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Abstract of the Keynote Speech

Generative AI in Education

Catherine Jenkins, PhD

Lecturer, School of Professional Communication, The Creative School, Toronto Metropolitan University, Toronto, Canada

As educators, we do our best to prepare students for future success. Teachers have expressed both negative and positive opinions about Generative AI in the classroom, but the genie is out of the bottle. Students are already using AI either openly or covertly. They are graduating into a working world where AI is in common use. Preparing students for future success now means giving them the experience of using AI intelligently, critically, and responsibly.

When calculators and the internet first came into popular use, educators were concerned about the impacts these new technologies would have on student learning. AI is just another tool. Part of our anxiety as teachers is having to learn how to use this new technology on the fly, alongside our students, rather than being in the position of confidence we have in our field of expertise.

Teaching successful AI use requires having clear guidelines and in-class discussions to ensure transparency. Because Generative AI is built on Large Language Models (LLMs) that scrape existing data from the internet, it cannot generate new ideas; all it can do is restate or combine existing ideas. Students sometimes think that AI will produce assignments with minimal effort on their part, but this is when AI "slop" is submitted. Students need to understand that using AI effectively requires time, re-prompting, critical review, and editing for a good result.

This consideration of Generative AI in Education will critically review the pros and cons of AI, providing tools to support intelligent AI use for both instructors and students. Takeaways include how to develop strong AI prompts considering persona, context, task, and output, as well as introducing the ACCURATE-LE tool for critiquing AI production.

Abstract of the Workshop I

Be a Disruptor in the Higher Ed AI Disruption: From Awareness to Application Through Learning Frameworks and Theories

Prof Feygens Saint-Joy[1,2,3&4]

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[2]*MBA Professor, Strategic Marketing, AI and Data Innovations course, Monroe University*
[3]*Associate Adjunct Professor, Digital Marketing City College of New York, CUNY*

Artificial intelligence represents a structural transformation in higher education that extends beyond technological adoption into pedagogy, curriculum design, and institutional identity. Generative AI systems are reshaping how knowledge is accessed, synthesized, and evaluated, challenging long-standing assumptions about academic rigor, authorship, assessment, and disciplinary expertise. As students gain immediate access to advanced analytical tools, the role of faculty must evolve from content transmission to intellectual architecture, emphasizing discernment, ethical reasoning, and contextual judgment. This paper introduces a four-pillar model for integrating AI into higher education: AI Literacy, Emotional Intelligence, Co-Intelligence, and Integration. Positioned in the Transparency in Learning and Teaching (TILT) framework, the Association of College and Research Libraries (ACRL) Framework for Information Literacy, and the Higher Education Learning Framework (HELF), the session provides a structured approach to redesigning assignments, assessments, and course experiences in ways that strengthen both human and technological competencies. Grounded in the learning theory of constructivism and organizational theories, contingency, and human capital at the core. The readers will explore bias awareness, ownership and attribution, and ethical AI use while engaging in applied exercises that reframe existing assignments using transparent criteria and contextual learning principles. The paper advances the concept of co-intelligence, positioning AI not as a replacement for faculty expertise but as a cognitive collaborator that can enhance creativity, research inquiry, and instructional design. Emphasis is placed on cultivating emotional intelligence, adaptability, and critical thinking as core learning outcomes in an AI-enabled academic environment. Rather than treating AI as a compliance issue or short-term disruption, this session invites educators to become architects of pedagogical transformation. Attendees will leave with a framework-driven strategy for integrating AI into their courses, strengthening academic integrity through transparency, and preparing students for a workforce where technical fluency and human-centered leadership coexist. The goal is not passive adaptation but intentional redesign, equipping faculty to lead confidently at the jagged frontier of higher education's ongoing transformation. Students now have PhD's at their fingertips, and the need is to understand how to navigate that access to vast knowledge and professors need to begin upskilling them for the future.

Abstract of the Workshop II

From Lesson to Learning Experience: Human Centred Design in Learning and AI Tools

Tracy Tang
| *Leader, Digital Engagement, Island Health, British Columbia, Canada*

Brief description: Learners disengage when content feels disconnected to their lives. Using a recent research study about human-centred design and engagement in online learning for health care workers, this interactive workshop will take what K-12 teachers already know about their students and explore how to integrate Universal Design in Learning together with AI tools to centre learning experiences around students.

What participants leave with: Participants will arrive with knowledge of a lesson they already teach. They leave with an AI-enhanced version of it grounded in a specific student's needs. The core argument throughout: AI is only as student-centred as the teacher using it.

Prerequisites/Prior Experience with AI: None required. Participants are encouraged to come with a mobile device such as a smartphone, tablet, or laptop to engage in the interactive elements of the workshop.

Abstract of the Workshop III

Empowering the Next Generation: Embodied Intelligence in the Age of Accelerated AI

Eren Chen

Booster Robotics

Executive Summary

As Artificial Intelligence transitions from screen-based Large Language Models (LLMs) to **Embodied Intelligence**, the physical world is becoming the new frontier for computation. **Booster Robotics** (est. 2023) is at the forefront of this shift, providing the hardware and software foundations necessary for students and researchers to engage with AI in the physical realm. This presentation will explore how humanoid platforms are transforming STEM education and prepare educators for a future where robots are essential classroom utilities.

Core Presentation Themes

1. **The Rise of Embodied Intelligence:** How AI is moving beyond "chatbots" into physical forms that can perceive, reason, and act within a classroom or lab environment.

2. **Bridging the Skill Gap:** Why hands-on experience with humanoid platforms (like the Booster K1 and T series) is critical for students entering the future workforce.

3. **Scalable Research Solutions:** Discussing how our open-source tools and proprietary operating systems allow schools to build "billion-dollar robot businesses" or advanced research papers on top of accessible hardware.

Duration: 60–90 Minutes

Format: Technical Keynote + Live Humanoid Demonstration

Abstract of the Keynote Speech – Virtual Conference

AI Literacy & Classroom Integration: From Awareness to Integration

Dr. Jennifer L. Penland

Virginia Space Grant Consortium, U S A

This presentation explores AI literacy as an essential research frontier in STEM education, emphasizing the need for transparent, developmentally appropriate integration across learning environments. By clarifying that AI operates through statistical pattern prediction rather than human reasoning ("AI does not think or understand like humans") and can generate inaccurate or biased outputs ("AI can produce incorrect information, fabricated citations"), the session advances an equity-centered instructional framework. It introduces UDL-aligned strategies, bias-spotting protocols, and classroom guardrails designed to support responsible, inclusive AI adoption in STEM fields, ensuring that emerging technologies enhance, not replace, human judgment, inquiry, and disciplinary rigor.

Empowering Educators: Using C.O.D.E.S to Design Student AI Use Statements in Higher Education

Jeralyne Manweiler[1]

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The rise of generative artificial intelligence (AI) tools in post-secondary education demands a shift in how instructors approach student AI use. Rather than policing AI use through surveillance and suspicion, this session advocates for a purposeful, and ragogically grounded approach that fosters transparency and ethical engagement. Designed for professors and instructors, the session introduces the C.O.D.E.S framework (Clarify, Offer, Define, Explain, Set) as a practical guide for structuring student AI use statements. These statements help educators clearly communicate expectations, permitted and prohibited uses, and academic integrity standards. Participants will explore how to categorize AI use (Closed, Restricted, Conditional, Open) and align it with learning outcomes using the SAMR educational technology integration model (Substitution, Augmentation, Modification, Redefinition), the TILT Framework (Transparency in Learning and Teaching), and UDL (Universal Design for Learning) principles. The framework encourages instructors to focus on learning processes rather than products, using AI to scaffold lower levels of Bloom's taxonomy while preserving opportunities for critical thinking and creativity. Through interactive examples and tools, attendees will learn how to design AI use statements that are inclusive, adaptable across disciplines, and supportive of student success. This session empowers educators to move beyond detection and toward intentional integration of AI in teaching and learning.

Keywords*: AI Use Statements, Academic Integrity, Inclusive Learning, AI Literacy*

Examining the Role of Augmented Reality Technology in College Student Engagement, Athletic Identification, and Sport Consumption Behaviors

Geumchan Hwang

Associate Professor, Department of Human Performance and Health Education, Faculty, Western Michigan University, Kalamazoo, United States

Augmented Reality technology has emerged as a significant innovation in higher education, yet research on its effects on college students remains limited, particularly in the context of college sports. While prior studies have examined the influence of Virtual Reality on college students, Augmented Reality presents a distinct approach by layering computer-generated enhancements onto real-world settings, rather than fully simulating an artificial environment. Despite its potential, no studies have explored how Augmented Reality technology is perceived and utilized by college students during sporting events or in sport-related educational contexts. This study aims to investigate three primary questions: 1) how college students perceive and experience the use of Augmented Reality technology in academic and sport contexts, 2) the extent to which Augmented Reality influences their identification with college athletics, and 3) whether Augmented Reality positively affects sport consumption behaviors, including ticket purchases, merchandise acquisition, and stadium experiences. A sample of over 500 United States college students will be randomly recruited due to their familiarity with technology and representativeness as college sport fans. Participants will engage with three Augmented Reality mobile applications—an educational app, a college football game app, and an online shopping app—viewed through a computer screen that overlays Augmented Reality content onto real-world environments. Pre- and post-exposure surveys will assess changes in fan identification, attitudes toward technology, and purchase intentions. Measurement scales will be adapted from established research. Data will be analyzed using Structural Equation Modeling to evaluate the influence of Augmented Reality technology on the targeted outcomes. This study contributes to higher education in several ways. First, it provides insights for faculty to enhance student engagement in physical education courses, aligning with broader educational goals of active participation, discovery, and global engagement. Second, it informs college athletic departments on effective fan relationship management strategies by demonstrating how Augmented Reality experiences can strengthen fan identification and engagement. Third, it offers guidance for online marketing strategies, highlighting how Augmented Reality applications can influence college students' sport consumption behaviors. Finally, this research makes original contributions by addressing a critical gap in the literature: understanding college students' perceptions of Augmented Reality technology in sport contexts and differentiating its effects from Virtual Reality. By doing so, the study advances knowledge of emerging technologies in higher education and their potential to enhance fan experiences, educational outcomes, and marketing effectiveness.

