International Conference and Summer Institute on GenAI Literacy: Multidisciplinary Research and Practice in the Age of GenAI

Conference Period	**:**	**June 10-13, 2025**
Venue*	**:**	**Budapest, Bécsi út 96/B, 1034, Obuda University**
Submission Deadline	**:**	**May 26, 2025, 23:59**
Submission via EasyChair	**:**	**EasyChair**

***Those who can't come to Budapest may participate in the conference online via Microsoft Teams**

ICGAL 2025

Keynote Speakers

Honorary Chair / Honorary Committee

Prof. Dr. Levente Kovács DSC

Rector, Full Professor at Obuda University; Head of Physiological Controls Research Center, ERC StG Laureate; IEEE Senior Member; IEEE Systems, Man, and Cybernetics Society Board of Governors Member; IEEE SMC Hungary Chapter Chair; IEEE Control Society Hungary Chapter Chair; IEEE Hungary Section Past Chair; John von Neumann Computer Society President.

Bio:

Levente Kovács, Rector of Obuda University, is a leading expert in modern control theory and physiological controls. He holds MSc degrees in electrical and biomedical engineering, a PhD, and a DSc from the Hungarian Academy of Sciences (2024). With over 500 publications, an impact factor exceeding 200, and 4500+ citations, he is among Stanford's top 2% most-cited researchers. He founded the Physiological Controls Research Center at Obuda University and has chaired multiple IEEE chapters, including the IEEE SMC Hungary Chapter and Control Society Hungary Chapter. He received the ERC Starting Grant (2015) for research on personalized tumor control and the Dennis Gabor Award (2022). He holds honorary titles from universities in Romania, Slovakia, and Hungary, reflecting his global impact in research and education.

Official Welcome Speech
(11 June Tue morning)
Prof. Dr. Enikő Maior
Vice-Rector for Education at Óbuda University

Bio:
Enikő Maior, PhD, currently serves as Vice-Rector for Education at Óbuda University. She completed her undergraduate studies at Babeș-Bolyai University in Cluj-Napoca and obtained her doctoral degree from the West University of Timișoara, where she also earned her habilitation in 2020. Her research focuses primarily on issues of identity in Jewish American literature. She is the author of several monographs and has published extensively in peer-reviewed journals and edited volumes. In the first half of 2013, she was a SCIEX fellow at the University of Fribourg, Switzerland, and in the first half of 2018, she held a Fulbright fellowship at Central Connecticut State University, Connecticut, USA.

Prof. Dr. Péter Galambos
Vice-Rector for Innovation, Obuda University

Keynote:
Generative AI in Robotics - Latest trends and fresh results from the lab

Abstract:
Today, the primary focus of technological development is on the autonomous execution of practical and useful tasks by machines. Fields such as transportation, elderly care, household chores, and industrial manufacturing have seen slow but consistent progress over the past 10-15 years. Innovations in these domains tend to be task-specific, emerging through specialized devices without integrating into a unified, generalized platform.

In contrast, rapid advancements have occurred in areas of artificial intelligence not directly connected to physical interactions, with widely accessible, commercially transformative innovations arising within only a year or two. This accelerated growth can largely be attributed to an exponential increase in the intellectual and financial resources dedicated to neural network model development.
Recently, significant progress in humanoid robotics has been driven by the integration of Vision-Language-Action (VLA) models, which allow robots to interpret visual scenes, understand human instructions, and execute appropriate physical actions. Concurrently, Generative AI's successes are currently most evident in creating textual, visual, and audio content. But an important question remains: what role can these rapid AI advancements play in further bridging the gap with the physical world?
In my presentation, I will explore this critical question, highlighting ongoing research trends and the potential future impact of these technologies on physical tasks and interactions.

Bio:
Peter Galambos (Senior Member, IEEE) received his M.Sc. and Ph.D. degrees in mechanical engineering from the Budapest University of Technology and Economics (BME) in 2006 and 2013, respectively. From 2007 to 2008, he was a Research Intern at the Toshiba Corporate Research and Development Center. He then joined the Institute for Computer Science and Control of the Hungarian Academy of Sciences (MTA SZTAKI), where he held a Young Researcher Scholarship from 2010 to 2012. Between 2011 and the end of 2015, he served as a team leader at MTA SZTAKI, coordinating the development of the VirCA VR system and its research applications. In 2013, he joined Óbuda University, where he has been actively involved in robotics-related

research, development, and education. He is currently a Full Professor and Director of the Antal Bejczy Center for Intelligent Robotics at Óbuda University, Budapest. Since July 2024, he has been serving as Vice-Rector for Innovation. His current research interests include Advanced Industrial Robotics and Control Systems, Cyber-Physical Systems, and Virtual Reality. He is the author or co-author of over 160 scientific publications, with more than 2,000 citations. Beyond his academic career, he is a successful entrepreneur, co-founder, and CTO of the MAXWHERE 3D Digital Twin software platform.

Dr. Thomas Chiu
Associate Professor of Digital and STEM Education (from August 1, 2025), The Chinese University of Hong Kong; Associate Director, Centre for University and School Partnership; Associate Director, Centre for Learning Sciences and Technologies.

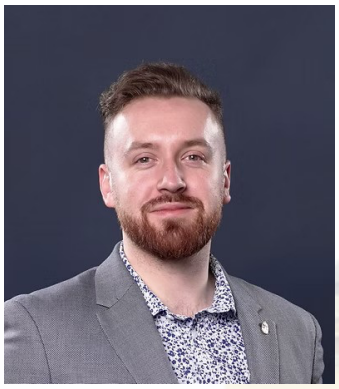
Keynote:
Empowering Education with AI: Preparing for the Future of Learning and Work

Abstract:
AI impacts education in two areas: AI education and AI in education. AI education focuses on teaching about AI, while AI in education involves utilizing AI to support learning and teaching. Incorporating AI technology and topics into education not only helps youngsters understand what AI technologies are and how they work, but also prepares them for future workplace demands. However, understanding how AI can be effectively integrated into educational settings remains in its early stages. In this talk, the speaker will present the key findings of his empirical investigations on how AI CRAFT education, as well as future research directions for practices and policy.

Bio:
Dr. Thomas CHIU is an Associate Professor of Digital and STEM Education (from 1 August, 2025) at The Chinese University of Hong Kong, as well as the Associate Director of the Centre for University and School Partnership and the Centre for Learning Sciences and Technologies. He has extensive experience in school teaching and leadership, while also recognized as one of the top 2% most cited scientists in education by Stanford University. He currently serves as a co-editor of interactive learning environments and an associate editor of three international SCCI journals. His recent book, Empowering K-12 Education with AI: Preparing for the Future of Education and Work, reflects his commitment to and expertise in AI education.

Dr. Kristof Fenyvesi
Senior Researcher of the Finnish Institute for Educational Research, University of Jyväskylä, Finland
Associate Professor of Indonesia University of Education
Associate Professor of University of Milano-Bicocca
Associate Professor of Korea National University of Education

Dr. Zrubka Zsombor MD, MBA
Associate Professor at Obuda University
Director General of University Research and Innovation Center, Obuda University



Mr. Zoltan Marton
Director of the Hungarian STEAM Platform
Head of the STEAM Office at Obuda University
PhD Student at the Doctoral School on Safety and Security Sciences of Obuda University

Keynote:
Exploring Technology Augmentability: A Framework for Enhancing Capabilities in Education

Abstract:
This presentation introduces the early concept of the Technology Augmentability Framework (TAF). It explores how people can augment their skills and capabilities through the use of technology. The main idea is that while digital tools, including artificial intelligence, can support learning and personal development, but they may also lead to greater inequalities in skills across the society.

Technology augmentability refers to a person's ability to improve academic, work-related or health-related skills with technology. We hypothesize that it may not depend on current skill levels and can be developed through education. The framework is in a conceptual phase and raises open questions about its definition, measurement possibilities, evidence base, and its potential applications in real learning environments. Through TAF we aim to promote individual development beyond current frontiers,

mitiage the negative consequences, and contribute to the overall shift of the society towards greater capabilities across multiple domains including education, employment, health or the social environment.

The talk will briefly reflect on the role of STEAM education and AI in helping students and teachers develop this ability. It also invites discussion on how universities could use the concept to support innovation and talent development.

