach to address this situation. As environmental awareness is an important factor in our future, we wanted to explore how much knowledge about environmental awareness students acquire during their studies, what their preferences are for learning about these topics and what importance they attach to environmental awareness topics. We were also interested in whether digital technology is used in their learning and whether technology would encourage them to explore environmental topics. The following research

questions were formulated:

- RQ1: Do students feel that they receive sufficient environmental awareness content during their studies?
- RQ2: Does the amount of environmental awareness content during their studies follow their preferences?
- RQ3: Is digital technology used in the environmental awareness content, and would digital technology encourage them to explore the field of environmental awareness?

3. Methodology

3.1. Participants

This section presents the characteristics of the participants involved in the study, focusing on their demographic and academic background. Data were collected through a student survey using a questionnaire specifically designed for the purposes of this research. 140 students from the University of Maribor took part in the questionnaire, of which 40 did not complete the questionnaire in full. 100 responses were considered. In terms of gender, 61 % of participants were female, 38 % were male (1 % did not want to disclose their gender). The questionnaire covered different age groups of students: 22 % of participants were aged 18-20, 50 % were aged 21-23, 19 % were aged 24-26, 3 % were aged 27-29 and 6 % were aged 30 or older. The students participating in the survey were randomly selected from different fields of study. Students from all five levels of study (bachelor's degree programmes, master's degree programmes, single master's degree programmes, doctoral degree programmes and advanced study programmes) also participated in the research.

3.2. Instrument

To carry out the research, the first step was to review the literature in the field and in related areas covered by our research. During the review, we came across various questionnaires [11], [12], [13] which we adapted to our study. This meant that we used some selected statements from the questionnaires that were relevant to the objectives of our research, and we added some of our own research. This strategy was used to fill gaps in the research and to adapt the questionnaire to the objectives and research questions of our study.

The questionnaire included a statement in the introduction informing about the voluntary participation in the survey and a declaration that the data was collected anonymously, in accordance with

ethical regulations and that the data would be treated in this way. This was followed by a set of demographic questions. The questionnaire was further divided into four separate sections. The first set related to the extent to which students receive knowledge about environmental awareness during their studies. This set included seven statements related to the inclusion of environmental awareness content during the study, the teaching materials and the amount of environmental awareness content in the teaching materials, the way environmental awareness content is acquired during the study, and the way environmental awareness content is presented during the study. The second set consisted of five statements concerning students' preferences for the inclusion of environmental awareness topics in the study process. This set contained statements that identified the preferences for environmental awareness content during the study period, the way to integrate this content into the study process and the frequency with which this content is integrated into the study process. The third set related to the relevance of environmental awareness content on students' professional life and consisted of six statements. The statements related to the usefulness of learning about environmental issues for students' future careers, their willingness to adapt their careers and their awareness of the importance of environmental awareness for their future. The fourth and final set of statements concerned the use of digital technology in environmental awareness education. This set contained five statements relating to students' perceptions of the effectiveness of environmental awareness education using digital technologies and the attractiveness and motivation to learn environmental awareness topics using digital technologies.

Participants were asked to indicate their agreement with the statements on a five-point scale, 1 = not at all agree, 2 = disagree, 3 = undefined, 4 = agree and 5 = strongly agree.

3.3. Research Design

The following section outlines the research design, detailing the procedures for data collection, the development and implementation of the survey instrument, and the statistical techniques employed to analyse the results. The study was carried out in November and December of the academic year 2024/2025. For the purpose of the research, a questionnaire was developed and uploaded to the Slovenian open-source online survey application 1ka.si. The link to the questionnaire was sent by e-mail to students of randomly selected faculties of the University of Maribor, and in case the faculty was not able to invite students to participate via e-mail due to problems in the university's IT system, the link was published on the faculties' websites together with the invitation. The online questionnaire was completely

anonymous, and participants had to give their consent to participate before starting the questionnaire.

The questionnaire was submitted to a reliability test. The internal consistency of the scale is acceptable for this sample, as indicated by a Cronbach's alpha of 0.848. The data from the questionnaire were analysed using descriptive statistics by calculating means (M) and standard deviations (SD). To test for statistically significant differences between the statements according to the gender of the students, for some of the statements, a non-parametric Mann-Whitney U test was performed on the sample to compare the results between two independent groups at the 95 % confidence level. The conditions of use were tested before the test was carried out. The Mann-Whitney test was chosen because it does not require a normal distribution of the data. All analyses were carried out using IBM SPSS statistical software.

4. Results

The statements in Table 1 refer to the amount of knowledge on environmental issues that students acquire during their studies. In most cases, their opinion is positive. For the first statement "The study programme includes enough content focusing on environmental awareness", $M = 3.30$, indicating that students are satisfied with the amount of content in the sub-field of environmental awareness. Similarly for the second statement, "Environmental awareness is included as a topic in the courses of the study programme I am studying", where $M = 3.28$. For the statement regarding the clarity of the presentation of environmental awareness content, the students' response is also positive, with $M = 3.20$. Slightly weaker, but still encouraging, are the results for the statement concerning the teaching materials, which do not seem to follow the content that students are otherwise exposed to during their studies. Students also feel that they acquire sufficient background knowledge during their studies ($M = 3.40$). However, they showed the highest agreement with the statement that they acquire most of their knowledge about environmental awareness in an informal way ($M = 4.05$).

Table 1. Amount of knowledge on environmental awareness provided to students

Statement	<i>M</i>	<i>SD</i>
The study programme includes enough content focusing on environmental awareness.	3.30	1.13
Environmental awareness is included as a topic in the courses of the study programme I am studying.	3.28	1.15
	3.20	1.09

The content related to environmental awareness is clearly presented in detail.		
The learning materials used in our studies adequately cover topics in the field of environmental awareness.	3.07	1.05
The content I have received on environmental awareness topics during my studies is sufficient to develop my general environmental awareness.	3.11	1.10
My education so far at university has given me a good basic understanding of general environmental issues.	3.40	1.08
Most of my knowledge about environmental awareness comes from informal sources (internet, media, etc.).	4.05	.85

When asked about students' preferences for content related to environmental awareness, responses are on average high, as shown in Table 2. Students indicate that they would like to see more environmental awareness content included during their studies ($M = 3.49$). They also believe that all students should be exposed to this content, regardless of their subject area of study ($M = 3.92$). Students also think that they should acquire environmental awareness content during their studies ($M = 4.01$), they would like to be involved in various activities related to environmental awareness content ($M = 3.66$) and they would like to see this type of content included more often in their studies.

Table 2. Expectations for the amount of content on environmental awareness during studies

Statement	M	SD
I would like to see more content and activities related to environmental awareness topics.	3.49	1.06
It makes sense to me that all students should be exposed to content relating to environmental awareness topics, regardless of the content of the study programme.	3.92	.88
I think we should develop our own environmental awareness during our studies.	4.01	.83
Students should be involved in environmental awareness content through various	3.66	1.04

activities (participation in projects, discussions, participation in conferences, etc.).		
Environmental awareness topics should be included more frequently in the study content.	3.61	.97

On average, students also responded positively to the statements relating to the relevance of environmental awareness skills for their careers, as shown in Table 3. They believe that environmental awareness skills would benefit them in their career ($M = 3.32$), that such knowledge would be valued by employers in the future ($M = 3.46$) and that environmental awareness knowledge would be relevant to many career fields ($M = 3.50$). The majority are also willing to adapt their career path ($M = 3.13$). They also show a view that they can make an important contribution to further environmental awareness ($M = 3.69$).

Table 3. The importance of knowledge on environmental awareness for students' career paths

Statement	M	SD
I believe that my knowledge of environmental awareness topics can be useful in my job search.	3.32	1.08
I believe that my knowledge of environmental awareness topics can be useful in my future job.	3.61	1.02
Employers will value environmental awareness skills more in the future.	3.46	1.15
Environmental awareness content will be relevant to most professions, regardless of discipline.	3.50	1.08
I want to work in the field of environmental protection, so I'm open to adjusting my career path.	3.13	1.18
I believe that my generation can positively influence the environmental awareness of future generations with the knowledge they would gain from their studies.	3.69	.94

As regards the importance of environmental awareness for career paths, we also aimed to examine whether there are any differences in this according to the gender of the students. The only statistically significant difference by gender was found for the statement "Environmental awareness content will be

relevant to most professions, regardless of discipline” ($U = 892$, $z = -2.019$, $p = .044$). For this statement, female students expressed higher agreement with the statement than male students.