Keywords*: Augmented Reality, College Students, Fan Identification, Sport Consumption*

Investor Challenge: A Gamified Learning Model Integrating Generative AI Assistants and Interactive Avatars to Foster Collaborative, Communication, and Critical Thinking Skills in Higher Education

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Higher education faces increasing pressure to prepare students for complex professional environments where collaboration, effective communication, and critical thinking are essential transversal competencies. However, conventional teaching approaches often address these skills in a fragmented manner and underutilize the potential of emerging educational technologies. At the same time, Generative Artificial Intelligence (GenAI) is rapidly entering educational settings, frequently as a discrete or instrumental tool rather than as an integrated learning partner.

This paper presents Investor Challenge, an innovative, gamified learning model that integrates Generative AI as a continuous pedagogical assistant throughout the learning process in a graduate-level entrepreneurship course. The model is designed to move beyond episodic uses of AI by embedding GenAI across all stages of learning, including evidence exploration, hypothesis development, critical questioning, collaborative sense-making, and oral defence of ideas.

The proposed approach combines experiential learning theory (Kolb), the Jigsaw collaborative learning method, and gamification grounded in Self-Determination Theory. Students work in multidisciplinary teams assuming complementary entrepreneurial roles, each with partial information, requiring sustained collaboration to construct a coherent venture proposal. Multiple AI-driven assistants support distinct cognitive and metacognitive functions, such as sourcing and validating evidence, challenging assumptions through Socratic questioning, structuring feedback, and stress-testing arguments. The learning experience culminates in a simulated investment pitch evaluated through real-time interaction with an AI-generated avatar representing an angel investor, creating an authentic communication and decision-making scenario.

Currently in the experimentation phase, this educational innovation focuses on how Generative AI, when pedagogically orchestrated, can foster active engagement, collaborative knowledge construction, and higher-order thinking. The model contributes to ongoing discussions on AI in education by offering a structured and replicable framework for integrating Generative AI into higher education teaching practices as an embedded learning facilitator rather than a standalone technological add-on.

Keywords*: Generative Artificial Intelligence, Gamified Learning, Innovative Teaching Methods, Higher Education*

Educational Technology in Sub-Saharan Africa: A Systematic Review and Meta-Analysis of Learning *Outcomes, Access, and Implementation Challenges*

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Educational technology (EdTech) is seen as a key factor in enhancing teaching and learning outcomes worldwide, particularly in sub-Saharan Africa (SSA), where investments have been made by governments and organizations to tackle educational issues like low literacy rates and teacher shortages. However, the evidence regarding EdTech's effectiveness in improving learning outcomes and ensuring equitable access in SSA is still inconsistent. This paper quantitatively synthesizes and thoroughly evaluates previous research on the effects of educational technology interventions in elementary and secondary education settings in sub-Saharan Africa. The objective is to assess the overall effectiveness of EdTech on student learning outcomes, to identify contextual factors that have a moderate impact, and to evaluate implementation barriers across diverse SSA contexts. A comprehensive search across major academic databases (e.g., ERIC, Web of Science, Scopus, PubMed) and grey literature was conducted up to December 2025. The review included studies evaluating educational technology interventions in Sub-Saharan Africa that reported sufficient data for effect size estimation. A random-effects meta-analysis was performed to calculate pooled standardized effect sizes (Hedges' g), with subgroup analyses assessing variations by intervention type, educational level, and implementation context. Risk of bias was evaluated using established educational research criteria. Out of *2,487* screened records, *53* studies met inclusion criteria, representing *12* SSA countries. According to meta-analytic data, EdTech interventions had a somewhat favorable impact on student learning outcomes ($g = 0.42$, 95% CI [0.27, 0.57], $p < 0.001$). The impacts of computer-assisted and mobile learning were greater than those of broadcast (radio/TV) modalities. Several study designs, intervention settings, and outcome measures were reflected in the high level of heterogeneity ($I2 = 78\%$). Stronger effects are suggested by subgroup analyses in primary education and in programs with ongoing technical assistance and teacher training. Contextual adaption issues, teacher competence limitations, and inadequate infrastructure (Internet/electricity) were common implementation hurdles. Educational technology interventions in sub-Saharan Africa show promise for enhancing learning outcomes, especially when coupled with teacher support and tailored to local contexts. Challenges in implementation stress the importance of context-sensitive program design and thorough evaluation. Policy recommendations emphasize the need for investments in infrastructure, teacher professional development, and technology models that promote equity and sustainability.

Keywords: *educational technology, systematic review, meta-analysis, sub-Saharan Africa, digital learning, learning outcomes, implementation barriers.*

Effective Use of Generative Artificial Intelligence in Teaching and Learning of Educational Technology for Sustainable Development

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Faculty of Education, Ekiti State University, Ado-Ekiti. Nigeria

Generative Artificial Intelligence (GAI) has emerged as one of the most vital digital innovations transforming teaching and learning and shaping contemporary educational practices thereby supporting the attainment of Sustainable Development Goal 4. This paper examines effective use of generative artificial intelligence in teaching and learning of educational technology with emphasis on its contribution to Sustainable Development Goals (SDGs), particularly SDG 4 (Quality Education). The study also investigated how the adoption of generative AI as an innovative tool can improve students' learning engagement, digital skills acquisition and lifelong learning for national sustainable development. A comprehensive review of recent literature was carried out highlighting the importance of GAI in improving academic performance and development of teachers' digital literacy skills. The study aligned with SDG particularly SDG4 that is quality education. The study adopted descriptive survey research approach using questionnaires as instrument for data. collection. The population consisted of all the secondary school teachers in Ekiti State, Nigeria. A total of 200 Secondary Schools teachers were selected as sample for the study, using multi-stage sampling Procedure. A self-structured questionnaire titled "Generative Artificial Intelligence in Teaching and Learning Educational Technology Questionnaire "(GAITLETQ) was used to collect data. Both face and Content validity were ensured through Educational Technology and Test and Measurement experts' review. Reliability of the instrument was established using test-retest method and a reliability coefficient of 0.85 was obtained. Descriptive statistics (mean, frequency, percentage) and inferential statistics (t-test, ANOVA) were used to analyze the data. The study concluded that Effective use of Generative Artificial Intelligence in teaching and learning of Educational Technology enhance quality education and academic achievement of secondary schools' students in Ekiti State which invariably contributed to sustainable development. The findings revealed that GAI-supported teaching positively influenced students' academic performance invariably contributing to sustainable development. Based on the findings, it was recommended that Policymakers should develop clear guidelines for effective AI use in teaching and learning Educational Technology. The Ministry of Education should invest on AI infrastructure and digital resources and continuous professional development on GAI for teachers.

Keywords: *Use, Generative Artificial Intelligence*

Positive Pedagogy in Practice: Leveraging Cognitive Strengths through Technology-Enhanced Learning in Psychology

Ms. Christine Hau Yu TANG

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This project, funded by the Departmental Teaching Development Grant (DTDG) at The Education University of Hong Kong, explored how technology can support positive pedagogy in psychology education. An interactive e-book entitled *Learning Psychology Inspired by the Virtue of Wisdom and Knowledge* was developed to integrate five cognitive strengths—creativity, curiosity, open-mindedness, love of learning, and perspective—into the study of psychology. The e-book provided guiding questions and culturally contextualized case studies across three courses (Child and Adolescent Psychopathology, Positive Psychology, and Adolescent Development and Schooling Across Cultures), encouraging students to apply cognitive strengths in analyzing psychological topics from global and intercultural perspectives.

Implemented in three related classes, the project demonstrated measurable improvements in students' sensitivity to cultural issues and post-test performance, highlighting the pedagogical value of embedding character strengths into digital learning resources. The e-book also proved to be a sustainable teaching tool, adaptable across courses and reproducible at minimal cost. The project underscores the potential of technology-enhanced positive pedagogy to foster intercultural competence, deepen disciplinary knowledge, and promote lifelong learning. Future directions include extending the e-book's use across curricula and sharing implementation strategies through departmental seminars to advance teaching innovation.