Dr. Kristof Fenyvesi's Bio:
Dr. Kristóf Fenyvesi (www.kristoffenyvesi.com) is an education researcher specializing in STEAM pedagogy and multidisciplinary learning, serving as Senior Researcher at the University of Jyväskylä's Finnish Institute for Educational Research and founder of the Experience Workshop Global STEAM Network, with present and past academic affiliations in Indonesia, Korea, Italy, Estonia; and an extensive international track record in publications and global education initiatives.

Dr. Zrubka Zsombor MD, MBA Bio:
Dr. Zsombor Zrubka is an associate professor, general director of University Research and Innovation Center and head of the HECON – Health Economics Research Center at Obuda University, Budapest, Hungary. He is a medical doctor, with and MBA from Oxford Brookes University, UK and PhD in health economics from Corvinus University of Budapest. Prior his academic career, he gained 17 years' experience in the pharmaceutical industry including international management roles at Pfizer, and Egis Pharmaceuticals. He has been the author / co-author of over 60 scientific articles in peer-reviewed journals with over 1280 citations in Google Scholar.

Zsombor is a founding member of the Innovation Management Doctoral School at Obuda University, secretary of the Health Economic Section, and founding member of the Innovation Section of the Hungarian Economic Association. In addition to his research in health economics and digital health, Zsombor is involved in various initiatives around building the innovation ecosystem at Obuda University.

Mr. Zoltan Marton's Bio:
Mr. Zoltan Marton is the Director of the Hungarian STEAM Platform and the Head of the STEAM Office at Obuda University. He is also the STEAM Unit Lead of the EdTech Talents project at the university and the Head of the National STEM Excellence Program. He holds a BA in Safety Technology Engineering and an MA in Teacher of Engineering. He serves as Scientific Coordinator for the STEAMCRAFT project and was the National Scientific Coordinator for the SOBER project, in addition to participating in several international initiatives. Currently a PhD student at the Doctoral School on Security and Safety Sciences, his research includes STEAM related digital curriculum development, gamification, and cyberspace-based protection strategies. He is an assistant lecturer teaching innovative learning methods and engineering pedagogy. He has published multiple peer-reviewed articles, including Web of Science-indexed

Q2-level papers, which focus on STEAM education and GBL, among other topics. He is also the founder of the Children's Summer Universities at Obuda University, fostering digital competence, safety awareness, and environmental responsibility.

Dr Christine O'Dea
Senior Lecturer in Management and Technology Education, King's College London, United Kingdom; Co-Editor-in-Chief, Artificial Intelligence in Education

Keynote:
Human centric intelligence in Industry 5.0: what skills do university graduates really need?

Abstract:
Industries globally are transitioning from Industry 4.0 to Industry 5.0. The focus is then shifting from reducing human involvement using disruptive technologies such as AI to human-machine/technology collaboration. In this context, it is important to understand how disruptive technologies are integrated in industries, and the impact on jobs requiring low, middle and high skills. As a result, higher education institutions can react accordingly and support students to develop specific skills and componentises needed for Industry 5.0.

Bio:
Xianghan (Christine) O'Dea is a Senior Lecturer (Associate Prof.) at King's Business School, King's College London. Her research focuses on AI in education (AIEd), with a particular focus on Generative AI and AI literacy; digital transformation and digital education.

She has published her research in high-impact journals, such as Studies in Higher Education, British Journal of Educational Technology, and Fudan Journal of the Humanities and Social Sciences. She has also published featured articles regularly in prestigious media, such as Times Higher Education and Wonkhe. Currently, Christine is Co-Editor-in-Chief of AI in Education (An Emerald Open Access Journal), and academic chair of AI knowledge hub at Circle U (European University Alliance).
Her recognized expertise in AIEd has led to numerous invitations to deliver keynotes, workshops and seminars at the (inter) national level, including prestigious organizations, such as QAA, Society for Research into Higher Education (SRHE) and Centre for Global Higher Education (CGHE).

ICGAL 2025

Invited Speakers

Dr. CHENG, Wing Kin
Senior Lecturer, Department of Education, School of Education and Languages, Hong Kong Metropolitan University

The Power of Interplay with GenAI tools in Mathematics Education

Abstract:
The swift advancement of artificial intelligence (AI) has significantly impacted multiple fields, including education. In this context, AI is reshaping conventional teaching and learning practices by introducing innovative approaches that enrich educational experiences. Specifically, mathematics teachers can utilize AI to create tailored learning materials, streamline the preparation of instructional resources, and facilitate the resolution of complex mathematics problems. This technology not only aids in personalizing learning experiences for students but also provides educators with critical insights into student performance, ultimately enhancing the overall effectiveness of mathematics instruction.

In the talk, we will explore the practical applications of various AI-powered tools, including Poe, Copilot, Thetawise, Wolfram Alpha, Mathpix, Magic School, and Websim AI for mathematics teachers. While familiarizing themselves with these tools is beneficial, it is important to note that simply using them does not guarantee an improvement in teachers' pedagogical effectiveness. However, the inteeplay between these AI-powered tools can certainly enhance teaching practices by increasing efficiency in preparing learning and teaching materials, accommodating diverse learner needs, and strengthening teachers' abilities to tackle complex mathematics problems.ms of data may be created at a much-enhanced speed and at a higher quality with GenAI.

Bio:
Dr. CHENG, Wing Kin is a Senior Lecturer in the Department of Education, School of Education and Languages, Hong Kong Metropolitan University. He is now serving as

the overseas director of the International Society for the Advancement of STEAM education, vice-internal president of the Hong Kong Association for Mathematics Education (HKAME), expert panel member and adjudicator of the Hong Kong Mathematics Creative Problem Competition for Primary Schools and for Secondary School, and the adjudicator of The Hong Kong Creative Maths & Science 4D Frame Competition. He has strongly background in Mathematics and STEAM education. Dr. CHENG Wing Kin is actively involved in research studies since joining HKMU in 2024. He has been granted the HKMU R&D fund on a research project "Advancing AI on teaching secondary mathematics in Hong Kong". He was invited to deliver talks and seminars. His research interest includes AI in Education, Mathematics Education, STEAM education, Learners' Agency, etc.

Ms. Leticia Ramírez Diarte's
Paraguayan-Guaraní Meztica independent professional, indigenous space architecture

Dr. Balázs Hangya
Institute of Experimental Medicine, Budapest

Dr. Gábor Soós
Secretary-General of the Hungarian National Commission for UNESCO

Keynote:
How We Prompt AI Will Shape Our Common Future: A Global Call for Blue Prompting and Green Prompting

Abstract:
As generative AI becomes increasingly embedded in education, governance, culture, and daily human experience, the act of prompting is no longer a technical gesture — it is a civilizational choice. This invited talk explores how each interaction with AI systems contributes to shaping not only machine behavior but also the moral, epistemic, and emotional fabric of our shared future. Prompting, in this view, becomes a performative act of co-creation — one that either reinforces existing inequities or opens pathways toward ethical, wise, and inclusive intelligence.

The talk introduces the emerging methodology of co-prompting — a values-driven, dialogical engagement between humans and machines. It argues that AI learns not only from data but from the ethical and imaginative quality of our questions. Echoing UNESCO's foundational ethos, the speakers call for a planetary literacy of prompting that invites every citizen to participate meaningfully in the evolution of AI through conscience, clarity, and compassion.

This approach is about to be operationalised within the TOLMA SOPHIA ecosystem — an applied framework for ethical AI and participatory intelligence. TOLMA (Topo-Logos Materia) provides the layered spatial and epistemic structure for place-based, embodied knowledge systems, while SOPHIA (Wisdom) anchors foresight, governance, and ethical design. Together, they enable Blue-Team praxis and concrete pilots across education, heritage, science policy, and creative industries — including AI-enhanced learning environments, digital twins for wise cities, and intercultural dialogue platforms. Within this living matrix, ethical prompting becomes not only a method but a movement — rooted in shared responsibility for shaping our common future.

Dr. Gábor Soós's Bio:
Gábor Soós, PhD, is Secretary-General of the Hungarian National Commission for UNESCO. He holds a DEA in Philosophy from Paris–Sorbonne (Paris IV) and a PhD in English from Eötvös Loránd University, Budapest. He is the creator of the TOLMA–SOPHIA ecosystem and co-developer of the BluePrompt model for ethical prompting in generative AI. His work explores human–machine resonance, ontological adaptability, and cultural intelligence. Since 2003, he has been actively engaged in UNESCO's cultural and heritage governance frameworks, including as Rapporteur of the Intergovernmental Committee for the Safeguarding of Intangible Cultural Heritage in 2017. He is committed to interdisciplinary dialogue and culturally grounded innovation in public policy and AI ethics.