Table 4. Gender differences in the relevance of environmental awareness knowledge for students' career paths

Statements	Gender	Mean Rank	Mann-Whitney U Test
I believe that my knowledge of environmental awareness topics can be useful in my job search.	female	52.21	$U = 1024.0$ $z = -1.011$ $p = .312$
	male	46.45	
I believe that my knowledge of environmental awareness topics can be useful in my future job.	female	54.01	$U = 914.5$ $z = -1.914$ $p = .056$
	male	43.57	
Employers will value environmental awareness skills more in the future.	female	53.37	$U = 953.5$ $z = -1.545$ $p = .122$
	male	44.59	
Environmental awareness content will be relevant to most professions, regardless of discipline.	female	54.38	$U = 892$ $z = -2.019$ $p = .044$
	male	42.97	
I want to work in the field of environmental protection, so I'm open to adjusting my career path.	female	52.26	$U = 1021$ $z = -1.026$ $p = .305$
	male	46.37	
I believe that my generation can positively influence the environmental awareness of	female	51.91	$U = 1042.5$ $z = -.896$ $p = .370$

future generations with the knowledge they would gain from their studies.	male	46.93	
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Therefore, female students believe that environmental awareness content will be relevant to most professions, regardless of discipline. Other results are presented in Table 4.

Table 5. The importance of digital technology in teaching environmental awareness content

Statement	M	SD
The programme I am studying uses digital technology to address topics related to environmental awareness.	1.35	.65
Interactive materials are key to a deeper understanding of topics related to environmental awareness.	2.09	1.09
Interactive materials and simulations could help to make learning about environmental awareness topics more effective.	1.60	.94
Digital technology should be an integral part of every course that deals with environmental awareness.	2.05	1.05
I would be more interested in learning about environmental awareness if it were learnt through digital technologies.	2.87	1.44

The results in Table 5 refer to the use of digital technology in teaching environmental awareness content. Most study programmes do not use technology in this type of content ($M = 1.35$). Students also generally feel that digital technology is not essential for the education of environmental awareness topics ($M = 2.09$). They also do not feel that interactive materials would help in learning about environmental awareness topics more effectively ($M = 1.60$). A similar negative opinion was expressed for the other statements relating to digital technology in environmental awareness topics.

We were also interested to see if there were statistically significant differences between the genders. No statements showed statistically significant gender differences in the use of digital technologies in environmental awareness education. The results are presented in Table 6.

Table 6. Gender difference in the importance of digital technology in learning environmental awareness content

Statement	Gender	Mean Rank	Mann-Whitney U Test
The programme I am studying uses digital technology to address topics related to environmental awareness.	female	45.89	U = 908 z = -1.875 p = .061
	male	56.61	
Interactive materials are key to a deeper understanding of topics related to environmental awareness.	female	50.62	U = 1121.0 z = -.286 p = .775
	male	49.00	
Interactive materials and simulations could help to make learning about environmental awareness topics more effective.	female	50.48	U = 1129.5 z = -.229 p = .818
	male	49.22	
Digital technology should be an integral part of every course that deals with environmental awareness.	female	51.87	U = 1045.0 z = -.866 p = .386
	male	47.00	
I would be more interested in learning about environmental awareness if it were learnt through digital technologies.	female	51.24	U = 1083.5 z = -.570 p = .569
	male	48.01	

A very marginal result was found for the statement “The programme I am studying uses digital technology to address topics related to environmental awareness” (U = 908, z = -1.875, p = .061), where male students expressed higher agreement with the statement than female students. However, here again, there was no statistically significant difference that

would confidently claim that male students are more inclined towards technology.

5. Discussion

The results show that students generally feel that they acquire enough knowledge about environmental awareness during their studies. They expressed positive attitudes in all statements. Despite the positive results and the fact that students feel that there is enough content on environmental awareness, we do not believe that this means that we should not pay more attention to it. It would make sense for professors to consider where else to include content on environmental awareness, even though there is sufficient quantity. It is also worth considering the presentation of these topics in the context of courses on degree programmes, to ensure multidisciplinary cooperation [14]. This will help to make environmental awareness more meaningful. We also believe that there is a need for continuous development and monitoring of the field by the professors, so that we can keep abreast of new developments and up-to-date content. It would also make sense to promote this type of content more widely [15]. In the context of the results, we would also suggest that special attention should be paid to study materials. In some cases, these may be outdated and not keeping up with new findings. It would therefore be useful for professors to evaluate the materials and adapt them to the content they teach. This would provide students with relevant content material to complement their environmental awareness education. This is particularly important given that students acquire most of their knowledge about environmental awareness in an informal way.

The results show that students are generally satisfied with the amount of content on environmental awareness. However, some of the results suggest that students would like to see more of this kind of content. It would therefore be worthwhile to consider adopting common guidelines on the integration of environmental awareness content into the study process. The importance of environmental awareness content for students is also shown by the fact that they overwhelmingly agree that all students should listen to environmental awareness topics, regardless of the subject area of study, and that studying is an important period for learning about this content. Also, some studies, such as [16], show that students' interest increases when they are exposed to environmental awareness topics. So, the amount of environmental awareness content is keeping pace with student preferences, but it is worth reflecting and developing a strategy to continue to advocate this in the future. Especially as most students attach importance to the knowledge on environmental awareness also for their future policy career. Here, students need to be properly addressed.

Regarding the importance of digital technology in environmental awareness content, the results showed that students mostly do not attach much importance to digital technology. As the results show, digital technology is not used by professors when teaching environmental awareness topics. Students also consider that digital technology is not crucial in this type of content. This opens up a new area that could benefit from more attention. We think it would be worth exploring this area and looking at how digital technology can be used in a meaningful way in teaching environmental awareness. We believe that if students were exposed to the use of digital technology, it might encourage them to explore the field of environmental awareness more, as some studies suggest [17].

6. Conclusion

The research conducted gives us an insight into the current state of the dissemination of environmental awareness content in the study programmes of the University of Maribor. Given the importance of the field, further research is also worthwhile in the broader scope of the education system in Slovenia, as well as elsewhere in the world, as education plays an important role in achieving the goals set at the global level and in achieving environmental awareness, which is becoming an extremely important field.