Artificial Intelligence and Educational Technology: Opportunities and Challenges in Modern Learning Systems

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Artificial Intelligence (AI) and educational technology are changing the way students learn and educators teach, creating both exciting opportunities and complex challenges. By integrating AI-driven learning platforms, adaptive assessment tools, and virtual learning environments, educational institutions can offer more personalized learning experiences, improve accessibility, and streamline teaching processes. This study explores how AI-supported educational technologies affect learning outcomes, student engagement, and institutional readiness, highlighting both their potential and the obstacles that must be overcome. We used a mixed-method approach, combining survey responses from 480 students and 95 instructors with in-depth interviews of 20 academic administrators and technology coordinators across different countries using Google Forms. The results show clear benefits: 71% of students reported easier access to personalized learning materials, and 59% felt more engaged and flexible in managing their studies. AI-assisted tutoring and automated feedback systems helped institutions improve course performance by 34% and increased course completion rates by 29%. Instructors also reported saving time and improving student monitoring through AI-driven analytics, with 63% noting enhanced teaching efficiency. The qualitative insights paint a richer picture: AI tools not only help students learn at their own pace but also allow educators to identify struggling learners early and provide targeted support. Students described feeling more motivated and confident, while instructors valued the data-driven insights that inform better teaching decisions. However, the journey is not without challenges. About 45% of participants raised concerns about data privacy and ethical AI use, while 41% pointed to weak digital infrastructure as a major hurdle. Nearly 37% of instructors are worried about insufficient technical training and the risk that overreliance on AI could reduce critical thinking and personal interaction in learning. In conclusion, AI in educational technology offers powerful ways to enhance learning and teaching, but its success depends on strong infrastructure, ethical guidelines, and continuous capacity building. To truly benefit students and institutions, technology must be integrated thoughtfully, with a human-centered approach that balances innovation with fairness and accessibility.

Keywords: *Artificial Intelligence; Educational Technology; Digital Learning; Personalized Learning; Blended Learning; Learning Analytics; Data Privacy; Student Engagement; Institutional Readiness; Capacity Building*

Parental Use of Artificial Intelligence (AI) to Enhance the Quality of Life (QoL) of Children with Disabilities in Saudi Arabia

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Artificial intelligence (AI) technologies are increasingly being used in everyday contexts, offering new possibilities for supporting individuals with disabilities. While previous research has primarily focused on the use of AI in educational and assistive technologies, limited attention has been given to how parents themselves utilise these tools to support children with disabilities. This study explores how parents in Saudi Arabia use artificial intelligence to support their children and enhance their quality of life. A qualitative exploratory approach was employed, involving semi-structured interviews with 14 parents of children with disabilities (7 fathers and 7 mothers). Two participants were excluded from the analysis because they reported not using artificial intelligence tools, leaving a final sample of 12 participants. The findings revealed several common patterns in parental use of AI. All participants reported using AI to obtain diagnostic and cultural information related to the nature of their child's disability and to identify effective ways to interact with their child. Many parents also used AI to explore modern therapeutic approaches and strategies for managing behavioural challenges, particularly among parents of children with autism spectrum disorder and intellectual disabilities associated with behavioural difficulties. In addition, the majority of participants reported using AI as a support tool for their children's learning and training activities, as well as for identifying available support services. Despite these perceived benefits, all parents highlighted concerns regarding the reliability of AI-generated information, and some participants reported encountering inaccurate or inconsistent responses. No significant differences were observed in parental responses based on gender or type of disability, except in relation to behavioural management inquiries, which were more prevalent among parents of children with autism and intellectual disabilities. The findings highlight the emerging role of artificial intelligence as a family support resource and emphasise the need for reliable and culturally appropriate AI-based guidance for families supporting children with disabilities.

Keywords*: Artificial Intelligence (AI), Parents, Disability, Quality of Life (QoL)*

Evaluating The Performance of ThetaWise, Mathos AI, and ChatGPT-4o in Solving Mathematics Problems in English and Malay Languages

Chua Ling Ling, Georgina[1]; Alibalayeva, Zibakhanim[2]; Pelton, Tim[3]

[1]& [2]PhD Candidates, Department of Curriculum and Instruction, University of Victoria, Canada
[3]Associate Professor, Department of Curriculum and Instruction, University of Victoria, Canada

Generative artificial intelligence (GAI) chatbots are widely used in education for their features, such as providing immediate feedback, obtaining personalized help, simplifying difficult concepts for students, and developing teaching materials. However, the accuracy of information provided by these chatbots still requires further exploration. This research proposes a comparative analysis of the performance of three GAI chatbots, two of which will be experimental chatbots and one will be a control, in solving mathematical problems in two different languages. The research question is: How do the performance of mathematics-based GAI chatbots (ThetaWise and Mathos AI) compared to that of non-mathematics-based GAI chatbot (ChatGPT-4o) in solving mathematics problems in English and Malay based on their: (a) final responses? (b) error analysis of incorrect responses? (c)error analysis of correct responses?

To address these questions, this study will adopt an adapted version of Newman's Error Analysis (NEA) framework to analyze chatbots' answers to mathematical questions. Newman identified five hierarchical stages: reading, comprehension, transformation, process skills, and encoding, which play important roles in connecting literacy and numeracy. This framework focuses on examining students' errors, identifying the level at which misunderstandings occur, and applying appropriate strategies to address those challenges.

Bilingual questions sourced from a national mathematics examination for Secondary 5 students in Malaysia (equivalent to Grade 11 in Canada) will be used as the dataset. This study will focus on multiple-choice questions to enable systematic comparison and analysis of the responses. Along with each uploaded image, a text prompt "Solve the question by explaining each step clearly and selecting the correct answer" and its Malay equivalent will be included to ensure that the chatbots provide responses in a consistent and comparable format.

To answer the research question, we will conduct data analysis in three phases. First, we will apply binary coding for the responses: 0 for incorrect response and 1 for correct response to compare the overall performance across chatbots and languages. Second, we will analyze all incorrect results using NEA to identify the stages at which errors occur. Finally, correct responses will be further examined to determine whether they are supported by valid correct mathematical reasoning/workings or are coincidentally correct.

Through this approach, this study seeks to provide a deeper understanding of the strengths and limitations of GAI chatbots in mathematics problem-solving, particularly in bilingual contexts, and to contribute insights into their potential role in education.

Keywords: *Mathematics, GAI Chatbots, Languages*

Animation-based Computer Assisted Maninka Language Learning System

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This research focused on the development of an animation-based Computer-Assisted Language Learning (CALL) system for Maninka, aimed at supporting young children in acquiring foundational language skills. The study began by gathering and analysing data on how children learn the Maninka alphabet, vocabulary, grammar, numbers, and counting. Data collection involved questionnaires, interviews, and collaboration with language experts. A digital camera captured image and audio samples, which were processed and cleaned using video editing software (VSDC). Text data was tone-marked with Takada Text Editor Software. The system specification phase utilized mock-up diagrams to outline core features, including a lexical database, grammar support, multimedia integration, and user profiles for Administrators and Students.

The Maninka grammar model was constructed using formal language techniques, while the resource computing tool was designed with Unified Modeling Language (UML) diagrams, including flowcharts and sequence diagrams. Animated characters, Malik and Malika, were created using Adobe Animate and exported in web-compatible GIF formats to enhance cultural relevance and learner engagement. The application was implemented with the Dart programming language and built as a cross-platform mobile app using Flutter. The user interface was designed to be child-friendly and validated through usability testing.

The project produced a curated dataset containing the Maninka alphabet in both Latin-based and N'ko scripts, and a bilingual vocabulary list adapted to the Kankan dialect of Guinea, ensuring linguistic consistency and cultural significance for early learners. System evaluation used Mean Opinion Score (MOS) to measure user satisfaction and effectiveness. Results showed the animation-based system outperformed traditional human tutoring in usability (95.5% vs. 79%) and engagement (90% vs. 79%), with slight differences in satisfaction (87.5% vs. 94%) and educational value (85% vs. 93%). The system nearly matched human tutors, meeting the Turing Test threshold for intelligence.

In conclusion, the animation-based Maninka language learning system was found to be an effective, engaging, and intelligent tool for helping young children develop essential language skills in a home environment.

Keywords*: Maninka Language Learning, Computer Assisted Language Learning (CALL), Animation-based learning.*

Human-Centred Design in Online Workplace Learning and Relationship to Engagement and Skills Development for Health Workers: A Systematic Literature Review

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Health care systems globally face a compounding crisis: a projected shortage of 10 million health workers by 2030, persistently high attrition rates, and mounting evidence that workplace learning experiences are failing to meet employee needs. Despite extensive investment in online workplace learning, research indicates that fewer than one in four employees view their organisation's learning as highly effective. This study investigated how human-centred design (HCD) approaches in online workplace learning might contribute to engagement and skills development among health care workers, and how those responsible for learning design might use assessment strategies informed by HCD principles. Guided by Engagement Theory (Kearsley & Shneiderman, 1998) and Self-Determination Theory (Deci & Ryan, 2000), this applied research project employed a systematic literature review of 33 peer-reviewed studies published between 2017 and 2025, supplemented by three qualitative interviews with individuals involved in the planning and delivery of workplace learning for health care employees. Thematic analysis of both the literature and interview data surfaced three primary themes: (1) factors influencing the planning and delivery of online workplace learning; (2) skills development and engagement; and (3) assessment. Findings revealed that within health care organisations, logistical, budgetary, and time-driven conventions frequently supplant learner-centred design practices. Healthcare workers reported that when online learning fails to reflect their real-world experiences or involve them as co-designers, engagement and knowledge retention suffer significantly. Conversely, when learning is designed with attention to learner needs, interactivity, and collaboration, health workers demonstrated stronger motivation and skills development. The study also identified persistent inconsistencies in how online workplace learning is assessed, with neither qualitative nor quantitative data routinely collected in ways that reflect authentic clinical settings. Recommendations include investing in evidence-supported learning design, involving employee learners in the planning process, identifying economies of scale across health authorities, supporting data-informed approaches to learning design, and centralising the learning function under dedicated organisational leadership. These findings contribute to the growing body of knowledge on human-centred design in health care education and offer actionable strategies for addressing workforce attrition through improved workplace learning. In preparing this abstract, the AI writing assistant Claude (Anthropic, 2025) was used to draft and format the text based on the author's original research. All content, findings, and interpretations reflect the author's own work.