Dr. Balázs Hangya:
Balázs Hangya was trained as a medical doctor at Semmelweis University, Budapest and received his MD degree in 2006. In parallel he was also trained as a mathematician and received a master's degree in Probability Theory and Statistics from Eotvos Lorand

University, Budapest in 2007. He joined the laboratory of Tamas Freund at the Institute of Experimental Medicine, Budapest, where he worked on the neural mechanisms of hippocampal and neocortical oscillations. He received his PhD in Neuroscience in 2010 from the Janos Szentagothai Doctoral School. Hangya spent four and a half years in the United States as a postdoctoral researcher in the Kepecs lab at Cold Spring Harbor Laboratory where he studied the role of the basal forebrain cholinergic system in attention and learning. He started his independent laboratory in the Institute of Experimental Medicine, Budapest in 2015, investigating the neuromodulatory control of cognitive functions including learning and decision making.

Ms. Leticia Ramírez Diarte's Bio:

Leticia Ramírez Diarte is a Paraguayan-Guaraní Meztica architect with over a decade of experience in community-focused architecture, heritage protection, and museum design. She has worked on infrastructure and renovation projects across Latin America for major multinational clients in telecommunications, finance, and retail, while also contributing to exhibitions, vernacular architecture initiatives, and community resilience efforts. Now based in Budapest, she engages across generations and cultures with fluid empathy, placing living heritage and intercultural dialogue at the heart of her work. A graduate of the National University of Asunción and certified in project management by PMLA, she is fluent in Spanish, English, Guaraní, and Portuguese—bringing linguistic and cultural fluency to inclusive, sustainable, and ethically grounded architectural practice.

Mr. Eagle Chan

Founder of iSTEM AI Lab, a collaborative initiative supported by the Hong Kong University of Science and Technology (HKUST) and Hong Kong Cyberport.

Dr. Davy Tsz Kit Ng
Assistant Professor, Education University of Hong Kong

Exploring Students' Artificial Intelligence Literacy in Science Education: A Teachable Machine Approach to Recognize Metal Ions via Flame Test.

Abstract:
Existing studies primarily focus on integrating AI education into computer science curricula, with limited attention to its integration into science lessons. However, AI has been extensively utilized in various scientific industries, including chemistry. This study investigates the potential of incorporating AI into science teaching by employing a mixed-method approach involving 65 students from Grade 9 and Grade 11. Students conducted flame tests to recognize metal ions using machine learning models developed with Teachable Machine. Results demonstrated a positive impact on students' AI literacy and meaningful AI-assisted science learning. This study highlights the potential of AI in science classrooms and offers guidance to educators on developing effective AI-assisted scientific experiments.

Mr Eagle Chan's Bio
Mr. Eagle Chan is the founder of iSTEM AI Lab, a collaborative initiative supported by the Hong Kong University of Science and Technology (HKUST) and Hong Kong Cyberport. A fully licensed teacher in both Hong Kong and Vancouver, Eagle holds a Bachelor's degree in Computer Engineering from the Chinese University of Hong Kong (CUHK) and a Master of Education from the University of Hong Kong. He furthered his education by pursuing an MPhil in Technology Leadership and Entrepreneurship at HKUST.

With a robust academic foundation and expertise at the intersection of technology and education, Eagle is committed to driving innovation and advancing knowledge in these fields, ultimately contributing to the synergy of technology, leadership, and entrepreneurship.

Dr Davy Ng's Bio
Dr. Davy Tsz Kit Ng is an Assistant Professor at the Education University of Hong Kong. He earned his PhD in Education from the University of Hong Kong. His academic background also includes a Master of Education in Educational Psychology, a Bachelor of Science in Computer Science, and a Postgraduate Diploma in IT

Education from the Chinese University of Hong Kong (CUHK).

Dr. Ng's research focuses on AI literacy, STEM education, and technology-enhanced pedagogical innovation. His work draws on recent studies in AI literacy, STEAM education, and the intersection of education and technological change.

Dr. Zamzami Zainuddin
Senior Lecturer and the Deputy Lead, Higher Degree by Research (HDR) Coordinator and Training at the College of Education, Psychology, and Social Work, Flinders University, Australia

From No AI to Full AI: Understanding Contemporary Assessment Scales in Higher Education

Abstract:
This study examines how Perkins et al.'s (2023) six-scale assessment framework, ranging from no AI to full AI, can be adapted to contemporary assessment challenges in higher education. Conducted at an Australian university, it explores student perceptions of different assessment types based on this scale. Findings provide insights into how AI integration influences authenticity, academic integrity, and learning experiences. As an exploratory study, it sets the foundation for future research on student-perceived assessment models in the AI era. The study contributes to ongoing discussions on balancing innovation with authentic learning in higher education assessment design.

Bio:
Dr. Zamzami Zainuddin is a senior lecturer and the Deputy Lead of the Higher Degree by Research (HDR) Coordinator and Training at the College of Education, Psychology, and Social Work, Flinders University, Australia. Prior to this, he served as a senior lecturer at the Faculty of Education, University of Malaya (UM), Malaysia. He has been consecutively listed among the World's Top 2% Scientists from 2021 to 2024 for his scientific impact in the field of Education, as announced by Stanford University and Elsevier (Ioannidis, 2021; 2022, 2023, & 2024). The central focus of his research centres around technology-enhanced learning, including AI literacy. His scholarly contributions in this field have been showcased in prestigious international journals with high impact factors, such as Computers & Education, Educational Research Review, the British Journal of Educational Technology, the Australasian Journal of Educational Technology, Education and Information Technologies, and Interactive Learning Environments. His current book publication is titled Gamification in a Flipped Classroom: Pedagogical Methods and Best Practices, published by Springer. He is also the editor of the Springer book titled Resilient and Sustainable Education Futures: Insights from Malaysia and Indonesia's COVID-19 Experience.

Presenter Information

1.
Author: Mirko Labbri

Title: The Death of Teaching: Embracing AI Tools in a Shrinking Educational Landscape

Abstract:
This paper explores the unsettling implications of artificial intelligence (AI) on the teaching profession, arguing that the rise of capitalist AI technologies threatens to render traditional teaching obsolete. Through practical examples of classroom activities that incorporate AI-driven tools—such as automated grading systems and personalized learning platforms—the discussion underscores a troubling shift where teaching becomes increasingly transactional. As these technologies permeate educational settings, they risk transforming educators into mere algorithmic facilitators, stripping away the essence of their professional autonomy and reducing their roles to that of technicians managing software, rather than nurturing human potential. The historical evolution of teaching has often been a struggle between empowerment and control; however, the current trajectory indicates a move toward commodification, diminishing the value of teacher sand their craft. This analysis adopts a pessimistic lens, illustrating how the promise of personalized learning facilitated by AI may instead exacerbate inequalities and further marginalize the teaching profession. The future suggests a grim reality for educators, as their roles become subsumed within a mechanized framework that prioritizes efficiency over critical consciousness, leaving little room for the kind of transformative education that once defined the profession. Ultimately, the fate of teaching as we know it hangs in the balance, urging educators to confront and remodel this encroaching technological paradigm.

Keywords: Death of teaching, Teacher as algorithmic facilitator, Capitalistic AI, Future of the teaching profession

2.
Author: Ying Dai

Title: Prompt-Based Learning in Flipped Classrooms: Empowering Student Autonomy with Chatbots and Generative AI

Abstract:
This poster examines the integration of prompt-based learning within flipped classroom settings, utilizing chatbots and generative AI (GenAI) to foster student autonomy.

Based on a pilot study conducted in a secondary mathematics course, the research explores how AI-driven dialogue and customized prompts can enhance pre-class preparation, stimulate intellectual curiosity, and promote student engagement. Initial observations suggest that students who interacted with GenAI tools prior to class exhibited stronger conceptual understanding, participated more actively in lessons, and demonstrated greater confidence in navigating course content. The poster proposes a structured framework for embedding prompt engineering into flipped classroom pedagogies and outlines key directions for future research.

Keywords: Prompt-based learning, flipped classroom, generative AI, student autonomy, AI feedback

3.