7. References

- [1] Varela-Candamio, L., Novo-Corti, I. and Garcia-Alvarez, M. T. (2017). The importance of environmental education in the determinants of green behavior: A meta-analysis approach. *Journal of Cleaner Production*, 170, 1565-1578. DOI: 10.1016/j.jclepro.2017.09.214.
- [2] Weiland, S., Hickmann, T., Lederer, M., Marquardt, J., and Schwindenhammer, S. (2021). The 2030 Agenda for Sustainable Development: Transformative Change through the Sustainable Development Goals? *Politics and Governance*, 9(1), 90–95. DOI: 10.17645/pag.v9i1.4191.
- [3] Bappah, A., and Ubugadu, P. I. (2023). Effect of Play-Way Method on Academic performance among Nursery school pupils in Gombe Metropolis, Gombe State. *Zamfara International Journal of Education*, 3(2), 86–90. DOI: 10.5281/zenodo.8383671.
- [4] Hart, P., and Nolan, K. (1999). A Critical Analysis of Research in Environmental Education. *Studies in Science Education*, 23(1), 1-69.
- [5] Oguz, D., Çakci, I., and Kavas, S. (2010). Environmental awareness of University Students in Ankara, Turkey. *African Journal of Agricultural Research*, 5(19), 2629–2636.
- [6] Pressick-Kilborn, K., Buchanan, J. and Maher, D. (2018). "Promoting environmental education for primary school-aged students using digital technologies. *Eurasia Journal of Mathematics Science and Technology Education*, 15(2). DOI: 10.29333/ejmste/100639.
- [7] Paramitha Eka Putri, I. G. A. (2018). Critical environmental education in tertiary English language teaching (ELT): A collaborative digital storytelling project. *Indonesian Journal of Applied Linguistics*, 8(2). DOI: 10.17509/ijal.v8i2.13280.
- [8] Morin, O., Simonneaux, L., Simonneaux, J., and Tytler, R. (2013). Digital technology to support students' socioscientific reasoning about environmental issues. *Journal of Biological Education*, 47(3), 157–165. DOI: 10.1080/00219266.2013.821748.
- [9] Altin, A., Teacher, S., Teacher, L., Altin, S., and Kahraman, B. F. (2014). Environmental awareness level of secondary school students: A case study in Balıkesir (Türkiye). *Procedia - Social and Behavioral Sciences*, 141, 1208–1214. DOI: 10.1016/j.sbspro.2014.05.207.
- [10] Kerneža, M., and Zemljak, D. (2024). A brief analysis of the inclusion of environmental topics in the first- and second-degree pedagogical study programmes of Slovenian universities. *Dianoia*, 8(2), 115-126.
- [11] Filho, W. L., Ayal, D. Y., Wall, T., Shiel, C., Paco, A., Pace, P., Mifsud, M., Salvia, A. L., Skouloudis, A., Moggi, S., LeVasseur, T., Antonio, G. V., Azeiteiro, U. M., Ioannis, N., and Kovaleva, M. (2023). An assessment of attitudes and perceptions of international university students on climate change. *Climate Risk Management*, 39. DOI: 10.1016/j.crm.2023.100486.
- [12] Novotný, R., Huttmanová, E., Valentiny, T., and Kalistová, A. (2021). Evaluation of Environmental Awareness of University Students: The Case of the University of Presov, Slovakia. *European Journal of Sustainable Development*, 10(2), 59–72. DOI: 10.14207/ejsd.2021.v10n2p59.
- [13] Eren, B., and Yakub, M. (2015). Environmental Consciousness Survey of University Students. In *Proceedings of the ISITES 2015 3rd International Symposium on Innovative Technologies in Engineering and Science* (pp. 375–384), Akademik Platform.
- [14] Vlek, C., and Steg, L. (2007). Human Behavior and environmental sustainability: problems, driving forces, and research topics. *Journal of Social Issues*, 63(1), 1–19. DOI: 10.1111/j.1540-4560.2007.00493.x.
- [15] Erhabor, N. I., and Don, J. U. (2016). Impact of Environmental Education on the Knowledge and Attitude of Students towards the Environment. *International Journal of Environmental and Science Education*, 11(12), 5367-5375.
- [16] Randler, C., and Bogner, F. X. (2007). Pupils' Interest Before, During, and After a Curriculum Dealing with Ecological Topics and its Relationship with Achievement. *Educational Research and Evaluation*, 13(5), 463–478. DOI: 10.1080/13803610701728295.
- [17] Ruchter, M., Klar, B., and Geiger, W. (2009). Comparing the effects of mobile computers and traditional

approaches in environmental education. *Computers and Education*, 54(4), 1054–1067. DOI: 10.1016/j.compedu.2009.10.010.

Peer Tutoring in Open-access Higher Education: Evidence of its Effectiveness in Belgian French-speaking Universities

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Abstract

In open-access, low-tuition higher education systems, such as in the French-speaking Belgian community, dropout and failure rates remain significant challenges. While peer tutoring is effective in selective, high-tuition systems, its impact in open-access contexts is unknown. This study evaluates the causal impact of the peer tutoring program on first-year undergraduate performance at the Université libre de Bruxelles (ULB). Using propensity score matching (PSM) to address selection bias, we analyse data from 879 students across three courses: Neuropsychology, Cytology, and Statistics. Results show peer tutoring significantly improves performance, with a 2.4-point increase, out of 20, in Neuropsychology ($p < 0.01$). Notably, it enables one-third of tutored students to pass the course. Smaller gains occur in Cytology and Statistics. However, participation remains low (12%-17%), highlighting the challenge of motivating students who face difficulties. Targeted strategies to promote engagement and integrate peer tutoring into curricula are crucial to improving success in open-access systems.

Keywords: Peer tutoring, Causal inference, Student success, Propensity score matching.

1. Introduction

Ensuring student success in higher education has become a global priority, particularly as enrolment numbers continue to rise across educational systems. While many higher education models have introduced academic support mechanisms, such as peer tutoring, their effectiveness varies significantly depending on the institutional and cultural context. Peer tutoring has been shown to improve academic outcomes in selective, high-tuition systems like those in the United States, Australia, and the United Kingdom [1],[2]. However, its impact in more inclusive, open-access

systems, such as those in French-speaking Belgium, is less looked at.

The French-speaking Belgian higher education system, overseen by the Fédération Wallonie-Bruxelles (FWB), operates on a unique combination of open access and low tuition fees, which fosters inclusivity but also creates significant challenges. Open access in that context is characterized by most faculties only requiring an upper secondary education certificate to enroll. Students in this system often come from diverse educational and socio-economic backgrounds, leading to varying levels of preparedness for university studies. For many, the transition from secondary to tertiary education is particularly difficult, resulting in high failure and dropout rates [3]. Unlike selective systems, where students undergo rigorous selection process, the open-access model admits a wide range of students, many of whom struggle with basic academic skills [4].

To address these challenges, the *Aides à la Réussite* program was introduced to support first-year undergraduate students through targeted peer tutoring. Implemented in the French-speaking Belgian higher education institutions like the *Université libre de Bruxelles* (ULB), this program provides group tutoring sessions aimed at improving students' understanding of key course material. Tutors, who are typically advanced students with strong academic records, guide first-year students in high-risk courses where failure rates are particularly high. Despite its potential, participation in the program remains voluntary, raising questions about its reach and overall effectiveness [2].

This study aims to evaluate the causal impact of the peer tutoring on student performance at the Faculty of Psychological and Educational Sciences of the ULB. By focusing on three critical courses from the first year of bachelor in psychology – Neuropsychology, Cytology, and Statistics – we apply propensity score matching to account for selection bias on observables and estimate the program's effects on academic

success. This methodology enables us to provide rigorous, causal evidence of tutoring's effectiveness in an open-access, low-tuition context. By doing so, we contribute to the broader literature on academic support programs and their role in promoting student success across diverse educational systems.

2. Literature review

Peer tutoring is a widely studied academic support mechanism, with significant evidence of its benefits in improving student outcomes. Programs such as Supplemental Instruction (SI) in the United States and Peer-Assisted Study Sessions (PASS) in Australia have been implemented successfully in higher education institutions for years, demonstrating measurable improvements in grades, retention rates, and overall student engagement [1],[2]. Bowman et al. [3] used propensity score matching and found that SI participation in the US improved grades by 0.10 to 0.19 points on a four-point scale while reducing failure rates by 4 to 6 percentage points. Similarly, Guarcello et al. [4] observed that students who attended at least one SI session significantly increased their likelihood of passing a challenging introductory psychology course.

In Europe, peer tutoring programs have also shown promise, though their implementation and evaluation remain less consistent. Studies in Spain, Germany, and the Netherlands have reported positive effects on academic performance, particularly in courses with high failure rates [4],[7]. For example, Arco-Tirado et al. [7] demonstrated that peer tutoring in Spanish universities improved student grades and fostered stronger study habits. However, many of these European studies rely on descriptive analyses or randomized controlled trials (RCTs), which are often hard to implement in open-access systems.

To address these limitations, alternative impact evaluation methods such as propensity score matching have been employed to estimate causal effects while accounting for selection bias on observables. Propensity score matching compares students who participate in tutoring with those who do not, using observable characteristics to create comparable treatment and control groups [6]. This approach has been successfully applied in various studies to demonstrate the effectiveness of peer tutoring and other field of research while mitigating biases inherent in observational data.

Despite the growing body of evidence supporting peer tutoring, its effectiveness in open-access, low-tuition systems remains unknown. French-speaking Belgian universities, which operate under the FWB's open-access policy, face unique challenges due to the diverse academic preparedness of freshly arrived students. High failure and dropout rates among first-year undergraduates underscore the need for effective academic support programs. However, participation

in peer tutoring remains voluntary, raising concerns about self-selection bias and the program's overall impact [2],[3]. This study contributes to the literature on the causal effects of peer tutoring on student success by focusing on a non-selective, low-tuition context, thereby enhancing our understanding of student support programs in higher education.

3. Methodology

The study analyses data from first-year undergraduate students enrolled in the psychology bachelor from the Faculty of Psychological and Educational Sciences at ULB over four academic years (2013-2016). The dataset includes 879 first-generation students. Here, first-generation student as one who is enrolled in their first year of study and has never previously been enrolled in any higher education program. The students from the dataset participated in three high-risk courses – high failure rate – as part of the bachelor program: Neuropsychology, Cytology, and Statistics. These courses were selected due to their high failure rates and the availability of detailed attendance records for tutoring sessions.

The dependent variable in this study is student performance, measured by course grades on a scale of 0 to 20. The treatment variable indicates whether a student attended at least one peer tutoring session offered during the year. To control for confounding factors, we include a range of covariates: gender, scholarship eligibility (a proxy for socio-economic status), high school background (e.g., Latin/Greek studies, advanced mathematics), grade repetition, and the socio-economic index of the student's high school.