Keywords: *human-centred design, online workplace learning, employee engagement, skills development, health workers*

Advancing Inclusive Education through Technology-Supported Pedagogies: Strengthening Teacher Readiness for Autism-Inclusive Classrooms

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As education systems worldwide move toward more inclusive and technology-enhanced learning environments, preparing teachers to effectively support learners with diverse needs has become a critical challenge. Among these learners, students with Autism Spectrum Disorder (ASD) often require structured instructional approaches, adaptive teaching strategies, and accessible learning environments that mainstream classrooms are not always prepared to provide. Inclusive education policies have expanded significantly across many developing education systems, including Pakistan; however, the professional preparation of teachers has not always kept pace with these policy developments. Consequently, many teachers encounter difficulties in addressing the complex learning needs of students with autism in inclusive classroom settings.

This study explores teacher readiness for autism-inclusive education and examines how technology-supported pedagogical approaches can strengthen inclusive teaching practices in mainstream schools. Using a mixed-methods research design, the study draws on survey data and semi-structured interviews with teachers and teacher educators involved in inclusive and special education programmes. The research investigates teachers' understanding of autism, their attitudes toward inclusive education, and their capacity to integrate technology-assisted strategies that enhance accessibility and engagement for learners with diverse needs. The findings suggest that while teachers demonstrate generally positive attitudes toward inclusive education, many reports limited professional training in autism-specific pedagogy and insufficient exposure to technology-supported learning tools that facilitate inclusive classroom participation. In response, the study proposes a capacity-building framework aimed at strengthening teacher readiness for autism-inclusive classrooms. The framework emphasizes targeted professional development, collaborative engagement between special and mainstream educators, and the integration of inclusive digital pedagogies within teacher education programmes. By presenting insights from a developing country context, the study contributes to international conversations on innovative and sustainable approaches to inclusive education. The findings offer practical implications for policymakers, teacher educators, and school leaders seeking to enhance teacher preparation systems and create more accessible and supportive learning environments for students with autism.

Keywords *Inclusive education, Autism Spectrum Disorder, Teacher readiness, Educational technology, Inclusive pedagogy*

The Role of Augmented Reality (AR) and Virtual Reality (VR) in Enhancing Education

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In an era of rapidly evolving technology, creating interactive teaching and learning experiences is essential. Augmented Reality (AR) is a powerful tool for enhancing science education by making concepts easier to visualize and understand through experiential learning. AR supports diverse learners by accommodating different backgrounds, abilities, and learning styles. Because a single instructional approach cannot meet every student's needs, AR helps educators create more inclusive and effective learning environments. Augmented reality is a technology that places digital elements onto real-world objects, enriching what users see and experience. By making complex ideas easier to visualize and more engaging to explore, AR is transforming education at every level. From early schooling to professional training, it enables learners to develop a deeper and more meaningful understanding of any subject matter. Virtual Reality immerses users in a fully digital environment through devices such as VR headsets or goggles. In educational contexts, it enables the creation of realistic, hands-on simulations that enhance experiential learning. Augmented Reality and Virtual Reality differ significantly in how they interact with the user's environment. AR enhances real-world settings by overlaying digital elements, while VR immerses users in a completely simulated environment.AR adds digital information to real-world scenes without replacing them, whereas VR disconnects users from their physical surroundings and transports them into a fully virtual space. Another key distinction lies in the required technology: AR typically uses devices such as smartphones to layer digital content onto the physical world, while VR relies on specialized hardware like headsets or special goggles. The use of augmented and virtual reality in education offers clear advantages. These technologies enhance academic performance and enrich the overall learning experience by making instruction more accessible, engaging, and personalized. They also support improved knowledge retention.

Keywords*: AR- Augmented reality, VR-Virtual Reality*

Information Literacy Skills and Students' Research Competence in Ekiti State University, Ado Ekiti, Ekiti State, Nigeria.

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The study examined Information Literacy Skills and Students' Research Competences in Ekiti State University, Ado Ekiti, Nigeria. Specifically, the paper investigated the relationship between information literacy skills and students' research competence, identified digital literacy skills possessed by students and the influence on their ability to conduct academic research. The descriptive research design of the survey type was adopted for the study. The population of the study consisted of all the Library and Information Science undergraduate students in the Department of Vocational and Technical Education. A sample of sixty (60) students was selected through simple random technique. The instrument for the data collection was a structured questionnaire titled Information Literacy Skills and Students' Research Competences in Ekiti State University, Ado Ekiti (ILSSRCESUAE). Data collected were analysed using descriptive and Inferential statistics. The findings of the study revealed that students did not possess adequate information literacy skills hence their research competences were inadequate. The study further highlighted the critical role of academic libraries and librarians in enhancing students' research capacity. Some challenges were encountered by students which included limited exposure to digital training, digital infrastructure and poor internet connectivity with unstable power supply. The study concluded that information literacy skills are strong predictor of effective research competence among Ekiti State University students. Based on the findings of the study, it was recommended that integration of information literacy programmes should be included into the university curricula to promote effective research practices. Based on the findings it was also recommended that more digital infrastructure with internet facilities should be put in place for students' use and they should be made easily accessible to them. The study is significant because it has demonstrated that information literacy skills significantly predict students' research competence.

Keywords: *literacy skills, research, competences*

Using LLMs for Outcome-Aligned Course Design

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Designing a high-quality online course requires more than generating content; it requires maintaining alignment among course learning outcomes, assessment evidence, module objectives, and learning activities. This challenge becomes more complex in structured curriculum development processes where instructors begin with a course outline, define intended learning results, identify acceptable evidence, and then plan instruction across a fixed set of modules. This abstract presents a conceptual framework for using large language models as design assistants in backward-designed course planning. The proposed approach begins with the course outline as the primary source of course intent, particularly the stated learning outcomes, and then supports the development of course design artefacts through three planning stages: establishing desired learning results, determining acceptable evidence, and planning learning experiences and instruction. Within this workflow, the model helps instructors translate course-level outcomes into aligned module objectives, propose suitable assessments and learning activities, and examine whether coverage of the outcomes remains coherent across all nine modules. The framework is illustrated through a software engineering course design context in which each module must include objectives, activities, and assessment expectations that remain traceable to broader learning outcomes. Rather than positioning artificial intelligence as a replacement for instructor judgement, this work argues for its use as an alignment-aware planning partner that can assist with curriculum mapping, identification of gaps or redundancy, and consistency checking across design documents. The paper contributes a practical design perspective on how large language models may support systematic course development while preserving human oversight, pedagogical intent, and institutional course design requirements.

Keywords: *course design, backward design, curriculum alignment, large language models*

Training Effectiveness and Employee Performance in Public Sector Organizations in Zanzibar, Tanzania

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Training is one of the most fundamental functions of human resource management as it enables employees to acquire the knowledge, skills, and competencies required to perform their duties effectively. In public sector organizations, effective training programs contribute significantly to improving institutional performance, service delivery, and overall organizational productivity. This study examines the factors influencing training effectiveness and their impact on employee performance in public sector organizations in Zanzibar, Tanzania. Specifically, the study evaluates the influence of training needs analysis, training design, training delivery style, training resources, organizational support, and trainee characteristics on training effectiveness. Additionally, the study investigates the impact of training effectiveness on employee performance and analyzes the moderating role of motivation to learn and training transfer climate between training effectiveness and employee performance. The study employed quantitative research methods to analyze the relationships between the variables. Pearson correlation analysis was used to assess the relationships between training factors and training effectiveness. The results revealed a very strong positive correlation between training delivery style ($r = 0.88$, $p < 0.05$), organizational support ($r = 0.83$, $p < 0.05$), training needs analysis ($r = 0.80$, $p < 0.05$), and training effectiveness in public sector organizations in Zanzibar. These findings indicate that well-designed training programs supported by appropriate organizational mechanisms significantly improve training outcomes and employee capabilities. Furthermore, the study examined differences in employee performance perceptions based on demographic characteristics such as gender, age, and level of employment. The independent sample t-test results indicated no statistically significant difference in the perception of male and female employees regarding performance ($t(230) = 0.319$, $p = 0.506$). Similarly, the one-way ANOVA results showed no statistically significant difference in employee performance perceptions across age groups ($F(3,226) = 0.981$, $p = 0.301$). However, a slight variation was observed across levels of employment, indicating the need for tailored training strategies within different employment categories. Multiple regression analysis was also used to test the conceptual model and determine the combined effects of training needs analysis, training design, training delivery style, training resources, trainee characteristics, and organizational support on employee performance. The findings of this study provide important insights for policymakers, government institutions, and human resource practitioners seeking to strengthen training systems in public sector organizations. Improving training design, organizational support, and delivery methods can significantly enhance employee performance and institutional effectiveness in Zanzibar.