Author: Janika Leoste, Anne Uukkivi, Andres Käver and Mart Soonik

Title: Overview of Generative AI Policies in Higher Education in Estonia and the Nordic Countries

Abstract:
Generative artificial intelligence (AI) tools like ChatGPT have quickly spread to entered classrooms and lecture halls, prompting universities and governments to formulate relevant guidelines. We analyse current rules and regulations governing the use of generative AI in teaching and learning at Estonian public universities and in national education policy, comparing them with policies and practices in Nordic countries (Finland, Sweden, Norway, Denmark, and Iceland). We examine formal regulations (from university guidelines to ministry directives) and explore, how teachers and students are implementing these rules in practice. Larger Estonian universities such as the University of Tartu and Tallinn University have adopted relatively liberal policies that encourage AI as a learning aid under strict conditions of transparency and academic integrity. Nordic institutions similarly emphasize responsible use. We involve ideas from recent papers to ground the analysis in empirical data and pedagogical perspectives. In the discussion, we hypothesize how the Estonian President's recent nationwide "AI Leap" initiative for integrating AI into education could further liberalize and harmonize AI policies. The comparison reveals a trend toward cautious integration of generative AI across both Estonia and the Nordic region, balancing innovation with ethics and academic standards.

Keywords: Generative AI, Education Policy, Academic Integrity, Higher Education, AI in Education

4.

Author: Zhipeng Wen and Samuel Kai Wah Chu

Title: Integrating AI into Educational Game Design: An AI-Enhanced MDA Framework

Abstract:
This study proposes an AI-enhanced framework that integrates Artificial Intelligence with the Mechanics, Dynamics, and Aesthetics (MDA) framework through theory synthesis and framework development methodology to advance ducational game design. By incorporating generative AI, adaptive learning algorithms, and procedural content generation (PCG), the framework enables dynamic, personalized learning experiences aligned with learner progress. AI-driven mechanisms also enhance teaching effectiveness by adapting game difficulty in real time. The framework bridges constructivist learning theories with game-based educational practices, offering practical applications such as optimizing game mechanics and refining curriculum design. Initial findings demonstrate how AI can support each MDA component. As an ongoing project, current work focuses on identifying additional relationships between AI and the MDA framework to refine expand the framework. The full version of the paper will present extended findings and a more comprehensive model for AI-integrated game design in education.

Keywords: AI-enhanced framework, MDA framework, Teaching effectiveness, Constructivist learning theories, Educational game design

5.

Author: Gabor Sterczl

Title: AI in the classroom

Abstract:
Technological development has already caused challenges in terms of digitalization, not only in public education but often at the university level as well. In recent years, and especially as a result of the COVID situation, although greater emphasis was placed on digitizing education, in most cases this was limited to digital documents and online classes, with no real digital transformation taking place in most educational settings. In this situation, the general availability of generative AI technology emerged a few years ago. This brought new possibilities, but primarily new challenges to the education system, further deepening systemic problems. Generative AI-based technologies are playing an increasingly important role in education, enabling personalization of learning processes, immediate processing of student feedback, and more efficient performance of administrative tasks. But even if we don't experience all of this directly,

students quickly discovered these tools and are increasingly trying to use them for various purposes. Years after the breakthrough caused by Gen AI, it's apparent that despite the rapid global challenges and visible impacts, relatively few educational in situations have substantially responded to the changed environment. There is limited high-quality educational material available to help teachers leverage these opportunities and view the technology objectively. There are few opportunities to access new methodological training on how to shape the perspective of students (and parents) regarding the new technology. The purpose of our research conducted at the end of 2024 was to examine what AI tools teachers use and for what purposes in their work, what experiences and difficulties they have in applying these tools, thereby gaining in sight into teachers' current relationship with Generative AI technologies.

Keywords: generative AI, skills, teachers, education, tools

6.

Author: Peter Zhihong Wan

Title: Toward more systematic application: Theory and Practice of SWEETIE AI-enhanced school STEM Learning Management System

Abstract:
Cross-disciplinary STEM education has become a focal point in recent educational reforms. However, there are two major barriers to advancing this initiative. One is the insufficient capabilities and confidence among teachers, and the other is the difficulties of catering learning diversity during STEM learning. To address these challenges, it is essential to leverage modern educational technology to establish online learning platforms that facilitate the transition from theoretical knowledge to practical application in STEM teacher training. Such platforms will alleviate the pressures teachers face while accommodating diverse learning needs Our ongoing large-scale project has already established a comprehensive STEM curriculum and developed systematic teaching methodologies, successfully converting 47 design-driven STEM activities into online courses via a learning management system (LMS). This online STEM curriculum is being successfully implemented in over 60 schools in Hong Kong. Although the LMS has initially addressed the two major challenges in STEM education, several limitations remain: limited teacher-to-student feedback during learning; (ii)insufficient accommodation of learning diversity; and (iii)inadequate flexibility for cross-disciplinary learning, and(iii) inadequate flexibility and extensibility for cross-disciplinary learning. Recent advancements in high-performance and low-cost open artificial intelligence (AI) large model (e.g., DeepSeek) offer unprecedented opportunities to further enhance the LMS. The SWEETIE STEMLMS is harnessing the latest AI technologies to strengthen its functions through two key initiatives: (i) the development of a vertical AI model that enables students to engage in direct dialogue

with intelligent agents throughout their STEM learning process, facilitating discussions about their ideas and the challenges they encounter; and (ii) the collection of data on students' learning characteristics to build algorithms that provide intelligent recommendations upon the completion of activities. The integration of AI with STEM LMS represents a systematic approach to enhancing science education, distinct from the use of AI in individual learning contexts. In fact, generative AI embedded within the LMS can streamline multiple aspects of teaching and learning—from content creation and assessment design to automated grading of open-ended responses and data-driven instructional adjustments. Beyond the two initiatives outlined above, this presentation will explore additional future directions for AI-enhanced STEM LMS development. Bio of the author Peter Zhihong WAN is an Associate Professor at The Education University of Hong Kong, the President of the EASE (East-Asian Association for Science Education), and the Secretary-General of the GCASER (Global Chinese Academy of Science Education Research). Dr. Wan obtained his PhD degree from the University of Hong Kong. Before starting is research in STEM education, he had taught middle school science for 5 years. Cultivating STEM talent is along-standing research interest of Dr. Wan with an emphasison interdisciplinary STEM learning. He has published over50 papers in prestigious international journals and led several significant research projects that address various key issues in STEM education, including blended STEM learning, the relationship between STEM learning and STEM career aspiration, the impacts of designed-based STEM learning, understanding the integration in STEM, and cultivating students with ADHD (Attention Deficit Hyperactivity Disorder) through STEM robotics. In recent years, Dr. Wan has been dedicated to promoting and implementing the educational philosophy of "STEM for All; STEM by All." The blended "SWEETIE" STEM curriculum that he designed and developed aims to integrate advanced teaching concepts with modern educational technologies, enabling all students to participate in STEM activities and all teachers to conduct STEM instruction. This curriculum has been well-received by primary and secondary school teachers and is currently being implemented in over 60 schools in Hong Kong.

Keywords: AI, STEM education, Science education, Learning management system (LMS), Engineering design for children

7.

Author: Pei Peng, Davy Tsz Kit Ng, Lingran Xu, Cameron Shum Yi Lee, and Samuel Kai Wah Chu

Title: How older adults' perceptions of AI literacy develop via AI creation training: a qualitative study

Abstract:
To investigate how older adults' AI literacy develops via AI training, semi-structured

interviews were conducted with16 older adults aged 55 and above after completing a three-month training on using AI to create songs, images, and stories. Data was analysed following a the matic approach. Participants recognized the limitations of AI, noting issues such as the unsatisfactory quality of AI-generated production and the inability to access certain offline information. They expressed a clear awareness of the need for lifelong learning to keep pace with technological advancements. They also voiced concerns about the potential dangers of deep fakes. Participants experienced a range of emotions throughout the process: excitement about acquiring new skills, recognition of AI's limitations during training, and ongoing concerns about its capabilities after training. This reflects the evolving cognitive engagement of older adults' perception of AI. The enthusiasm for using AI to assist with travel, document life stories, and share creation with friends indicates a strong desire for expression and social interaction in their later years. The participants demonstrated a general satisfaction with life, suggesting that future research could explore whether the satisfaction attitude influence solder adults' willingness to express themselves using AI and engage in AI training actively.

Keywords: Older adults, Generative AI, AI literacy, AI training, AI creations

8.