To estimate the causal impact of tutoring, we employ propensity score matching. Propensity score matching addresses selection bias by matching tutored students with non-tutored peers who share similar observable characteristics. The average treatment effect on the treated (ATT) measures the impact of tutoring on academic performance. We implement various matching algorithms, including K-nearest neighbour matching (KNN) with and without replacement, using various ratio (1:1, 1:2, 1:3) as well as caliper matching (0.01, 0.05), to ensure the robustness of our results [5],[6].

We also verify two key assumptions required for the validity of propensity score matching: (1) the conditional independence assumption (CIA), which assumes that treatment assignment is independent of potential outcomes given the observed covariates, and (2) the overlap assumption, which ensures sufficient overlap in the propensity scores of treated and control students. The overlap is visually inspected using propensity score distribution plots to confirm that both groups share a common support region

4. Results

A dual methodology was used. Firstly, a multivariate regression was used to see if our sample was related to the results found in the literature. Then, to deal with the selection bias on the observables and talk about causality, propensity score matching was applied.

4.1. Multivariate regression

An initial multivariate analysis gives us an idea of the relationship between tutoring and course success. Although they do not establish a causal link, this type of analysis is a good starting point. The results of the multivariate regression analysis indicate that peer tutoring has a significant positive effect on student performance. The strongest impact is observed in the Neuropsychology course, where tutoring increases grades by approximately 2.42 points ($p < 0.01$). Smaller but positive effects are observed in Cytology (0.76 points) and Statistics (1.29 points). These differences may reflect the varying nature of these courses. The coefficients of the other variables are in line with the literature.

4.2. Propensity score matching

Propensity score matching confirms these findings, providing causal estimates of the program's impact by treating the selection bias on observables. In Neuropsychology, the ATT ranges from 2.19 to 2.57 points, depending on the matching algorithm, and remains significant at the 1% level. For Cytology and Statistics, the ATT ranges from 1.00 to 1.67 and from 1.16 to 1.78 points, respectively.

To provide further insights, we examined the proportion of students who achieved passing grades thanks to their attendance to tutoring support. In Neuropsychology, 31.9% of tutored students passed the course because of the program, compared to 35.3% in Cytology and 26.2% in Statistics. These results suggest that while tutoring improves performance across all courses, its relative impact may be greater in courses with higher conceptual complexity. In particular, the low percentage of students that pass the course thanks to the tutoring can be explained by the fact that the Statistics course is often considered to be the most difficult by undergraduate psychology students and the one with the highest failure rate. Because of the difficulties inherent to the course, attending the tutoring sessions is not enough to succeed.

Overall, participation rates remain low, ranging from 12% to 17%, which limits the program's impact. This aligns with prior research indicating that less-prepared students are often reluctant to seek help [2],[4],[7]. Addressing barriers to participation, such

as stigma or lack of awareness, is crucial for improving the program's reach and effectiveness.

5. Discussion and limitations

The findings of this study confirm that peer tutoring is an effective intervention for improving academic performance in an open-access, low-tuition context. The strongest effects were observed in Neuropsychology, a course often perceived as conceptually demanding. This result highlights the importance of additional academic support in courses requiring strong conceptual understanding and critical thinking skills. In contrast, the more modest but still positive effects in Cytology and Statistics suggest that tutoring can also help students manage technical and procedural material, though the magnitude of the impact may vary depending on the course structure and content.

However, the relatively low participation rates raise questions about the program's accessibility and the factors preventing broader engagement. Potential barriers include a lack of awareness about the program, time constraints, and the stigma associated with seeking academic help. Addressing these challenges is critical to maximizing the program's reach and ensuring that the students who need it most can benefit.

The results also suggest that future iterations of the program could be tailored to better meet the needs of specific student populations. For example, integrating tutoring sessions into mandatory course components or offering targeted outreach to at-risk students may improve participation rates. Additionally, fostering a culture that normalizes help-seeking behaviour could reduce stigma and encourage more students to take advantage of available resources.

Despite its strengths, this study has several limitations. First, while propensity score matching reduces selection bias on observables, it cannot fully account for unobservable characteristics, such as motivation or self-discipline, which may influence both participation in tutoring and academic performance. Future research could address this limitation by incorporating longitudinal data or implementing randomized controlled trials where feasible.

Second, the study focuses on three courses within a single faculty at one institution. Although these courses were selected due to their high failure rates, the findings may not generalize to other disciplines, faculties, or institutions. Replicating this methodology across different contexts would provide more robust evidence of the program's effectiveness.

Third, participation in the tutoring program was voluntary, leading to self-selection bias. Students who chose to attend tutoring sessions were likely more motivated or academically conscientious than their peers, which may have contributed to the observed

effects. Future research could explore ways to encourage participation among less-engaged students and evaluate the impact of mandatory tutoring sessions on academic outcomes.

6. Implications for future research

Future research should focus on understanding the long-term effects of peer tutoring on student retention and graduation rates in open-access systems. Additionally, studies could explore strategies to increase participation among less-prepared students, such as targeted outreach or integrating tutoring sessions into mandatory curricula. Examining the role of individual characteristics, like socio-economic background or prior academic performance, in determining who benefits the most from tutoring could provide valuable insights. Finally, replicating similar programs in other open-access educational contexts would help confirm the generalizability of these findings.

7. Conclusion

This study provides robust evidence of the effectiveness of peer tutoring in an open-access, low-tuition system. Using propensity score matching, we demonstrate that tutoring significantly improves academic performance, particularly in high-risk courses like Neuropsychology. The results highlight the potential of academic support programs to address the challenges of open-access systems, where students often enter university with varying levels of preparedness.

Despite its benefits, low participation remains a significant barrier to the program's success. To maximize its impact, universities should consider integrating tutoring sessions into the formal curriculum and implementing targeted outreach strategies to encourage participation among at-risk students. Future research should explore the long-term effects of tutoring on retention and graduation rates, as well as the specific characteristics of students who benefit most from these interventions.

By strengthening academic support programs, policymakers and institutions can promote equitable outcomes in higher education, ensuring that all students have the opportunity to succeed.

8. References

[1] Topping, K. J. (1996). The Effectiveness of Peer Tutoring in Further and Higher Education: A Review of the Literature. *Higher Education*, 32(3), 321–345.

[2] Dawson, P., van der Meer, J., Skalicky, J., and Cowley, K. (2014). On the Effectiveness of Supplemental Instruction: A Systematic Review. *Review of Educational Research*, 84(4), 609–639.

[3] Bowman, N. A., Preschel, S., and Martinez, D. (2023). Does Supplemental Instruction Improve Grades and Retention? A Propensity Score Analysis Approach. *The Journal of Experimental Education*, 91(2), 205–229.

[4] Guarcello, M. A., Levine, R. A., Beemer, J., Frazee, J. P., Laumakis, M. A., and Schellenberg, S. A. (2017). Balancing Student Success: Assessing Supplemental Instruction. *Technology, Knowledge and Learning*, 22(3), 335–352.

[5] Rosenbaum, P. R., and Rubin, D. B. (1983). The Central Role of the Propensity Score in Observational Studies. *Biometrika*, 70(1), 41–55.

[6] Imbens, G. W., and Rubin, D. B. (2015). *Causal Inference for Statistics, Social, and Biomedical Sciences: An Introduction*. Cambridge University Press.

[7] Arco-Tirado, J. L., Fernandez-Martin, F. D., and Hervás-Torres, M. (2020). Evidence-Based Peer-Tutoring Program to Improve Students' Performance at the University. *Studies in Higher Education*, 45(11), 2190–2202.

Managing the Universities for Greater Efficiency in the Era of Society 5.0. the Policy Imperative for Nigeria

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Abstract

The dynamics of technology continue to alter educational delivery in the 21st century. This, coupled with the need to creatively address the growing population, increasing youth unemployment and emerging pandemics in society, the advancement in technology, especially in the area of Information and Communication Technology (ICT), is changing the norms of teaching and learning. As repositories of knowledge and nurseries for producing the quality manpower needed to energise the economy, higher educational institutions must continuously respond to these changes to achieve efficiency and maintain relevance in the scheme of affairs. This study looks specifically at Nigerian universities and the need to formulate and implement policies necessary to efficiently meet the demands of society, in terms of knowledge and skills, by leveraging on the potentials of society 5.0. The study used an online survey of critical stakeholders, including government, university administrators, academics, students and employers of labour on the efficiency of university products in relation to the needs of society in this modern age. Diffusion of innovation theory was used to underpin the acceptability or resistance of education stakeholders to the new trend in the education system. The results show that a policy framework to internalise the new methods in the transmission of knowledge and production of high-level manpower for the country is very crucial. Furthermore, the study found that Nigerian universities have a lot to do in terms of the contents of programme offerings and mode of delivery to meet the yearnings of society and achieve global competitiveness.