Keywords: *Training Effectiveness, Employee Performance, Public Sector, Human Resource Development*

Types and Levels of Reflective Practice in Post-microteaching Reports of Pre-service Chinese Language Teachers

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Reflection is a fundamental competency in teacher education. Microteaching offers pre-service teachers a structured and supportive setting to rehearse instructional strategies, engage in simulated teaching, and develop self-reflection habits. Although previous research has largely emphasised the role of feedback in microteaching, far less attention has been paid to the specific types of reflection that pre-service teachers produce and the depth to which they reconstruct their thinking.

This study examines the types and levels of post-microteaching reflections written by pre-service Chinese language teachers in Hong Kong secondary schools. Using Amobi's three-level reflective typology—describe, inform, and confront/reconstruct—the reflections of 14 participants enrolled in a Postgraduate Diploma in Education programme were analysed. A qualitative research design was adopted, drawing on triangulated data sources including reflective narratives, microteaching artefacts, and follow-up discussion records.

The findings indicate that participants predominantly engaged in cognitive-level reflection, with a strong emphasis on lesson objectives, instructional sequencing, and the selection and use of teaching resources. Most reflective reports combine descriptive and informative elements, typically identifying areas for improvement or explaining teaching choices. However, only a small proportion demonstrated higher-level reconstruction, such as critically examining the underlying pedagogical assumptions or proposing alternative instructional approaches.

The study recommends strengthening reflective judgement through guided feedback, encouraging the use of first-person reflection to deepen personal engagement, and restructuring mentoring cycles to better support sustained pedagogical insight. Overall, the findings highlight microteaching as a valuable formative space for reflective practice in the future teachers' preparation.

Keywords*: Microteaching, reflective practice, pre-service teachers, Chinese language education, reflective typology*

Connecting the Dots: A Digital Practical Toolkit to Support the Well-being of Japanese as a Second Language Students in Diverse and Evolving Educational Contexts

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This project addresses the growing need to support the well-being of Japanese as a Second Language (JSL) students in Japanese public primary schools. As the number of foreign students has increased significantly in the past decade, many schools continue to face challenges in responding effectively to linguistic and cultural diversity. Previous research in Japan indicates that minority students often experience lower levels of well-being compared to their peers.

The purpose of this project is to develop a practical, school-centred digital toolkit that enables principals and school leaders to take immediate and context-sensitive action. Aligned with the principles of inclusive education and Sustainable Development Goals, the toolkit aims to foster an "ideal school" environment where: (1) students experience a strong sense of well-being; (2) teachers are motivated and positive; (3) diversity is valued as a resource; (4) JSL support is flexible and sustainable; and (5) schools actively collaborate with the local community. The toolkit, Connecting the Dots, visually maps existing resources, practices, and support systems, providing digital platforms to help educators reorganize and reconnect them in ways that are actionable and sustainable.

The project draws on insights from public primary schools in Montreal, where multilingual and multicultural practices are well established. It identifies two key factors underpinning student well-being: sustained language support and teachers' well-being. Based on these findings, the project introduces a conceptual model, generated by Copilot, that illustrates how these elements interact to foster positive student experiences. In an era where AI-enabled personalization is becoming a priority, this project emphasizes the essential human and structural ecosystem required to make such technologies effective. It also proposes a school-centred educational ecosystem that supports collaboration among schools, families, and community organizations, as well as online learning resources as an effective and useful tool.

In addition to the toolkit, a companion guide provides research-based explanations to support deeper understanding and implementation. While practice-oriented, the project also considers how evolving educational environments, including the increasing role of digital tools, shape principals' responses to student diversity.

This presentation offers a practical and transferable approach to bridging policy and practice and enhancing student well-being across diverse educational contexts.

Keywords*: student well-being, multilingual education, school leadership, comparative education*

Integration of Artificial Intelligence (AI) in Engineering Education: A Review

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Artificial Intelligence (AI) is no longer a distant concept in engineering education and research. In engineering education, where technical precision and problem solving are of paramount importance, AI presents both an opportunity and a leadership challenge. AI offers immersive and interactive learning experiences, as exemplified by virtual science laboratory simulations. An early exposure to AI concepts prepares future engineers to tackle the challenges of modern technology-driven industries. Integrating AI within undergraduate engineering curricula not only leads to solutions for complex engineering problems but also increases job opportunities for engineering students.

This paper aims to provide a comprehensive review of the integration of Artificial Intelligence (AI) within undergraduate engineering education courses taught at many American universities. Using case studies, this review analyzes how undergraduate engineering students are embracing the use of AI tools in their education and research. The paper specifically describes the infusion of AI tools into traditional engineering problem solving routines using problem-based learning approach.

Keywords*: Artificial Intelligence, Engineering Education, Undergraduate*

Transforming Personalized Learning and Workforce Readiness through an AI-Powered Learning Management System: A Pilot Intervention Study of Student and Staff Experiences at Kepler College

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This study examines persistent challenges in African education, including the misalignment between curricula and labour market needs, overcrowded classrooms, and limited technology infrastructure. To address these issues, an AI-powered Learning Management System (LMS) was developed and tested to support personalized learning in low-resource contexts. A pilot study was conducted with 1,000 students from Kepler College, a Higher Learning Institution representing diverse settings across the region. Data were collected through continuous system tracking, capturing how students and staff interacted with the platform, engaged with learning materials, and responded to adaptive features in their daily learning activities. Analysis using descriptive statistics and comparative performance modelling assessed changes in learner engagement, pathway efficiency, and curriculum-to-workforce alignment before and after implementation. The findings indicate notable improvements in student engagement and learning pathway efficiency, as well as stronger alignment between acquired competencies and labour market demands. However, variations in digital literacy among users and financial constraints within institutions limited full utilization of the platform's adaptive features. The study highlights the potential of adaptive learning platforms to support educational transformation at scale in Africa and underscores the importance of integrating labour market-informed technologies alongside targeted digital literacy initiatives for both students and educators.

Keywords*: Adaptive learning technology, AI-powered learning management system, digital literacy, higher education in Africa*

Educational Technologies: A Comparative Study Between Developed and Developing Countries

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Educational technology is transforming learning in developing countries by enhancing access, quality, and flexibility. Innovations such as mobile learning platforms, digital classrooms, and AI-supported instructional tools are diminishing geographical and institutional barriers, especially in underserved and rural areas. This study examines how educational technology influences learning outcomes, access to education, and institutional readiness in selected developing country contexts. Using survey data collected from 420 students and 85 instructors across three higher education institutions, including Tshwane University of Technology (South Africa), Cairo University (Egypt), and Bahir Dar University (Ethiopia), and supported by institutional infrastructure assessments, the study reveals substantial outcomes associated with educational technology. The findings show that 68% of students reported improved access to learning materials through digital platforms, while 54% experienced increased learning engagement and academic flexibility. Additionally, 61% of instructors reported improvements in instructional delivery and student interaction through digital teaching tools. Institutions implementing blended learning models recorded a 32% increase in course completion rates and a 26% improvement in student assignment submission consistency compared to traditional face-to-face delivery methods. The results also demonstrate broader academic and institutional impacts. Approximately 57% of students reported improved independent learning skills, while 49% indicated increased motivation and participation in virtual classroom discussions. Furthermore, institutional assessments revealed that digital learning platforms reduced administrative workload by approximately 21%, allowing instructors to dedicate more time to student support and course development. Despite these positive outcomes, the study highlights persistent structural challenges. Approximately 47% of respondents reported unstable internet connectivity, and 39% demonstrated limited digital literacy skills, both of which negatively affected learning effectiveness and technology utilization. Additionally, 34% of instructors expressed concerns regarding insufficient technical training, while 42% of institutional

administrators identified financial sustainability and software maintenance costs as major constraints. Data privacy and cybersecurity risks were also recognized as emerging challenges affecting institutional trust and technology acceptance. Overall, findings suggest that educational technology significantly enhances learning accessibility, instructional efficiency, and student engagement in developing country contexts. Long-term effectiveness relies on sustained infrastructure investment, institutional capacity building, and inclusive policies. Recommendations include targeted digital literacy training, enhanced technological infrastructure, and adaptable technology strategies for equitable educational transformation.

Keywords: *Educational Technology (EdTech); Digital Learning; Developing Countries; Artificial Intelligence; Digital Literacy; ICT for Development (ICT4D); Education Policy.*

Virtual Reality as a Catalyst for Sustainable Innovation, Leveraging Experiential Learning for Sustainability Education

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The realization that the Earth is an exhaustible resource, approaching the threshold of its human carrying capacity, has gained significant momentum since the term "Sustainable Development" was defined by the Brundtland Commission and featured at the 1972 United Nations Stockholm Conference. The construct of sustainability education has subsequently been discussed in the academic literature as a tool to facilitate sustainable development. Yet, although Sustainability education has moved from the margins of educational curricula to the forefront of contemporary learning frameworks, most of the focus in this area is centered on teaching abstract theories, while applied learning tools required to facilitate sustainability education remain underutilized. Nevertheless, in recent years, there has been increased dialogue on the role of virtual reality in facilitating sustainability education and creating opportunities for student engagement with otherwise inaccessible grand challenges. Virtual reality is central to the sustainable development phenomenon in that it facilitates experiential learning to stimulate the effective and cognitive processes that drive pro-environmental behavior and sustainable innovation. However, while prior research demonstrates that Virtual reality increases conceptual understanding, immersion, and engagement, and experiential learning drives problem solving and innovation, both fields remain distinctive. Furthermore, the academic literature that addresses sustainability education lacks unifying paradigms on how virtual reality can facilitate sustainable development. A more refined and integrated understanding of these fields of research can offer the insights necessary to bridge the gap in sustainability education and enable sustainable innovation. This paper discusses how experiential learning through the medium of Virtual reality can enhance sustainability education and facilitate sustainable innovation by offering students a more comprehensive understanding of grand challenges.