Author: Celina Aparecida Almeida Pereira Abar and David Zatz Correia

Title: Prompts that Teach: The Importance of Questions in the Age of GenAI

Abstract:

Generative AI (GenAI), such as ChatGPT, have stood out for their ability to answer questions and generate content autonomously. However, for these tools to be effective in the educational context, it is necessary to know how to formulate questions in a way that obtains answers that truly support the context of the question formulated. The article presents a literature review on how some researchers guide teachers to formulate effective questions when using generative AI, such as ChatGPT, in the educational context. Empowering teachers to develop these skills, highlighting the importance of dialogue, critical reflection and questioning practice in education should be one of the pillars of education in the AI era. Results found indicate more productive interactions for an effective use of these technologies in the classroom, contributing to the promotion of a critical, participatory and dialogical learning environment.

Keywords: Generative AI, ChatGPT, Mathematics Education, Teacher Training

9.
Author: Qingyan Pei and Tong Wei

Title: From Classical to Digitalization: Restructuring the Encyclopedia Knowledge Organization System of Ancient China

Abstract:
In the context of the digitalization era, the digital reconstruction of ancient textual knowledge organization systems has become a critical topic in digital humanities research. As encyclopaedic compendia in ancient China, leishu (类书) face persistent challenges in digitization, including heterogeneous knowledge structures, hierarchical classification discrepancies, and a lack of cross-leishu associations. Thus, this study proposes anontology-based solution to reconstruct the knowledge organization system of leishu. Through a top-down ontology modelling approach, we established the Leishu ontology comprising 102 classes, 92 object properties, and 45 data properties, enabling the transformation of traditional knowledge organization into digital forms. By instantiating representative compendia such as Yongle Encyclopaedia (《永乐大典》), Pian Zhi(《骈志》), and Quan Fang Bei ZuJi (《全芳备祖集》), demonstrates that the ontological framework effectively integrates content from comprehensive and specialized leishu, forming a dynamically extensible knowledge network. The key contributions of this paper include: 1) Unifying the heterogeneous hierarchical structures of leishu to resolve knowledge unit alignment barriers; 2) Facilitating cross-leishu knowledge associations through thematic integration and citation network modelling. This research provides a practical reference for the digital preservation of ancient texts, harmonizing historical logic with digital-intelligent features, while advancing the deep mining and intelligent utilization of traditional knowledge resources.

Keywords: cultural heritage, ontology, Encyclopaedia, ancient Chinese, protege

10.
Author: Shutong Yang, Longxin Wang and Yin Zhang

Title: Exploring the Impact of Task Complexity and Learning Styles: A Theoretical Framework for AI Literacy Cultivation in GenAI Dialogue-Based Learning

Abstract:
Generative Artificial Intelligence (GenAI) offers novel pathways for cultivating AI literacy, yet the mechanisms underlying its impact on critical thinking and ethical competencies remain unclear. Through a systematic review, this study identifies three

key findings: First, a hierarchical task design based on Bloom's taxonomy (low-to-high complexity) can effectively enhance students' critical evaluation skills when interacting with AI tools, provided that cognitive load is strategically managed to mitigate over-reliance on technology. Second, learning styles (e.g., Kolb's experiential model) serve as pivotal moderators in adapting task complexity to AI literacy development. For instance, assimilators benefit from structured tasks (e.g., logic verification) to consolidate technical proficiency, whereas accommodators thrive in open-ended scenarios (e.g., ethical dilemma resolution) that stimulate reflective critique. Third, existing research lacks an integrative framework to synergize task complexity, learning styles, and AI literacy cultivation. To address this gap, we propose a "Task-Style-Literacy" framework, which posits two core principles: (1) Task complexity must align with learners' cognitive progression(e.g., foundational technical operations via low-complexity tasks precede high-complexity tasks targeting critical thinking); (2) Learning styles dynamically regulate the efficacy of complexity on literacy outcomes, necessitating differentiated support to avoid cognitive overload (e.g., scaffolding high-complexity tasks for assimilators). This framework not only provides educators and policymakers with actionable tools for interdisciplinary AI education design but also aligns with UNESCO's call for "embedding AI ethics education in cross-disciplinary collaboration." It further establishes a theoretical foundation for future empirical investigations into human-AI synergy in pedagogical contexts.

Keywords: Generative AI, AI literacy cultivation, task complexity, learning styles, dialogue-based learning

11.

Author: Longxin Wang, Shutong Yang and Yin Zhang

Title: Research on the influence of language styles and prompt frameworks on information retrieval ability of higher primary school students with the support of generative artificial intelligence

Abstract:
In the current digital education background, generative artificial intelligence has become an important tool to assist students in learning and information retrieval. However, in the current field, there is a problem of prompt "template", that is, students often rely on pre-set and standardized prompt templates for information retrieval, ignoring individual differences in language expression, thinking habits and retrieval methods. Aiming at the current problem of "templated" prompt of generative artificial intelligence, this paper proposes the influence of students' language styles and prompt frameworks on information retrieval ability when using generative artificial intelligence for retrieval. When people use generative artificial intelligence for retrieval, prompts act as a bridge between the user and the system by providing instructions or

queries to the language model to guide its behaviour and generate the desired output, and high- quality prompts can help the artificial intelligence tool generate more accurate results. However, high quality prompts require people's participation in higher order consciousness, which is inconsistent with the cognitive development level of primary school students. Based on this, this study improves the information retrieval ability of senior primary school students by optimizing the language styles and prompt methods used when using generative artificial intelligence for information retrieval.

Keywords: Generative artificial intelligence, Prompt frameworks, Language styles, Information retrieval ability

12.

Author: Jin Wang and Samuel Kai Wah Chu

Title: Exploring the Potential of Artificial Intelligence Chatbot with Gamification in a Flipped Classroom Framework to Enhance EFL Students' Speaking Abilities

Abstract:
The integration of artificial intelligence (AI) technology and gamification strategies within a flipped classroom framework has the potential to benefit both teachers and students in the context of English as a Foreign Language.AI chatbots, enhanced with gamified elements, provide an engaging mode of learning process, encouraging learners to practice speaking skills in a convenient and low-stress environment. The flipped classroom model allows students to learn at their own pace, review materials outside of class, and apply their knowledge in class. Despite these above benefits, empirical research on the practical application of the integration remains limited. This study aims to bridge this research gap by investigating the efficacy of the integration for enhancing speaking proficiency and explores the psychological dimensions. The research involves a sample of 120 fourth-grade students from primary schools in China, participating in an 11-month EFL course. After the courses, students will be invited to take part in interviews and complete surveys to provide feedback. A qualitative analysis of the collected data will be conducted to identify a range of pedagogical, technological, and social affordances, which are further categorized as enablers or inhibitors for effective language learning. This paper is the pilot study of the research.

Keywords: Artificial intelligence, AI chatbot, flipped classroom framework, foreign, language learning, speaking proficiency, gamification

13.
Author: Tiffany H. Tsang, Cheuk Yin Ng, Yuchun Zhong, Wilson O. Otchie and Samuel Kai Wah Chu

Title: Scoping Review for Research on AI-robotic Pets for Seniors

Abstract:
AI-robotic pets and virtual companion tools are emerging technologies that have garnered significant attention for their potential to support seniors. Researchers have begun to recognize the role of AI-robotic pets as potential companion tools designed to emulate animal-like behaviours and provide companionship and social support among seniors. Such innovations are essential, given the global rise in the ageing population driven by improved healthcare services, and reduced mortality rates. This demographic shift emphasizes the need to explore technologies that address the challenges faced by seniors, including social isolation, accessibility and support for daily life. Thus, this scoping review aims to summarize the characteristics of studies on the use of AI-robotic pets and identify important gaps and trends in the literature. A systematic search was conducted across three databases: PubMed, Scopus, and Web of Science. 34 articles were retained after the selection process. Findings indicate that AI-robotic pets could hold significant promise as companions and tools for social engagement. Accordingly, findings have demonstrated positive impacts on psychological domains, including reducing social isolation, providing emotional support, and improving mental well-being for seniors. Nevertheless, several challenges and concerns associated with their use persist. These include barriers to digital literacy among seniors, misperceptions of AI-robotic pets as live animals, and ethical and practical concerns. Future research on this topic should prioritize addressing accessibility challenges and exploring innovative ways to enhance the adoption of AI-robotic pets among seniors. Additionally, longitudinal studies are recommended to assess the long-term effectiveness of AI-robotic pet interventions within the ageing populations.