Session 16: Global Issues in Education

Title: A Mathematical Model of the Effect of Rehabilitation and Relapse in Host Community with Poverty, Depression, and Crime

Authors: Temitope Olu Ogunlade, Oluwatayo Michael Ogunmiloro

Title: Preventing and Countering Violent Extremism in the Global South through Educational Approaches

Author: Ilham Hoque

A Mathematical Model of the Effect of Rehabilitation and Relapse in Host Community with Poverty, Depression, and Crime

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Abstract

In this research we develop a mathematical model of the effect of rehabilitation and relapse in host communities with poverty, depression, and crime. This model incorporates randomness to reflect the inherent uncertainties in these complex social issues. We developed a system of differential equations to represent the transitions between different states of individuals within the community. Analysis of the behavior of the model to understand how changes in rehabilitation programs, poverty alleviation efforts, and mental health interventions can influence relapse rates, depression levels, and crime within the community. The model provides insights and recommendation for policymakers and community leaders regarding resource allocation for rehabilitation programs, poverty reduction initiatives, and mental health services.

Preventing and Countering Violent Extremism in the Global South through Educational Approaches

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Abstract

In 2006, the United Nations General Assembly adopted the Global Counter Terrorism Strategy [United Nations, n.d.], in response to terrorist attacks by non-state actors as a critical national security threat to nations worldwide. There have been notable counterterrorism strategies undertaken by national governments and with international cooperation, most notably the multilateral military campaign to defeat the Islamic State/Daesh [U.S. Department of State, n.d.]. However, educational approaches may also be an effective means to counter violent extremism and prevent violent extremism (acronyms of PVE and CVE will be used going forward) and which do not rely on expensive military and law-enforcement campaigns. This conference paper will discuss some of the educational strategies for CVE and PVE currently being used in what is known as the 'Global South' and the challenges and drawbacks of such strategies, when countering Islamist/Jihadist extremism. The growing impact of AI-generated content in increasing the threat of extremism will also be briefly discussed.

1. Introduction

In 2006, the United Nations General Assembly unanimously adopted the Global Counter Terrorism Strategy because terrorism by non-state actors is one of the major national security threats that nations worldwide grapple with today [United Nations, n.d.]. There is a crucial need to implement measures to prevent and counter violent extremism that can save innocent lives and mitigate threats to a country's national security, national identity and territorial integrity.

Therefore, many countries in the Global South have focused on a militarized response to countering diverse terrorist threats [Ashraf, 2024]. Global North countries have also adopted a militarized approach to CVE such as UK's Prevent Strategy which has since been criticized for fostering racist stereotyping and hyper police surveillance of Muslim communities and thus losing credibility with law enforcement amongst Muslim communities in the UK [Qurashi, 2018].

Due to issues with stereotyping of Muslims, the

heavy financial cost of military approaches to CVE, the potential to destabilize a country/tries, there is a gradual global recognition that peacebuilding initiatives, among them, educational initiatives, are needed to address the root causes of extremist movements and prevent people within a nation to turn to violent extremism [Saraiva and Erfe, 2023]. It is important to target the interconnected macro social, economic and political factors which pushes a person toward violent terrorism [Bashar, 2021, pp. 207.]

Since this paper is discussing educational approaches, the focus population of this memo will be on youth of school-going age and CVE/PVE approaches to prevent their embrace of Islamist/Jihadist violent extremism, in particular.

2. Theoretical Perspectives

Ubuntu is an indigenous African philosophy that have five core values: survival, spirit of solidarity, compassion, respect and dignity. Living an Ubuntu way of life "...brings about harmony and peace within the community. It becomes easier to share, cooperate and co-exist if there is mutual respect among community members" [Ngubane and Makua, 2021]. Ubuntu "acknowledges that individuals are social creatures who prosper in interconnected relationships and rely on others for their well-being...communal duties and responsibilities" [Nnodim and Okigbo, 2024, pp. 232]. Ubuntu is the opposite of the anger, fear and hatred of others which can lead to radicalization.

Ubuntu-based educational initiatives value solidarity, recognizing common humanity, mutual dialogue and pursuing justice for the sake of an interconnected community, which could lead to promising mindset changes amongst people vulnerable to extremism [Eyesan and et al., 2023].

On the other hand, the economic production function of education theorizes that people receive education to increase their cognitive functioning which can ultimately promote their own country's economic growth through individuals gaining well-paid jobs [Hanushek and Woessmann, 2007]. This theory strongly implies that the main role of education

is to promote a country's economic growth through the creation of jobs/hiring, rather than promoting the value of a kind and interconnected community as espoused by the Ubuntu philosophy.

The economic production function suggests that a country's economic prosperity can protect its residents from turning towards violent extremism, as residents would be gainfully employed and not be socio-economically marginalized, because of access to educational opportunities. However, the empirical evidence for such a belief is lacking as Varaine [2019] have found that Islamists terrorists often come from middle-class/upper-middle class and well-educated backgrounds. Interestingly, Varaine's [2019] study found that right-wing terrorists often come from impoverished, poorly educated, economically depressed regions of the United States. But there does not appear to be a firm poverty to radicalization pipeline for non-white supremacist-based extremism, which Sas et al. [2020] have also pointed out to be the case.

3. Educational Approaches for CVE/PVE: Opportunities and Challenges

Since 2015, there has been a paradigm shift away from using militarized and policing interventions to counter terrorism and towards using educational initiatives such as the teaching of cultural and civic norms and gaining moral legitimacy over violent and extremist ideology [Christodoulou, 2024].

However, Sas et al. [2020] indicates that quality education which teaches critical thinking skills and the ability to engage with diverse people, and their viewpoints matter the most in preventing radicalization, rather than mere access to schooling, because schools and universities can be hotbeds of extremist recruitment [ibid].

Nevertheless, there are a few issues with the current crop of CVE/PVE educational programming. First, it is difficult to determine the effectiveness of CVE/PVE programs because there is no universally accepted definition of what constitutes as preventing/countering violent extremism [Sajjad, 2022].

Saraiva and Erfe [2023] offered an explanation that CVE/PVE is a broad umbrella term covering a variety of approaches that, "...directly address socio-economic grievances through ongoing dialogue, participation, and community feedback and position themselves explicitly outside of hard-security or militarized approaches...PVE approaches have largely emerged to avoid the stigmatization of vulnerable groups at risk of radicalization." However, it is to be noted that there is no consensus among academic circles, global political and military leaders, multilateral organizations, donors, and community practitioners, that this is the definite definition to be followed when implementing CVE/PVE program-

-ming.

The second issue is that CVE/PVE strategies tend to have a global North bias. Therefore, the planning of CVE/PVE strategies is directed by the Global North onto the Global South, often without taking the historical, ethnic, racial and sociopolitical realities of individual countries in the global South into consideration [Mohammad, 2022]. Adding to this implicit Global North bias in terrorism studies, hardly any longitudinal studies have been conducted on CVE strategies in Asian countries [Amit et al., 2021]. Sas et al. (2020) have also found that most studies on radicalization and terrorism have been focused on its impact on European countries, even though most terrorist attacks claimed the lives of victims in only the following six, non-Western countries: Iraq, Afghanistan, Nigeria, Syria, Somalia and Pakistan.

In addition, with the explosion of generative AI there are now new avenues to incite extremism, increase the number and methods of recruitment, faster ways to disseminate and translate extremist materials and weapons-making guides to interested users, erode trust in government and educational institutions through deepfake content and disinformation, and feeding deliberately biased datasets to AI to sabotage content moderation on social media channels [Craanen, Allen and Atamuradova, 2025]. Government policies, the Law, civil society and educational institutions may not have the funding and know-how to be able to keep up with this new reality of extremism.

Despite these challenges, there are some successful examples of CVE/PVE which will be discussed next.