Keywords: *Sustainability Education, Experiential Learning, Virtual Reality, Sustainable Innovation*

All Teachers Are Improvisers: From Fishing Village Democracy to Global Education Leadership

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In 2006, I began as a pupil teacher in rural Ghana, teaching children whilst studying through distance learning—non-certified, passionate, and determined. In 2009, I earned my Diploma in Basic Education. In 2010, I graduated with my BEd and was elected District Assembly Member to represent my fishing village, Gomoa Dampase. I won overwhelmingly. The community trusted me with their future. For the next eight years, I balanced two impossible jobs: teaching full-time in Ghana's most remote schools whilst serving as an elected government official. I taught in villages where school buildings were mud and stucco, where we had no textbooks, no electricity, no supplies. Where teachers travelled to work on firewood trucks with farmers because there was no other way. Where I learnt the most important truth of my career: All teachers are improvisers in the classroom. In 2014, my community insisted I run again. I didn't want to—the pressure was immense—but I couldn't say no. I won by a narrower margin this time. I became Chair of the District Education Subcommittee. Now I wasn't just teaching; I was shaping education policy for an entire district. Leading meetings. Deciding resource allocation. Advocating for rural schools. All voluntary, all whilst still teaching. In 2018, opportunity called from China. I resigned from the subcommittee but remained an Assembly Member, supporting my community remotely. I taught ESL in Baoding until COVID pushed everything online. In 2021, I moved to Ivory Coast—an international school using American Common Core curriculum. Three years later, I'm in Kyrgyzstan teaching Cambridge IGCSE whilst completing my master's in international relations and diplomacy. My thesis examines "The Role of SCO in South-South Cooperation with Specific Reference to Africa." I'm living my research—an African educator in an SCO member state, bridging two worlds through teaching and scholarship. This presentation explores a journey from improvising with nothing in a fishing village to delivering Cambridge standards internationally. It examines how democratic leadership informs educational practice, how teaching in extreme conditions builds pedagogical creativity that works everywhere, and positions education as community service, policy work, diplomacy, and transformation. From firewood trucks to international curricula, from village democracy to global education—this is what teaching across worlds teaches us.

AI Tool Disclosure: Claude AI (Anthropic) was used to assist with formatting, language refinement, and structural organisation of this abstract. The core content, experiences, and narrative are entirely the author's own.

Keywords*: grassroots education, democratic leadership, international pedagogy, South-South cooperation*

Can Schools Build Better Analytics Than They Buy? Evidence from a US Public Charter K-12 Network That Redirected Vendor Costs to Student Programming

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School networks managing data navigate a persistent tension between two endpoints of a spectrum. Manual workflows built on static reports and spreadsheets keep costs low but accumulate quietly in staff hours, accuracy errors, and information that reaches instructional leaders too late to matter. Commercial analytics platforms promise integration, but per-seat subscriptions compound across campuses and roles, and schools rent access rather than own infrastructure, remaining dependent on vendors for features and timelines while still managing exports and working across disconnected systems. Neither direction gets the right data in front of the right person at the right time.

This project presents evidence that schools can build past both limitations. Using Google Workspace infrastructure that school networks already maintain, it delivers interactive web apps that schools fully own. Staff interact with live data through real-time filtering, drill-down navigation, and automated report delivery, calendar syncs, email automations, event-triggered notifications, and APIs embedded for dynamic generative AI insights. Drawing on production systems serving over 1,000 staff across a US public charter school network operating 22 campuses in New Jersey and New York, the session shows how Google Apps Script, custom HTML interfaces, and Google Sheets as a live data layer replaced commercial analytics subscriptions entirely.

Development originated in structured interviews across HR, business, IT, operations, and instructional teams to identify manual workflows consuming the most staff time. Those workflows were replaced through iterative design, user testing, and phased deployment, producing full-stack interactive web apps created and deployed on existing infrastructure. Recovered subscription costs and staff hours were reallocated directly toward student programming, demonstrating that data infrastructure decisions are, at their core, decisions about where school resources go.

Attendees will see a live demonstration and leave with a practical framework for auditing workflows, designing role-based tools, and creating and deploying their own apps. A central premise is that this work is now accessible to product-minded school leaders and data teams because AI tools support the development process itself, expanding what schools can produce without costly platforms or traditional engineering capacity. For school networks of any size, this session argues the build-or-buy question is worth asking again.

Keywords: *data-driven educational insights, AI-assisted app development, resource reallocation*

Balancing Agency and Accountability in HyFlex Science Communication Courses: Engagement, Contribution, and Perception

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Hybrid-flexible (HyFlex) learning environments give students the option to participate in-person, synchronously online, or asynchronously, but the literature has largely treated engagement, contribution, and peer perception as interchangeable indicators of participation. Prior HyFlex research, including large multi-study syntheses, has examined behavioural engagement and satisfaction across modalities, but has not tested whether peer perception and self-peer alignment operate consistently when students distribute themselves across modes. In this mixed-methods study, we advance a three-construct framework positioning engagement (behavioural), contribution (performance-assessed), and perception (socially visible) as distinct and only weakly coupled, and examine how participation mode shapes each across two undergraduate HyFlex science communication courses at McMaster University: a large-enrolment course with HyFlex lectures but mandatory in-person tutorials (SCICOMM 2A03; n = 291), and a small seminar with full participation flexibility across all course components, including group work (LIFESCI 4J03; n = 49). We analysed Echo360 engagement data, end-of-term survey responses, academic performance records, and approximately 1,100 open-ended responses coded deductively in MAXQDA using a nine-code framework with co-occurrence analysis. Non-parametric tests (Spearman, Kruskal-Wallis, Wilcoxon signed-rank, Mann-Whitney U, chi-square) were applied given non-normal distributions and unequal group sizes. Behavioural engagement was only weakly associated with group participation grades ($\rho \approx .20$), and final grades, group accountability ratings, and course satisfaction did not differ significantly across participation modes. Two perception-level asymmetries emerged. In SCICOMM 2A03, where group work occurred in mandatory in-person tutorials, students rated their own contributions significantly higher than their peers rated them ($p < .0001$), and this self-peer discrepancy did not vary by modality ($p = .767$). In LIFESCI 4J03, where group work itself crossed modalities, in-person students rated in-person peers as significantly more contributive than virtual peers ($p < .0001$), while hybrid students showed no such bias ($p = .9999$), suggesting perception asymmetry emerges specifically when mode is visible at the point of peer judgment. Qualitative responses reinforced these patterns: students described PeerScholar as carrying real grade weight through direct marks and group project penalties, yet gave uniform top ratings throughout the semester, flagging problems only once they reached crisis levels, reflecting evaluation anchored to global impressions rather than specific deliverables. Our findings suggest flexibility itself does not compromise accountability or academic outcomes, but that HyFlex course design requires accountability mechanisms tied to observable, deliverable-specific contributions, rather than peer evaluation systems vulnerable to physical-presence bias where group work crosses modalities, or to rating inflation where no granular behavioural anchor exists.

Keywords*: HyFlex learning, Student engagement, Peer assessment, Participation modality*

Hybrid Modelling of Student Support Services: Case Study of a Developing Country

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For Student Support Services (SSS), a hybrid model is not merely a temporary fix or a simple duplication of services online. It is an integrated, strategic approach that thoughtfully combines the best of both physical and virtual worlds. A hybrid model of student support services provides academic support, enhances equity and performance, improves institutional efficiency and provides a platform for the availability of data-driven insights for proactive policy making and funding. While the SSS unit in higher institutions (HEIs) is the administrative arm that plays a critical role in showcasing institutional effectiveness and quality in all aspects of academic missions and national development, its hybrid mode of operation warrants a huge investment in human capital, along with a structured framework that directly aligns with the nation's developmental goals. In a developing country like Guyana, characterised by significant geographical dispersion, a digital divide, and variations in needs, transitioning to a hybrid model for SSS has not been a luxury but a necessity, regularly requiring a multi-tiered approach. Recognising these unique socio-economic and institutional contexts, this study integrates quantitative data analysis with qualitative insights and literature reviews to develop a comprehensive model that captures the multifaceted nature of student support mechanisms. The methodology integrates statistical techniques, such as regression analysis, with stakeholder engagement methods, including interviews and focus groups, to ensure robustness and contextual relevance. The findings underscore the crucial role of hybrid services in providing adaptive, data-driven support interventions and frameworks that align institutional efforts with national goals. The study concludes by advocating for a comprehensive hybrid model that integrates statistical techniques to enhance students' retention, learning outcomes, and institutional quality and efficiency. Institutions can build a more inclusive, adaptive, and powerful education ecosystem with the support of a well-planned hybrid model of SSS.