Keywords: companionship robots, technology, Care, older adults, human-robot interaction

14.
Author: Kitti Solti-Kerekes, Bence Juhász and Zoltán Székely

Title: The Ghost in the Machine: AI's impact on ethical research

Abstract:
The rapid proliferation of LLMs (Large Language Models) overtakes not just our day-to-days, but changes the landscape of research by effortlessly executing complex data analysis and shortening the time researchers spend with collecting and managing

literature or handling the influx of background information for their work. With this trend, ethical and compliance issues are on the rise; whether the authors are transparent in their usage of AI (Artificial Intelligence), what kind of model do they use, do they provide human oversight or blindly trust the generated text offered? Compliance issues such as these and more has to be taken seriously, without demonising the incredible help LLMs provide for us. With the EU AI Act setting a global precedent by categorising AI risks and imposing obligations to be followed, we still have much to do in terms of developing good practices surrounding AI-usage. While the Act includes a research exemption, ethical and professional standards still apply, and should be applied. As LLMs become better at generating human-like text, the ability to distinguish between AI-generated and human-authored content is something we have to cultivate and learn for maintaining research transparency and authenticity. We have to accept, that just identifying AI-vocabulary or style within a text does not mean that the text was AI-generated. As humans hada huge impact on how does an AI "talk", the AI also has an impact on our vocabulary by consuming AI-generated text without knowing it. It is important to note, that no detection method is foolproof, but there are several signs that may or may not indicate that the analysed text is in fact written by an LLM. Besides the enhanced efficiency in data analysis, improved pattern recognition, and accelerated brainstorming, the LLMs are prone to amplify bias, to hallucinations and to be repetitive in composing its answer. Addressing these challenges and gaps, while also developing clear ethical guidelines and detection capabilities, is unavoidable for transparent and authentic AI integration in research.

Keywords: ethical research, compliance guideline, LLMs in research, detecting AI in research

15.

Author: Caiqian Zheng and Gaowei Chen

Title: GenAI-Supported Student Engagement in East Asian Classrooms: Current Evidence and Gaps

Abstract:
This literature review examines emerging applications of Generative Artificial Intelligence (GenAI) for enhancing student engagement in East Asian educational contexts, with particular attention to dialogic teaching approaches. Traditional East Asian classrooms often emphasize teacher-centered instruction, influenced by Confucian educational philosophy, which can limit active student participation. This paper analyses recent research on how GenAI tools can support the transition toward more interactive and constructive learning environments through three primary mechanisms: (1) facilitating dialogic teaching by reducing cultural barriers to participation, (2) supporting cognitive tool implementation such as mind mapping and

mnemonic techniques, and (3) extending engagement beyond classroom boundaries. The review reveals promising preliminary findings but identifies significant research gaps, including limited empirical studies inauthentic East Asian settings, insufficient focus on student orientation versus teacher development, and underdeveloped frameworks for culturally responsive Gen AI implementation. Future research directions are proposed, emphasizing the need for mixed-methods studies examining the dual preparation of both teachers and students in implementing GenAI-enhanced dialogic approaches.

Keywords: GenAI, Student Engagement, East Asian Education, Educational Technology

16.
Author: Caiqian Zheng and Gaowei Chen

Title: Privacy Concerns in GenAI-Enhanced Classroom Dialogue: A Critical Review

Abstract:
The integration of Generative Artificial Intelligence (GenAI) into classroom dialogue presents promising opportunities for enhancing student engagement and learning outcomes. However, this technological advancement raises significant privacy concerns that require careful consideration. This critical review examines the privacy implications of GenAI-enhanced classroom dialogue, analysing current research, regulatory frameworks, and emerging best practices. The analysis reveals four primary categories of privacy concerns: data collection and storage practices, consent and transparency issues, algorithmic bias and fairness considerations, and the potential for student profiling and surveillance. Despite growing awareness of these issues, substantial gaps exist in research, policy, and practice, particularly regarding implementation in diverse educational contexts and long-term implications for student privacy. The paper proposes a comprehensive privacy-by-design framework for GenAI integration in educational settings, emphasizing approaches that maximize educational benefits while safeguarding student privacy rights and promoting ethical technology implementation.

Keywords: AI Ethics, Student Privacy, Classroom Dialogue, Educational Technology

17.
Author: Caiqian Zheng and Gaowei Chen

Title: Optimizing Prompts for Mind Mapping: Design Principles for Educational

GenAI Applications

Abstract:
This literature review examines the emerging field of prompt engineering for generative artificial intelligence (GenAI) applications supporting mind mapping in educational contexts. As educational technologies increasingly incorporate large language models, optimizing prompts becomes essential for maximizing learning outcomes and cognitive development. This paper analyses current research on prompt engineering principles specific to mind mapping applications, identifying key strategies for enhancing knowledge organization and visualization. The review reveals three primary categories of effective prompt design: structural prompting that guides spatial organization, cognitive prompting that facilitates higher-order thinking, and collaborative prompting that supports group-based knowledge construction. Despite promising applications, significant research gaps persist regarding contextual adaptation, individual learner differences, and integration with established pedagogical frameworks. The paper concludes by proposing a three-dimensional framework for prompt optimization in educational mind mapping applications and identifying priority research directions, including comparative effectiveness studies and cross-cultural implementations.

Keywords: Prompt Engineering, Mind Mapping, GenAI, Educational Technology

18.
Author: Ying Zhao and Xiang Chen

Title: AI-Powered Language Learning: ChatGPT's Contributions and Risks for International Students

Abstract:
The rapid development of artificial intelligence has transformed how international students learn and apply a second language in academic contexts. Among various AI tools, ChatGPT stands out for its ability to support both language acquisition and practical application. It helps students expand vocabulary, correct grammar, generate essay ideas, understand academic texts, and prepare for presentations or discussions. This dual function makes ChatGPT an invaluable tool for overcoming linguistic and academic challenges faced by students abroad. This paper examines its applications and challenges in supporting international students' second-language learning and usage. Firstly, this paper explores how ChatGPT not only AIDS international students in customizing language learning pathways but also assists in the practical use of a second language for academic purposes. By analysing users'proficiency and goals, ChatGPT generates tailored exercises and feedback. More importantly, students frequently rely on it to refine grammar, translate texts, and generate ideas when working in a second language. Through three case studies, this paper investigates how ChatGPT is applied

to tasks such as vocabulary building, academic writing, and conversational practice, highlighting both its benefits and limitations. The case studies reveal key benefits of ChatGPT for international students. It offers immediate language support, which helps students build confidence in academic tasks, while providing flexible and personalized learning opportunities. Its capacity to generate examples and rephrase complex ideas makes academic language more accessible. However, the application of ChatGPT also presents notable challenges, including the risk of misinformation, lack of contextual and cultural sensitivity, and the need for ongoing human oversight. Ethical concerns, such as data privacy and academic integrity, also need to be addressed. While ChatGPT is a valuable supplementary tool, over-reliance on it may hinder students' independent language development. This paper advocates for a balanced and responsible integration of AI in language education, recognizing both its potential and limitations.

Keywords: Artificial Intelligence in Education, Second Language, Acquisition Academic, Literacy, Ethical Challenges in AI

19.

Author: Ying Zhao, Zijun Chen and Kai Wah Samuel Chu

Title: eHealth Literacy Among the Elderly in China: Current Status and Influencing Factors

Abstract:

As China's population ages rapidly, the integration of the elderly into a digital society is becoming increasingly challenging. By the end of 2023, the population aged 60 and above reached 297 million, accounting for 21.1% of the total population, with those aged 65 and above reaching 217million, or 15.4% of the total. While internet penetration among the elderly has risen from 4.9% in 2010 to 54.5% in2022, a significant digital divide remains, particularly in accessing and utilizing health information. This study aims to explore the current state and influencing factors of eHealth literacy among Chinese elderly individuals, providing empirical evidence to enhance their ability to access and utilize health information. A cross-sectional survey design was employed, administering questionnaires to 100 elderly individuals aged 60 and above in Fujian Province. The questionnaire covered various dimensions, including sociodemographic characteristics, the eHealth Literacy Scale (eHEALS), internet usage behaviour, health self-efficacy, and community support environment. The results indicated that the eHealth literacy of the elderly sample was significantly below the national urban average ($P<0.05$). Multiple linear regression analysis revealed that educational level ($\beta=0.32$, $P<0.01$), monthly income ($\beta=0.24$, $P<0.05$), frequency of smartphone usage ($\beta=0.36$, $P<0.01$), and perceived health risks ($\beta=0.28$,$P<0.05$) were independent influencing factors of eHealth literacy. The research further demonstrated significant correlations between educational level, technical usage ability, and health risk perception ($P<0.01$), which collectively impact the eHealth literacy of the elderly.