4. Successful Educational CVE/PVE Programming

An example of a successful global South-led CVE/PVE initiative can be seen in Morocco. Morocco has not experienced a large-scale terror attack since 2003 and this can be credited to its multidimensional CVE/PVE strategy [Baker and Cook, 2022], such as implementing innovative solutions like involving women in CVE/PVE work as trained imams (religious leaders) and providing primary social work services to vulnerable people [Couture, 2014].

Morocco is seen as a model for CVE programming to the extent that it has become a key non-NATO partner in countering violent extremism [NATO The Secretary General's Annual Report, 2023]. However, Morocco is now considered a prime exporter of Islamist extremist foreign fighters to the rest of Middle East, including fighting on behalf of ISIS/Daesh [Masbah, 2018]. This suggests that while the security/law enforcement strategies and socially tolerant version of Islam may be effective in preventing domestic Islamist terror attacks in Morocco, there are other powerful pull factors that are

enticing Moroccans to leave their country and join Islamist movements elsewhere.

Another strong example is Malaysia that has educational institutions involved in social media public awareness campaigns and cooperating with other institutions for conducting workshops for countering violent extremism, led by university students in the Malaysian Islamic Youth Movement [Zakuan and Semiwati, 2021]. In addition, the Malaysian government launched the MyPCVE which has comprehensive prevention programs; developing a legal framework and enforcement; rehabilitation and reintegration of former extremists; and reinforcement of Malaysia's multiethnic and multi-religious societal values through education of children and youth, as the four pillars of their CVE/PVE programming [The Ministry of Home Affairs, 2024]. Malaysia has not had a large-scale Islamist terrorist attack on its soil since the 2016 and this may be due to Malaysia's CVE/PVE efforts, although more locally based longitudinal research will need to be conducted to prove a direct connection.

5. Implications for Education Equity

Educational institutions often are prime recruitment grounds for extremist movements, as seen in Iraqi-based university campuses and in Islamic religious schools in West Africa, called Madrasas, possibly due to politically motivated curricula which can promote hyper-nationalist and xenophobic sentiments amongst students [Sas et al., 2020].

Sas et al. [2020] also note that lack of access to quality educational opportunities and low educational attainment can cause societal tensions, which could be a potentially ripe environment for extremist recruitment of socio-economically marginalized youth, particularly amongst frustrated young men and boys. The available literature does not define what they think are 'quality' educational opportunities.

However, Hanushek and Wobmann (2007) suggest that quality teachers do improve students' learning outcomes (although what are quality teachers is never defined), alongside strong accountability systems that measure student performance and the impact of policy decisions on the school; local autonomy for schools which can provide a localized approach for promoting student learning; and school choice and competition which can give parents more options for their children to receive quality education. All of this present at the primary and secondary levels of schooling may provide young people with better paid employment opportunities (economic production function) and prevent the perceived need to fight back against their perceived sense of injustice by joining in or sympathizing with violent extremism.

The literature cited in the paper suggests that there is some connection between poor educational outcomes in many countries and becoming radicalized

toward extremism, including Islamist extremism. However, there is no definite/proven link, yet.

6. Final Recommendations

UNESCO [2023] believes that educational approaches have longer-term viability in protecting communities vulnerable to extremist recruitment and countering extremist acts, over a strict policing and military approach. Despite a lack of direct link between inequities in educational outcomes and the susceptibility to join with Islamist extremist movements, it is still a good idea to pursue educational approaches for CVE/PVE with guiding moral humanistic and civic values, clear goals, sustained funding, and the ability improve one's socio-economic conditions through education. It is also a good idea for this curriculum to be taught/implemented by trained and non-extremist teachers and community/religious leaders.

Currently, countries around the world are implementing different locally made in-school and community education-based solutions for PVE/CVE, which show potential of success in protecting against radicalization and deradicalization of former extremists and which also take the realities on the ground into account.

However more empirical research needs to be conducted to determine what specific kind of religious and secular educational interventions are most effective in countering Islamist-based radicalization and extremist attacks. Further research also needs to be conducted on the factors which pull people toward extremism to better understand the program design for effective CVE/PVE and establishing a criterion for successful CVE/PVE and why some programs could be more successful than others. And finally, in the interests of economies of scale, is there a possibility that successful local educational approaches can be replicated across countries within the same region who are battling the same threat of Islamist extremism (such as across ASEAN organization or African Union)?

7. Conclusion(s)

Educational approaches, be they via formal educational environments, or within (or in partnership with) community agencies and religious institutions, have shown some promise in preventing violent Islamist/Jihadist beliefs in taking root amongst socio-economically disenfranchised populations who are thought to be most vulnerable to falling prey to extremist beliefs, which could lead them to participate in violent terrorist attacks. Educational approaches have also shown some promise in reintegrating individuals formerly engaged in terrorist groups and/or convicted of terrorism offences; however, this paper has not covered such tertiary prevention

programs in detail.

There are significant gaps in the academic research into educational programs for CVE/PVE as discussed in the final recommendations section. What may have caused these gaps in the literature is that there is no global consensus on what constitutes as PVE and CVE: is it educating on democratic and civic values amongst socio-economic groups considered to be most vulnerable to recruitment by local and transnational Islamist terrorist groups? Or is it defined

by successfully reintegrating individuals arrested for various terrorism offences and providing them with socio-economic incentives and intensive psychological support which cause them to renounce their beliefs permanently? Are educational programs that use former extremists as teachers and mentors more successful in preventing extremism due to the personal nature of teaching? Would ensuring well-paid job opportunities, especially amongst youth and new graduates, be an effective bulwark against extremism sympathizing and recruitment? We do not know yet. More research needs to be conducted in creating a consensual definition of counter and prevention of violent extremism that can be agreed upon by the member states of the United Nations, as a starting point.

8. References

- United Nations (n.d.). Countering terrorism. <https://www.un.org/en/global-issues/countering-terrorism#:~:text=It%20threatens%20the%20territorial%20integrity,in%20preventing%20and%20combating%20terrorism> (Access Date: 8 January 2025).
- U.S. Department of State. (n.d.). The Global Coalition To Defeat ISIS. About Us – The Global Coalition To Defeat ISIS. <https://www.state.gov/about-us-the-global-coalition-to-defeat-isis/> (Access Date: 19 January 2025).
- Ashraf, Ali. (2024). Policing, Intelligence, and Counterterrorism in South Asia: Militarization Theory Revisited. *Intelligence Review*, 1(01). <https://intelligencereview.com/index.php/intrev/article/view/2> (Access Date: 25 January 2025).
- Qurashi, F. (2018). The Prevent strategy and the UK 'war on terror': embedding infrastructures of surveillance in Muslim communities. *Palgrave Communications*, 4(1). DOI: 10.1057/s41599-017-0061-9.
- Saraiva, R., Erfe, A. (2023). Preventing violent extremism with resilience, adaptive peacebuilding, and community-embedded approaches. *Current Opinion in Environmental Sustainability*. 61. DOI: 10.1016/j.cosust.2023.101271
- Bashar, I. (2021). The role of civil society in preventing and Countering Violent Extremism. In Gunaratna, R. and Aslan, M.M. (1st Edition). *Civil Society Organizations Against Terrorism* (186-206). Routledge. <https://www.taylorfrancis.com.proxy.bib.uottawa.ca/chapters/edit/10.4324/9781003150145-9/role-civil-society-preventing-countering-violent-extremism-bangladesh-iftekhharul-basha> (Access Date: 29 January 2025).
- Ngubane, N., Makua, M. (2021). Ubuntu pedagogy - transforming educational practices in South Africa through an African philosophy: from theory to practice. *Sabinet African Journals*, 13(1). https://journals.co.za/doi/abs/10.10520/ejc-uz_inka-v13-n1-a2 (Access Date: 31 January 2025).
- Nnodim, P., Okigbo, A. (2024). *Ubuntu: A Comparative Study of an African Concept of Justice*. Leuven University Press. DOI: 10.11116/978961665386D/2024/1869/2.
- Eyesan, S., Ikwuamaeze, T., Makwudo, K.K. (2023). A Philosophic Reflection on Terrorism and the Significance of Ubuntu Human Values for Global Peace. *AKU: An African Journal of Contemporary Research*, 4 (4). <https://www.acjo1.org/index.php/aku/article/view/4284/4188> (Access Date: 9 February 2025).
- Hanushek, E., Woessmann, L. (2007). The Role of Education Quality for Economic Growth. World Bank Policy Research Working Paper No. 4122. <https://ssrn.com/abstract=960379> (Access Date: 9 February 2025).
- Varaine, S. (2019). Revisiting the Economics and Terrorism Nexus: Collective Deprivation, Ideology and Domestic Radicalization in the US (1948-2016). *Journal of Quantitative Criminology*, 36. DOI: 10.1007/s1094-0-019-09422-z.
- Sas, M, Ponnet, K, Reniers, G, Hardyns, W. (2020). The Role of Education in the Prevention of Radicalization and Violent Extremism in Developing Countries. *Sustainability*, 12(6). DOI: 10.3390/su12062320.
- Christodoulou, E. (2024). The development of UNESCO's programmes for preventing violent extremism: educational norms, institutional politics and declining legitimacy. *Compare: A Journal of Comparative and International Education*, 54 (5). DOI:10.1080/03057925.2023.2252319.
- Sajjad, F. W. (2022). Rethinking education to counter violent extremism: a critical review of policy and practice. *Ethics and Education*, 17(1), 59–76. DOI: 10.1080/17449642.2021.2023998.
- Mohammed, I. (2022). Decolonialisation and the Terrorism Industry. *Critical Studies on Terrorism*, 15(2), 417–440. DOI: 10.1080/17539153.2022.2047440
- Amit, S., Barua, L., Kafy, A. (2021). Countering violent extremism using social media and preventing implementable strategies for Bangladesh. *Heliyon*, 7(5). [https://www.cell.com/heliyon/fulltext/S2405-8440\(21\)01224-X](https://www.cell.com/heliyon/fulltext/S2405-8440(21)01224-X) (Access Date: 18 February 2025).
- Craanen, A., Allen, E., Atamuradova, F. (2025). Research Brief: Artificial Intelligence for Counter Extremism- Exploring Threats, Challenges, Opportunities and Needs for Leveraging Generative AI in Countering Extremism. <https://hedayah.com/app/uploads/2025/06/Hedayah-Research-Brief-AI-for-Counter-Extremism-June-2025.pdf> (Access Date: 19 February 2025).