Keywords: *Educational Administration; Higher Education; Hybrid Model; Quality Assurance; Student Support Services (SSS)*

Flexible Standardization in LMS Template Design: An Instructional Design Perspective on Balancing Consistency and Course Organization

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Postsecondary institutions increasingly implement Learning Management System (LMS) templates to improve course clarity, accessibility, and consistency in digital learning environments. While such templates support institutional quality assurance and reduce unnecessary cognitive load for students, they also create a design challenge for instructional designers and academic leaders responsible for digital learning infrastructure. LMS templates must provide consistent course structures across programmes while accommodating variation in course organisation and pedagogical approaches. Within instructional design literature, LMS templates are understood not only as technical tools but also as organisational design structures shaping how teaching practices are expressed. This paper examines LMS template design from the perspective of instructional design practice and institutional teaching and learning leadership within a small Northern Canadian postsecondary institution. Rather than focusing on faculty behaviour, the paper explores how an instructional designer and academic leader conceptualise and implement LMS template structures that balance institutional consistency with flexibility for course organisation. The analysis considers how template architecture supports multiple course structures, particularly weekly progression models and broader unit-based or modular course organisation. The paper adopts a theory-informed conceptual analysis drawing on structuration theory, professional autonomy theory, and principles from instructional systems design. Structuration theory frames LMS templates as institutional structures that enable and constrain pedagogical action, while professional autonomy theory highlights the importance of maintaining instructor agency within standardised digital environments. Together, these perspectives frame LMS templates as institutional design infrastructures negotiated between governance requirements and pedagogical flexibility. Insights informing this analysis draw on practice-informed instructional design knowledge developed through course development and LMS template implementation within a Northern Canadian postsecondary institution. The paper adopts a practice-informed conceptual approach in which theoretical analysis is informed by instructional design experience and teaching and learning leadership perspectives. While grounded in a single institutional context, the analysis offers conceptual insights relevant to broader instructional design practice. The paper introduces flexible standardisation as a conceptual framework for LMS template design and instructional design governance. In this model, core structural elements such as accessibility practices, navigation conventions, and assessment transparency remain consistent across courses, while template architecture allows variation in how learning content is organised. This framework positions LMS templates as adaptable instructional design infrastructures that support institutional coherence while enabling pedagogical flexibility. The framework offers a practitioner-grounded conceptual lens for understanding LMS templates as adaptable design infrastructures rather than fixed course structures.

Keywords: *Learning Management Systems (LMS), LMS Template Design, Instructional Design Governance, Online Course Design*

Designing for Workforce Demand: An Agile, AI-Assisted Process for Developing an Applied AI Bachelor's Degree

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A cross-sector employer survey (n = 171, 77.8% completion rate) found that 67.7% of respondents rated artificial intelligence (AI) literacy as essential or very important for new hires, with the dominant expectation being responsible use and critical evaluation of AI outputs rather than system development. Yet, a concurrent environmental scan of 157 Canadian AI-related programs found only 16 with an applied focus. A new Bachelor of Artificial Intelligence degree with a major in AI Systems Analysis at the University of Guelph is a concrete response to that gap. This paper presents the agile, AI-assisted process by which a team of three produced a complete degree proposal, ready for external review, in approximately three months. The development process comprised five components: a systematic scan of Canadian and international AI programs; a cross-sector employer survey with quantitative and natural language processing assisted qualitative analysis; supplementary stakeholder consultations with faculty, current students, and parents; a multi-agent AI consultation process for developing and refining program learning outcomes; and AI-assisted program sequencing to resolve prerequisite structures and scheduling constraints. Artificial intelligence tools were used substantively at each stage (document synthesis, thematic analysis, learning outcome generation, and logistics modelling), and this use is documented as a methodological contribution in its own right. The resulting degree proposal is organised around employer-validated competencies: responsible AI use, critical evaluation of outputs, data governance literacy, and domain-integrated applied learning. We discuss the design decisions behind the curriculum, the role AI played at each stage, and the limitations encountered in practice. The process is presented as a replicable model for institutions seeking to develop AI literacy programs rapidly and responsibly in response to documented workforce demand.

Keywords*: AI literacy, curriculum development, agile methodology, workforce readiness*

Determinants of Academic Performances Among Public University Students in Ethiopia

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Background: Education plays a pivotal role in producing qualified human power that accelerates economic development and solves the real problems of a country. Students are also expected to spend much of their time on their education and need to graduate with good academic results. Thus, the study aimed to identify the determinants of academic performance among university students in Ethiopia.

Method: Institutional based cross-sectional study was conducted from January 10,2025 to June 10,2025. A total of 385 students were enrolled, and data was collected using a self-administered questionnaire. A multistage sampling technique was applied to select study participants. Both descriptive statistics and econometric model were used for data analysis. Bi-variable and multivariable data analysis were computed.

Result: The descriptive statistics analysis indicated that 46.8% of students had a good academic performance. Students aged between 20 and 24 years from medical/ health colleges at the selected universities were significantly associated with a good academic performance. The study result revealed that 3.9% of students had awarded with the highest academic performance, often a Cumulative Grade Point Average of 3.75 or above, 6.2 % of students awarded for very good academic performance, typically a CGPA between 3.25 and 3.74 where as 21.2% of students awarded some good academic standards but fall below the top distinction tiers, such as a CGPA range of 2.75–3.24. The linear regression model analysis result revealed that age of the students, year of schooling, university infrastructure, study habits, socio-economic wellbeing, individual effort, quality of instructions, field of study and prior knowledge were positively and significantly influenced students' academic performance whereas smoking cigarettes, use of drugs/alcohol, lack of motivation, lack of job opportunities, lack of peace and security, attempt to cheat, lack of family support and technology negatively and significantly influenced students' academic performance.

Conclusion: The finding suggests that higher university officials need to raise awareness regarding to use of drugs/alcohol which negatively impacted academic performances. Due emphasis should be given to strengthening leadership, supplying adequate educational resources, sustainable financing, staff development, improving service delivery, and quality education in which overcrowded classrooms and limited support services remain a significant challenge for academic performance.

Keywords: *Academic performance, students, universities, Ethiopia*

Evaluating The Use of LLMs in Generating Knowledge Components Through Learning Curve Fits and Psychometric Models

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Accurately measuring student knowledge proficiency exists at the intersection of curriculum mapping and psychometrics, with Knowledge Component (KC) modelling providing the basis for showing student learning progression. Recent developments in this area suggest that Large Language Model (LLM)-generated KCs may capture the cognitive structure of student learning more accurately than expert-created KCs. However, these findings relied solely on learning curve analysis within Computer Science education datasets. This study looks to fill that gap using student response data from FoundationalASSIST, a large-scale repository of K-12 mathematics questions and student answers. We will compare three methodologies for constructing KCs and their corresponding Q-matrices: LLM-generated tags, Common Core State Standards (CCSS) codes, and human expert labels. CCSS codes represent the standards available for each problem, composing a nationally agreed-upon taxonomy for K-12 mathematics learning expectations, while human expert KC tags are made up of teachers and professionals adding their own tags to the dataset. Each approach is evaluated through learning curve fits and psychometric model predictive performance to identify the most effective methodology for KC construction in mathematics learning. The results from LLM-generated KCs point to the importance of a re-evaluation of the frameworks behind learning outcomes and KC generation for K-12 curriculums in the age of AI.

Keywords*: Knowledge Component, Common Core State Standards, Curriculum Mapping*

Beyond the Prompt: Generative Artificial Intelligence Applications in Ontario K–12 Classrooms — A Qualitative Study

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It is important that educators critically explore how rapidly emerging generative AI (GenAI) technologies can be incorporated into K-12 pedagogy and to what extent these tools are shaping student outcomes. This study used a qualitative approach to explore how secondary school teachers in Ontario are engaging with GenAI for lessons, to promote differentiation and to enhance student outcomes while navigating Ontario's policies and evolving curriculum expectations. The authors surveyed 142 Ontario secondary school teachers. Additionally, we conducted multiple focus groups. We analyze their written comments from our online survey and transcripts from our focus groups. We found that 71% of teachers have tried using GenAI to improve their lessons, 48% are actively teaching AI literacy to their students and 81% have experienced issues with GenAI in their classrooms. Most teachers agree that curriculum expectations should be updated in response to GenAI (60%) and that policies should be established or updated to guide the use of these tools in schools (89%). In our analysis of student use of technology, we discovered a mean rating of 2.76/6 concerning concern about whether GenAI is being used to meet the needs of equity - seeking students and a mean rating of 4.78/6 concern about the mental and emotional health of students, revealing that these are issues many teachers have concerns about with GenAI in the classroom. The intentionality and variety of early - adopting teachers' use of AI were further revealed in focus group transcripts, including: using a combination of Brisk, Notebook LM and School AI, having students interact with personalized chatbots, creating escape room experiences with AI, using AI to help develop an interdisciplinary project, creating AI - generated rubrics and teaching students to critique content generated by AI. These educators also discussed having in place rules about scaffolded AI use, teaching students follow - up assessment questions (oral assessment), helping students engage through voice tools and using AI to engage students in virtual education and special education settings. Though many early - adopting teachers are engaging intentionally and pedagogically with GenAI, they continue to experience barriers related to a lack of appropriate professional development, clear policies and curriculum that hasn't been aligned to this technology in schools across Ontario. Implications are discussed for Ontario school boards, curriculum writers and teacher educators.

Keywords: *generative artificial intelligence, K–12 education, Ontario, classroom applications, Qualitative method*

When AI Changed Everything: Shifting Competence Needs in the Norwegian Energy Sector

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Competence requirements from industry are evolving following technological and market demands. With the recent widespread adoption of AI, further needs have been added at an unprecedented speed and scale. In an effort to determine competence needs in the Norwegian energy sector working with carbon capture and storage, a work-relevance in education research project identified emerging competence needs. A mapping focused on digital competence was completed prior to and after the widespread adoption of generative artificial intelligence (AI).