Additionally, the accessibility of community health services exhibited a significant positive moderating effect on eHealth literacy (β=0.19, P<0.05).The study concludes that eHealth literacy among the elderly is influenced by a complex interplay of factors. Educational attainment and economic status serve as foundational enabling factors, while the frequency of technology usage and health awareness play direct roles. The community support environment also provides an essential moderating mechanism. The findings offer atheoretical framework and practical references for developing targeted programs to enhance digital health literacy among the elderly.

Keywords: eHealth Literacy, Digital Divide, Aging Population in China

20.

Author: Samuel Kai Wah Chu, Lingran Xu, Davy Tsz Kit Ng

Title: Implementing a Design Based Research Approach to Develop a Robust Generative AI Literacy Program for Older Adults

Abstract:
In the current era of technological advancement, digital literacy has become an essential knowledge and skill for social participation (Vuorikari et al., 2022). It is of paramount importance to ensure that all age groups, including older adults (i.e., people aged 60 and above) to have digital competence. Evidence shows that older adults (United Nations, 2019) are particularly vulnerable to digital exclusion given their inability to keep track of technological advancements (Malpass et al., 2022). The World Health Organization's projected an exponential growth in the global elderly population from 12% in 2015 to 22% in 2050 (WHO, 2022b). It highlights society's responsibility to ensure the digital inclusion of older adults through promoting GenAI literacy (GAIL) and the urgent need for researchers to introduce relevant initiatives for promoting GAIL in this population. This proposed project aims to develop a GAIL Inclusion Programme (GAILIP) to enhance GAIL among older adults. This training programme will be designed, implemented, reviewed, and refined to enhance GAIL based on authentic experience in graphic design, music composition, and chatbot development tailored to users' needs. Through the enhancement of GAIL, the programme may also improve cognitive functioning of older adults and reduce their feelings of loneliness by broadening their social circle. Through GAILIP, we will also investigate the major barriers to learning the latest technology experienced by older adults. The project will follow a design-based research approach in which 12 workshops will be conducted for three cohorts. The findings will enable not only the continual refinement of the pedagogical design of GAILIP, but also the development of a research instrument for the evaluation of knowledge and proficiency of older adults in the area of GAIL. The developed research instrument will also be applicable for other researchers investigating GAIL worldwide. Our research insights can guide other organisations in

developing GAIL programmes for older adults. Moreover, through GAILIP, we will collaborate with various stakeholders, such as healthcare professionals, elderly community centres, large associations/corporations, and governments to expand the trajectory of GAILIP and make our programme accessible to older adults across communities. This is also expected to create opportunities for partnerships within different communities and regions.

Keywords: AI literacy, Older adults, Generative AI literacy, Healthy aging

21.

Author: Sándor Burian, Trafferner-Gulyás Viktória and Miklos Kozlovszky

Title: How Reliable a Scientist is Your LLM?

Abstract:
Freely available Large Language Models (LLMs) such as ChatGPT-4, Gemini, and Scispace are increasingly used as educational tools. This study investigates their reliability by assessing the quality and verifiability of their scientific article recommendations. Large Language Models (LLMs), particularly those that are openly accessible, have become integral to everyday life. Freely available LLMs are increasingly employed as informational and educational tools. This study addresses several key questions: How reliable are LLMs? To what extent can their outputs be considered trustworthy? Specifically, we examine whether these tools can recommend peer-reviewed literature with traceable identifiers (DOIs) and analyse how they extract and present relevant publication data. Using a constructed user persona, we tasked each LLM with recommending sources across seven domains, then evaluated responses based on accuracy, completeness, and citation integrity. Preliminary findings reveal significant variation in the reliability and citation practices of each model. Our results highlight the importance of auditing AI tools used in education to prevent the spread of misinformation and inform responsible AI deployment in academic contexts. Our research focuses on evaluating the appropriateness of answers provided by LLMs. We did not consider the ethical implications or political alignment of the responses but rather assessed whether the knowledge sources cited were suitable for answering specific questions. With the rise of educational software leveraging LLMs to respond to student inquiries, it is crucial to validate these tools to avoid placing the future of education on an unstable foundation. The potential consequences of misinformation, such as an engineer relying on incorrect knowledge, underscore the importance of this validation. Preliminary results indicate that while Scispace offers the most accurate citation output, ChatGPT-4 demonstrates superior contextual synthesis. However, while all of these suggestions seem relevant, sometimes the suggested paper is not up to date or is not strongly attached to the topic.

Keywords: LLM, Education, Trust, Trustworthy, freely available, comparison, reliability

22. (Withdrawn)

23.

Author: Mehedi Hasan Anik, S M Hafizur Rahman and Nushat Khan

Title: Strategic Integration of Generative AI at the Tertiary Level Science Education in Bangladesh

Abstract:
The rapid integration of Generative AI (GenAI) in education presents new opportunities and challenges, particularly in low- and middle-income countries (LMICs). In Bangladesh, where no institutional AI policy exists for tertiary-level science education, GenAI adoption remains unstructured and informal, raising concerns about AI literacy, competency gaps, and policy integration. This study employs a multiphase mixed-method strategy, beginning with an explanatory sequential mixed-method design to investigate informal GenAI usage, AI competency acquisition, and systemic challenges of the students and faculties of tertiary-level science education, followed by a strategic AI integration plan based on the findings. Results indicate that students and teachers primarily act as passive consumers of GenAI, with students engaging in higher-order applications such as individual and collaborative content creation, whereas teachers—particularly senior faculty—demonstrate minimal engagement beyond passive use. Descriptive and inferential statistics (t-tests) revealed significant disparities in informal AI adoption across stakeholder groups, while thematic analysis identified competency gaps, and policy voids that disrupt traditional teaching, learning, and assessment practices, limiting educators' and learners' ability to optimize AI's educational benefits and ethical use of AI. To bridge this gap, the study proposes structured AI literacy programs, strategic institutional policies, and a redefined role of teachers as AI facilitators to support learners in achieving AI competencies as outlined by the United Nations (UN). While offering policy recommendations for scalable AI integration in LMIC higher education, this study contributes to evidence-informed GenAI adoption, ensuring that AI disruptions are harnessed for optimal educational outcomes.

Keywords: Generative AI, AI Usage Level, AI Competencies, Higher Education, Policy Integration

24.
Author: Kwan Ngok Ko, Kin Fun Tsang, Wing Kin Cheng and Chak Ming Wong

Title: Enhancing Mathematics Education Through Practical AI-TPK Integration

Abstract:
The rapid and extensive emergence of artificial intelligence (AI) is fundamentally transforming teaching and learning modes. Building on the Technological Pedagogical Content Knowledge (TPACK) framework, the concept of AI-Technological Pedagogical Content Knowledge (AI-TPACK) has emerged as an essential skillset for educators in the AI era. Within this, AI-Technological Pedagogical Knowledge (AI-TPK) is crucial for mathematics educators, focusing specifically on understanding how AI technologies transform pedagogical approaches and designing effective teaching and learning activities in mathematics. Recognizing that AI-TPACK for mathematics education students is currently at preliminary stage, this paper aims to explore the practical adoption of AI-TPK in mathematics education. We discuss practical ways mathematics teachers can leverage AI tools to enhance pedagogy, such as personalizing learning, providing feedback, and monitoring student progress. We also detail how students learn mathematics through direct interaction with AI tools, such as intelligent tutoring systems. Furthermore, the paper outlines strategies for developing AI-TPK competence among mathematics educators and addresses key challenges and considerations for successful AI integration.

Keywords: AI-TPACK, mathematics learning, effective teaching, AI competencies, AI integration

25.
Author: Weiqi Liu

Title: Generative AI Literacies in Teacher Education: A Systematic Review of Frameworks and Competency Models

Abstract:
The rapid penetration of generative AI in the field of education urgently requires the construction of contextually adaptive and evidence-based frameworks and competency models for teacher education. In this study, ten conceptual frameworks and thirteen competency models were systematically analysed using the PRISMA methodology, finding that they mainly focus on instructional design, ethical reasoning and institutional adaptation. Nevertheless, most models remain at the theoretical level and lack specific pedagogical guidance, systematic professional development pathways, and policy articulation mechanisms. In order to effectively support teachers in the ethical and functional integration of GenAI, future research is urgently needed to

promote the empirical construction and practical translation of the framework.