Baker, K., Cook, L. (2022). Morocco's Template for Dealing with Terrorism. The Cipher Brief. https://www.thecipherbrief.com/column_article/moroccos-template-for-dealing-with-terrorism (Access Date: 4 March 2025).

Couture, K. (2014). A Gendered Approach to Countering Violent Extremism: Lessons Learned from Women in Peacebuilding And Conflict Prevention Applied Successfully in Bangladesh and Morocco. The Brookings Institution. <https://www.brookings.edu/articles/a-gendered-approach-to-countering-violent-extremism-lessons-learned-from-women-in-peacebuilding-and-conflict-prevention-applied-successfully-in-bangladesh-and-morocco/> (Access Date: 13 March 2025).

North Atlantic Treaty Organization. (2023). The Secretary General's Annual Report 2023. Brussels: NATO Information Service. https://www.nato.int/nato_static_fl2014/assets/pdf/2024/3/pdf/sgar23-en.pdf (Access Date: 4 March 2025).

Mashbah, M. (2018). Middle East Brief: The Limits of Morocco's Attempt to Comprehensively Counter Violent Extremism. Brandeis University Crown Centre for Middle Eastern Studies. <https://www.semanticscholar.org/paper/The-Limits-of-Morocco-%E2%80%99s-Attempt-to-Counter-Masbah/f322f876a70a65430c404829c2b779b663ce3e3c> (Access Date: 17 March 2025).

Zakuan, U. A., Semiwati. (2021). Combating terrorism through community engagement. In Gunaratna, R and Aslan, M.M. (1st Edition). Civil Society Organizations Against Terrorism (107-123). Routledge. DOI: 10.4324/9781003150145.

The Ministry of Home Affairs. (2024). Malaysia Action Plan on Preventing and Countering Violent Extremism (MYPCVE). [https://www.moha.gov.my/images/MyPCVE/\[ENG\]%20Executive%20Summary%20MyPCVE.pdf](https://www.moha.gov.my/images/MyPCVE/[ENG]%20Executive%20Summary%20MyPCVE.pdf) (Access Date: 4 May 2025).

UNESCO. (2023). What you need to know about preventing violent extremism through education. <https://www.unesco.org/en/articles/what-you-need-know-about-preventing-violent-extremism-through-education?hub=388> (Access Date: 12 May 2025).

Session 17: Inclusive Education

Title: Equity and Inclusion Policy Implementation in French Immersion Schools in Canada
Author: Kimberly Auger

Title: Preservice Teachers' Readiness and Responses to Inclusive Education
Author: Yung-Ho Huang

Title: Lifelong Learning and Social Inclusion of Migrants in Transnational Society:
Understanding the Experiences of Brazilian Immigrant Youth in Japan
Author: Rafaela Yoshiy-Yoshioka

Equity and Inclusion Policy Implementation in French Immersion Schools in Canada

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Abstract

The Despite growing popularity amongst Canadians, French Immersion Public Schools do not seem to be successfully implementing federal Equity and Inclusion Policy in Education. This study examines how French Immersion teachers in Ontario are implementing equity and inclusion practices in their classrooms.

Due to Canada's federal and provincial mandates, every public-school board in Ontario, Canada, now has an Equity and Inclusive Education (EIE) policy. Demand for French Immersion Education (FIE) has continued to grow at a rapid rate and is supported by federal intent to invest more in growing bilingualism in Canada. As publicly funded schools, French Immersion (FI) Elementary Schools in Ontario are expected to implement EIE.

Furthermore, Ontario FI education documents highlight that all students are meant to be welcome in and can benefit from second or additional language learning [1]. Despite these official policies, parents of students requiring special education or English as a Second Language support, say they are being discouraged from entering their child into French as a Second Language (FSL) programs in Ontario. This divide aligns with patterns of streaming where racialized students are overrepresented in Special education programs and White students are overrepresented in specialty programs such as French Immersion [2], [3]. From this standpoint, it seems that, despite the intentions of being for all schools, EIE is not being successfully implemented across FI schools.

To address these issues, this paper will examine the status of the implementation of EIE in FI Elementary Schools in Ontario, focusing on how FI teachers in Ontario experience and implement EIE policy. The paper will center hope and possibility by demonstrating ways that EIE can and is being implemented in FI classrooms while also recognizing the currently existing obstacles that FI teachers face.

Drawing on the symbolic interactionism theory [4], [5], and a methodology guided by hermeneutic phenomenology [6], [7], I will analyze semi-structured interviews conducted with FI Elementary School teachers in Ontario to critically engage with FI teachers in their implementation of EIE. This way, I can embrace my own subjectivity as both a graduate of and a teacher in the FI program as well as a teacher and researcher committed to contributing to a more equitable and inclusive education system. My paper will focus on teachers rather than students, moving away from data collection based on exclusion, isolation, and belittlement, and towards hope and possibilities. We will see that teachers' EIE implementation choices define what Equity and Inclusion policy looks like in FI elementary classrooms - as hope that Ontario can move beyond the performativity of multicultural policy and towards a more culturally responsive EIE.

References

[1] Ontario. (2013). A Framework for French as a Second Language in Ontario Schools. DOI https://files.ontario.ca/edu-1_3/edu-framework-french-second-language-en-2021-11-18.pdf (Access Date: 30 June 2025).

- [2] Howard, P. S. S., & James, C. E. (2019). *When dreams take flight: How teachers imagine and implement an environment that nurtures blackness at an afri-centric school in toronto, ontario*. *Curriculum Inquiry*, 49(3), 313–337. doi:10.1080/03626784.2019.1614879 (Access Date: 7 December 2023)
- [3] Parekh, G., Gaztambide-Fernández, R., Pink, W. T., & Noblit, G. W. (2017). *The more things change: Durable inequalities and new forms of segregation in canadian public schools*. (pp. 809–831). Cham: Springer International Publishing. doi:10.1007/978-3-319-40317-5_43 (Access Date: 9 April 2024).
- [4] Brinkmann, S., Jacobsen, M. H., & Kristiansen, S. (2020). *Historical Overview of Qualitative Research in the Social Sciences*. In P. Leavy (Ed.), *The Oxford Handbook of Qualitative Research* (p. 22-58). Oxford University Press.
- [5] Spencer, R., Pryce, J. M., & Walsh, J. (2020). *Philosophical Approaches to Qualitative Research*. In P. Leavy (Ed.), *The Oxford Handbook of Qualitative Research* (p. 0). Oxford University Press. <https://doi.org/10.1093/oxfordhb/9780190847388.013.13> (Access Date: 15 July 2024).
- [6] Finlay, L. (2012). *Debating Phenomenological Methods*. In N. Friesen, C. Henriksson & T. Saevi (Ed.), *Hermeneutic Phenomenology in Education: Method and Practice* (p. 17-37). Oxford University Press.
- [7] Friesen, N., Henriksson, C. (2012). *Introduction*. In N. Friesen, C. Henriksson & T. Saevi (Ed.), *Hermeneutic Phenomenology in Education: Method and Practice* (p. 1-14). Oxford University Press.