The study investigates how the diffusion of AI tools has shifted competence demands across the Norwegian energy sector. We developed a survey in collaboration with industry stakeholders, targeting employees across sectors in Norway. The survey examines individual and organisational use of AI, company-level policies, and expectations regarding future workforce competences. While for study design purposes the area of relevance has been constrained, the findings can be extended and generalised to multiple areas.

Preliminary insights and existing evidence indicate a dual shift in competence needs. First, there is increasing demand for AI-related technical skills, including data literacy, programming, and the ability to interact effectively with AI systems. Second, there is a parallel rise in the importance of higher-order skills such as critical thinking, creativity, and communication, reflecting the complementary role of human capabilities in AI-augmented work environments.

The findings are expected to contribute to ongoing discussions on how higher education institutions can design work-relevant curricula in the context of rapid technological change. The study provides a framework for understanding competence shifts that are likely transferable beyond the Norwegian context and across industrial sectors.

We note that, given the constantly evolving maturity of AI and its level of integration within industry workflows, our conclusions (early 2026) should be considered as part of an evolving situation.

Keywords*: AI, education, industry, lifelong learning, competence shift.*

Transactional Distance and Systems Failure in Remote STEM: A Falsifiable VR Framework for Cognitive Synchrony (EVR-CS)

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Remote STEM attrition is a systems failure and not a content failure. We prove this by using the concept of transactional distance, which is learner's psychosocial disconnection in remote education. This severs non-verbal feedback loops. Those loops are needed for learning synchrony. As a result, it leaves instructors structurally blind to the moment a learner begins to disengage (Moore, 1993; Xu & Jaggars, 2014). The problem is that this architectural deficit cannot be addressed by most pedagogical interventions.

We propose that virtual reality can resolve it. Current literature shows that VR is the optimal model due to features such as gaze tracking, embodied spatial co-presence, full-field environmental control, and sub-100ms interaction latency. Also, it is the only medium that captures learner cognitive state as a real-time instructional variable. To operationalize it, we introduce EVR-CS (Empathic Virtual Reality for Cognitive Synchrony) derived from the HCI framework. Our model is based on four different theoretical frameworks: 1) Billinghurst's empathic computing concept (Billinghurst & Kato, 1999; Billinghurst, 2021), 2) empathic mixed reality systems (Piumsomboon et al., 2017), 3) shared gaze and collaborative cognition (Schneider & Pea, 2013), and 4) immersive social presence theory (Biocca et al., 2003). This model can easily be leveraged across VR headsets, AR and webcam infrastructures.

We also introduce the Mutual Understanding Index (MUI). We propose it as a scale from 0–100, and it integrates 1) gaze convergence vectors, 2) response-latency coherence, and 3) turn-taking temporal stability. Also, we introduce spatially embedded empathic scaffolding before disengagement escalates to learner withdrawal. Lastly, there are four VR-native design principles the model is based on: 1) ambient social cue externalisation below overload thresholds; 2) threshold-triggered environmental scaffolding; 3) learner-sovereign biometric privacy; and 4) structured post-session immersive analytics.

The key strength of our model is that it leads to a falsifiable proposition. VR interfaces significantly reduce the transactional-distance-driven attrition due to mutual gaze-awareness and spatially embedded empathic feedback. On the other hand, the non-immersive pathways cannot replicate these effects. MUI operationalises this as a reproducible dependent variable. This variable is testable against AR and webcam baselines. We treat these boundary conditions as practical limits, not as proof that a theory is wrong. They include using similar AR tools, estimating motion with a webcam, and being aware of simulator sickness.

This framework centres VR not as an educational novelty but rather as a necessary architectural response to the systematic failure that remote STEM learning possesses.

Identifying Facilitators of and Barriers to Digital Health Literacy in Pediatric Rheumatic Disease: A Scoping Review

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Digital health (DH) technologies have the potential to benefit patients with pediatric rheumatic diseases (PRD) and their caregivers. Digital health literacy (DHL) refers to the knowledge and skills necessary to use technology and the internet to manage and communicate about health. The aim of this scoping review is to: 1) identify facilitators of and barriers to DHL in children and adolescents with PRD and the caregivers of children and adolescents with PRD in the published literature and 2) map the facilitators of and barriers to DHL to the Capability, Opportunity, and Motivation Model of Behaviour (COM-B Model). Registered with the Open Science Framework[1]

We searched MEDLINE, CINAHL, Embase, Web of Science, and ProQuest for English full-text primary research studies. Facilitators of and barriers to DHL identified were codified and mapped to the COM-B Model. This review adhered to the JBI scoping review framework and conformed to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)-Scoping Review guidelines.

Of the 5789 unique records, 44 met inclusion criteria. No study directly addressed DHL but did identify facilitators and barriers relevant to the definition of DHL. The COM-B Model domains of psychological capability and physical opportunity emerged as prominent sources of facilitators of and barriers to DHL. Prominent findings among the included studies are the ability to utilize digital health services, health care provider recommendations, and provider-level supports.

All the included studies did not recognize the concept and impact of DHL. However, the studies identified factors affecting the success of DH that matched the definition of DHL. Thus, these were coded as facilitators of and barriers to DHL. The ability to utilize DH is contingent upon the design, functioning, and language used in the DH services, provider recommendation, and provider supports including medical and technical support. The latter includes the provision of DH education to users with lower levels of DHL. Considerations for DHL must occur in the clinical, administrative, DH design, and DH research settings. Recognition of inadequate DHL is essential and education interventions to raise the DHL of DH users is vital. Such education must be relevant to developmental, clinical, and sociodemographic contexts of children, adolescents, and their caregivers. Finally, DH interventions should accommodate for the unique needs of PRD patients, including limits to manual dexterity.

Keywords. *Digital health literacy, digital health, education, pediatric rheumatic disease, COM-B Model*

[1] https://osf.io/g4jbh/

Seeing the Invisible: A Systematic Review of AI-Assisted Visualisation in High-School Chemistry Education

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High-school students consistently struggle to construct accurate mental images of submicroscopic chemical phenomena — the atoms, ions, electrons, and molecular geometries that underlie ionic bonding, covalent bonding, and structure–property relationships. Traditional instruction relies on static diagrams and model kits that cannot fully bridge this representational gap, and although artificial intelligence (AI) tools are widely promoted as a remedy, the evidence base for their effectiveness in secondary chemistry is fragmented and rarely connected to cognitive-science frameworks. The present systematic review maps, critically evaluates, and synthesises empirical and theoretical evidence on AI-assisted tools in chemistry education, with a specific focus on their capacity to support high-school students' visualisation of submicroscopic concepts. Following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA, 2020) guidelines, systematic searches across Scopus, Web of Science, ERIC, Google Scholar, and ScienceDirect/PubMed yielded 47 included studies published between 2017 and 2025. Studies were categorised by AI tool type and analysed against Johnstone's chemistry triplet and Mayer's Cognitive Theory of Multimedia Learning. Five tool categories emerged: generative AI and large language models; intelligent tutoring systems and adaptive platforms; augmented and virtual reality environments; computer simulations and virtual laboratories; and machine learning for assessment. Meta-analytical evidence shows large effects for simulation-based instruction (Hedges' $g = 0.898$) and intelligent tutoring ($d \approx 0.79$), yet generative AI reveals a critical accuracy gap: ChatGPT produces fluent, sophisticated explanations of organic-chemistry mechanisms but is accurate in only about 28% of prompts (Yik & Dood, 2024) — a pattern that poses real risks for novice learners who cannot yet evaluate AI outputs critically. The review concludes that no single AI tool spans all three representational levels of Johnstone's triplet; effective integration therefore requires deliberate, multi-tool, cognitively grounded instructional design. As the first cognitively grounded mapping of AI tool categories to specific submicroscopic chemistry concepts at the high-school level, this review offers teachers, curriculum designers, and edtech developers an evidence-based framework for selecting and combining AI tools, and identifies three research priorities — longitudinal studies, concept-by-tool comparisons, and equitable implementation — that should guide the next generation of AI-in-chemistry research.

Keywords*: artificial intelligence; chemistry education; molecular visualisation; systematic review*

Innovating Learning Through Educational Technology: Advancing Literacy, Problem Solving, and Artificial Intelligence in Education

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Educational technology is transforming how students engage with learning, develop critical competencies, and connect classroom experiences to future pathways. This paper explores how innovative EdTech practices can meaningfully support literacy learning across K–12 educational settings. Drawing from school-board level innovation initiatives, the presentation highlights how emerging technologies such as digital literacy and design tools, robotics, coding platforms, virtual reality and makerspace technologies create authentic, interdisciplinary learning opportunities that increase student engagement and achievement.

The presentation examines how technology-rich learning environments strengthen literacy through communication, collaboration, design thinking and problem-solving. In literacy education, students engage in inquiry-based learning experiences that foster innovation, creativity, and critical thinking while building transferable future-ready competencies. Additionally, the emerging role of artificial intelligence (AI) in education is integrated and its impact on teaching, learning, and student achievement. AI-powered tools are increasingly supporting differentiated instruction, personalized learning pathways, formative assessment, language development, accessibility, and student creativity.

The presentation further discusses the importance of equitable access, educator capacity building, and community partnerships in sustaining innovation. By integrating technology intentionally across curriculum areas, schools can create engaging and inclusive learning environments that prepare students for a rapidly evolving technological and economic landscape.

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