Preservice Teachers' Readiness and Responses to Inclusive Education

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Abstract

If your school principal informs you that some special education students will be placed in your regular classes next year, how would you respond? Would you be positively accepting or negatively anxious? The purpose of this study is to explore preservice teachers' professional readiness for inclusive education, including their readiness in terms of knowledge, skills, and attitudes, and to investigate the readiness factors that effectively predict responses to inclusive education using path analysis.

This study employed a questionnaire survey method, targeting preservice teachers at a teacher education university in Taipei, Taiwan. The "Readiness and Responses to Inclusive Education Questionnaire" was administered. A total of 255 valid questionnaires were collected. Latent variable path analysis was conducted, using "positively accepting" and "negatively anxious" as dependent variables, and professional knowledge, skills, and attitudes as independent variables.

The research results indicate that: (1) Regarding the predictors of preservice teachers' "positively accepting" responses to inclusive education, professional knowledge did not demonstrate significant predictive power, while professional skills and professional attitudes did. Professional skills predicted "positively accepting" with a standardized regression coefficient of .45 ($p < .001$), indicating that higher professional skills among preservice teachers are associated with higher levels of "positively accepting" responses. Professional attitudes predicted "positively accepting" with a standardized regression coefficient of .38 ($p < .001$), suggesting that higher professional attitudes among preservice teachers are associated with higher levels of "positively accepting" responses. (2) Regarding the predictors of preservice teachers' "negatively anxious" responses to inclusive education, professional skills did not demonstrate significant predictive power, while professional knowledge and professional attitudes did. Professional skills predicted "negatively anxious" with a standardized regression coefficient of -.61 ($p < .001$), indicating that higher professional skills among preservice teachers are associated with lower levels of "negatively anxious." Professional attitudes predicted "negatively anxious" with a standardized regression coefficient of .15 ($p < .05$), suggesting that higher professional attitudes among preservice teachers are associated with lower levels of "negatively anxious."

This study's implications are: (1) Professional skills are crucial for positive acceptance. Teacher training should prioritize practical skills through practicums and workshops on differentiated instruction, accommodations, and behavior management. (2) Positive attitudes drive acceptance and reduce anxiety. Teacher preparation must foster inclusive mindsets, emphasizing diversity and the benefits of inclusion. (3) Knowledge alone is insufficient. Teacher training should integrate practical application and attitude development beyond theoretical knowledge.

Lifelong Learning and Social Inclusion of Migrants in Transnational Society: Understanding the Experiences of Brazilian Immigrant Youth in Japan

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Abstract

This study explores the role of ethnic empowerment education in promoting the inclusion of Brazilian immigrants in transnational social fields. Employing Freire's empowerment education and Sen's capability theory, this study highlights how community-led educational initiatives expand immigrants' choices and improve their well-being. The research found that leveraging Brazilian educational resources fosters stronger social networks, better integration, and enhanced career opportunities. By focusing on lifelong learning and non-formal education, the study underscores the importance of empowerment through community-based programs. It also challenges traditional views of immigrants as mere recipients of support, illustrating their evolving role in host societies. Overall, the study offers insights into strategies that can improve the social inclusion and quality of life for transnational migrants.

1. Introduction

Brazilians living in Japan are the fifth-largest immigrant group in the country. Although many initially came to Japan as migrant workers, there has been a recent trend toward pursuing higher education and career development, driven by a growing desire to settle down [1]. However, language barriers and economic challenges have contributed to a lower rate of higher education enrollment compared to other ethnic minorities, with many young people either not attending school or dropping out [2]. While the Japanese government has been slow to respond, ethnic empowerment education has emerged within the Brazilian community, led by immigrants themselves, to promote inclusion in the transnational social space. This study uses Freire's empowerment education and Sen's capability theory as a framework, employing the concept of "Translocal Capability" to explore the expansion of free choices that immigrants can access within Japanese society, in their home country and beyond.

2. Research Method

Fieldwork for this study was conducted at three

Brazilian schools in Japan, one distance learning university in Brazil, one patisserie course, and one language school from 2017 to 2022. Semi-structured interviews were conducted with 16 students, 8 instructors and staff, and 4 parents. This study aims to clarify the characteristics of each ethnic empowerment education initiative and analyze the improvement of individual abilities through education, the expansion of education and career options, and the development of networks within the community. Ethnic empowerment education aims to improve the well-being and quality of life of immigrants and minority groups by utilizing their cultural and linguistic resources. Based on Paulo Freire's critical pedagogy, it encourages learners to recognize their oppressive situations and take action to create positive change, fostering social inclusion and empowerment.

3. Discussion

This study examined the role of ethnic empowerment education in the inclusion of immigrants in transnational social spaces, making significant contributions to diaspora, transnationalism, and empowerment studies.

Diaspora studies have highlighted that Brazilian immigrants often experience weak networks due to their mobility, making it difficult to develop human resources to lead their communities. However, this study found that Brazilian immigrants in Japan strengthened ties with their compatriots by utilizing educational resources from Brazil. While concerns exist, that immigrants may prioritize their own culture and identity, potentially creating divisions with the host country, this study's results suggest that acquiring cultural and social capital from their home countries, such as vocational skills and educational backgrounds, actually supports better integration into the host country, improving the well-being of individual immigrants.

One of the study's contributions to transnationalism research is its exploration of the diversity of education for immigrants. Previous studies of transnational immigrants have often focused on formal schooling. In this context, this

study clarifies the essential role of immigrant-based lifelong learning and non-formal education—areas that have not received much attention in Japan—in facilitating the transnational inclusion of immigrant children and adults, specifically through Brazilian-led educational practices.

Moreover, most studies on transmigrant education have concentrated on middle-class and higher-income immigrants. In contrast, this study focuses on the experiences of lower-class Brazilians living in Japan, shedding light on the diverse transnational educational strategies they employ.

This study also contributes to empowerment research by demonstrating the potential for immigrant empowerment through initiatives led by the immigrants themselves. While previous studies have often portrayed immigrants as “recipients” of support, this research shows that as their stay in Japan extends, Brazilian immigrants’ role as “citizens” within the host society evolves, and they play a crucial part in the development of their communities.

4. Conclusion

Previous research has suggested that Brazilians in Japan typically aim to work in factories, but the participants in this study challenge this stereotype by demonstrating their focus on educational and career advancement.

Despite delays in creating a system for immigrant inclusion in transnational social spaces, this study critically examines the state of education not only in Japan but also in sending and receiving countries by focusing on the transnational educational practices of Brazilians living in Japan.

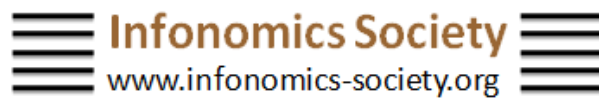
Participants often experienced exclusion due to differences in language, culture, and educational and employment systems, leaving them with limited options, such as working in unstable factory jobs with precarious income. The result of this research reveals that access to ethnic community-based lifelong learning resources enhances educational and career outcomes by facilitating skill acquisition in their native language, improving overall well-being, and building social capital. These programs help establish stronger social support networks, enabling integration into Japanese society.

Unlike traditional assessments focusing solely on academic and occupational achievements to measure the level of social inclusion of immigrants, this research emphasizes the importance of immigrants’ ability to enjoy “freedom” in their lives. Additionally, it underscores systemic challenges in Japan, such as rigid institutional structures and policies that restrict immigrants’ options, ultimately limiting their social inclusion. By addressing these issues, this study offers insights into strategies for enhancing the well-being of transnational migrants.

5. References

- [1] Higuchi, N., and Inaba, N. (2018). Kangeki wo nuu [University enrollment among Japan’s second-generation migrants: Analyzing the patterns of bifurcation]. *Japanese Sociological Review*, 68(4), pp. 567–583.
- [2] Miyajima, T., and Ota, H. (2005). *Gaikokujin no kodomo to nihon no kyōiku* [Foreign children and Japan’s education system]. University of Tokyo Press.

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