Keywords: Generative AI Literacy, Teacher Education, frameworks

26. (Withdrawn)

27.
Author: Frank Coyle

Title: Inside Thought Walker: Digital Flânerie Inspired by the Hungarian Martian Legacy

Abstract:
Thought Walker is an AI-driven educational platform that reimagines knowledge exploration through the metaphor of the flâneur—a curious wanderer navigating conceptual landscapes guided by personal and topical ontologies. The platform transforms abstract knowledge into interactive cityscapes where concepts appear as neighbourhoods, with each learner accompanied by an AI companion that functions as their personal guide. Algorithmic inspiration draws from the work of three brilliant Hungarian-born scientists nicknamed "The Hungarian Martians" [1] —Eugene Wigner, Theodore von Kármán, and Leo Szilard—whose revolutionary contributions to physics, engineering, and information theory find new application in educational contexts. Wigner's symmetry principles map invariant relationships across knowledge domains, von Kármán's vortex dynamics are reimagined as "productive turbulence algorithms and Szilard's information entropy drives the platform's "entropy mapping engine," calculating information entropy relative to student understanding. AI guides use entropy paths to guide students toward regions of productive uncertainty where existing knowledge structures can be reorganized into more powerful configurations.

Keywords: AI, Education Flâneur, Knowledge Graphs, Hungarian Martians, Wigner, von Karmann, Slizard, Thought Walker

28.
Author: Orsolya Tuba, Kati Clements and Kristof Fenyvesi

Title: Action Competence and GenAI in Education for Planetary Well-being

Abstract:
As GenAI becomes increasingly embedded in society and education, critical questions emerge: Does it enhance learners' critical thinking and autonomy, or foster passive

dependency? Can critical thinking be supported or outsourced to GenAI? Could overreliance on GenAI tools lead to a reduction in learners' confidence in their own ability to think critically and act meaningfully? This paper explores the relationship between AI and action competence (Jensen & Schnack, 1997) within education for Planetary Well-being (PW) (Korte maki et al., 2024), a framework that builds on sustainable development and global citizenship education for transformative education. Education for PW encourages meaningful action for sustainability through a post humanist, non-anthropocentric lens that emphasises mutual responsibility between humans and the planet (Aaltonen et al., 2023). We draw on data from debates at conferences and online events where participants discussed GenAI's role in translating knowledge into collective action. While GenAI can support awareness and decision-making, it may also risk undermining learners' agency, motivation, and capacity to engage with complex challenges. This paper argues that educators must critically consider how GenAI is applied in teaching and learning and consider its impact on influencing students' development as ethical, autonomous agents of change towards planetary well-being.

Keywords: Generative AI (GenAI), Action Competence, Planetary Well-being, Critical Thinking, Transformative Education

29.

Author: Chun Lin Wu and Kwok Wa Yuen

Title: A Preliminary Discussion on the Application of Retrieval-Augmented Generation Systems in the Knowledge System of Traditional Chinese Medicine

Abstract:
This study proposes a complete framework for constructing a Retrieval-Augmented Generation (RAG) system based on a meticulously human-annotated Traditional Chinese Medicine (TCM) database. The paper focuses on the pre-training procedure, model scale (e.g., 3B and 5B parameters), and floating-point precision (FP32) settings, elucidating that, in practice and in response to actual model sizes, RAG may offer advantages over Chain-of-Thought (CoT). The core methodology includes splitting large-scale TCM texts into contextually coherent knowledge segments so as to enhance retrieval efficiency; at the same time, it explicates the importance of vector embeddings in the retrieval workflow and examines the differences and applications of cosine similarity and Euclidean distance in determining information similarity. Within this framework, ensuring a high recall rate (above 80 %) through robust vector storage and retrieval strategies is pivotal for deployment in real production environments. In addition, the applications of NLP, NL2SQL, FAISS, and other algorithms and open-source vector databases will also be discussed in the paper. Through this comprehensive design, the study demonstrates that applying RAG in the TCM field can improve

retrieval accuracy, reduce development costs, and accelerate knowledge management. Although the system is still at the planning stage, the architecture and implementation blueprint presented herein can lay a solid foundation for subsequent model development.

Keywords: Retrieval-Augmented Generation, Traditional Chinese Medicine Database, Vector-Based Recall

30.

Author: Ting Hin Chan and Wing Kin Cheng

Title: AI Assistant or Cheating Tool? Investigating the Tension between Academic Honesty and Self-Directed Learning in Primary Students' Use of Generative AI

Abstract:
With the increasing accessibility of generative AI (GenAI) tools such as DeepSeek, Doubao, and Kimi among primary school students, there is a growing trend of using these tools to complete homework and everyday tasks, even though the skills for effectively using AI tools have not been taught in schools. This pilot case study investigates how Primary Five students navigate the tension between academic honesty and self-directed learning when utilizing AI. Through semi-structured interviews, the study explores students' motivations, use cases, and reflections on AI-assisted learning. Preliminary findings suggest that students use AI to complete homework tasks, including generating sentences, writing essays, and interpreting task instructions. Notably, they do not report to teachers how they use AI in their homework, which blurs the line between AI support and academic honesty. The study aims to uncover students' emerging learning practices and ethical considerations in the AI era, highlighting how young learners growing up with AI may develop new norms of academic honesty that challenge traditional educational expectations, and offering insights for promoting AI literacy and responsible usage. Implications can be drawn from this study regarding how educators can equip students with the necessary understanding of AI ethics while supporting self-directed learning.

Keywords: GenAI tools, self-directed learning, academic honesty, effective teaching, AI literacy, AI ethics

31.

Author: Matteo Ciastellardi, Paolo Maria Ferri, Giancarla Nasatti and Azzurra Salotto

Title: Everything is connected. Toward a Montessori ecology of STEAMs supported by GenAI

Abstract:
This paper introduces a theoretical and applicative model defined as the Montessori ecology of STEAM, where Montessori pedagogy, interdisciplinary STEAM education,

and Generative Artificial Intelligence (GenAI) converge within a unified, human-centered vision. Rooted in Maria Montessori's idea that everything in the universe is interconnected, this model highlights how her method—based on the prepared environment, freedom with responsibility, sensorimotor engagement, and the teacher as a silent observer—can meaningfully inform and transform contemporary education. Montessori's emphasis on the child as an active constructor of knowledge, learning through hands-on exploration and interaction with meaningful materials, aligns with current calls for learner-centered, discovery-based, and technologically integrated education. In this framework, GenAI is not a substitute for the teacher but a cognitive enhancer, offering new ways to personalize learning, support formative assessment, and foster creativity and reflection. The research adopts a dual perspective: it draws from established pedagogical literature and international frameworks (including OECD Learning Compass 2030, DigComp Edu, and the EU Key Competences for Lifelong Learning), while also grounding its approach in field studies conducted in preschool and primary school contexts. These pilot experiences demonstrate increased learner autonomy, engagement, critical thinking, collaboration, and multimodal expression. Within the Montessori ecology of STEAM, assessment is reimagined as a dynamic, formative, and inclusive process that values the learning journey over mere outcomes. The educational environment becomes a relational atelier—an integrated space where children, educators, technologies, and materials co-construct knowledge in authentic, meaningful ways. The strategic role of primary education emerges as foundational for cultivating personal, cognitive, and ethical growth. In this sense, Montessori pedagogy—reinterpreted through the lens of GenAI—provides a robust and visionary framework for fostering autonomy, curiosity, and lifelong learning within a connected and evolving world.

Keywords: Montessori-inspired STEAM education, Generative Artificial Intelligence (GenAI), Montessori ecology of STEAM, AI as booster, Cognitive and personal capital, Prepared and sensorial learning environment, Tinkering and maker-based learning, Personalized and adaptive learning with GenAI

32.

Author: Junping Gao, Yi Wen and Xiaolu Lu

Title: Artificial Intelligence in Educational Robots in Co-Teaching: A Systematic Review

Abstract:
The integration of artificial intelligence (AI) in educational robotics has gained

prominence as educators seek improved learning outcomes. Despite the proliferation of AI-driven robots in education, systematic reviews examining AI-powered educational robots (AIER) in real-time teaching and learning environments remain scarce. This study conducts a comprehensive analysis of AIER's educational and technical dimensions through a systematic review of empirical literature published between 2015 and 2025. Following PRISMA guidelines, we screened 449 studies from Web of Science, Scopus, Sage, and Taylor & Francis databases, ultimately analysing 41 peer-reviewed articles meeting our inclusion criteria. Our multidimensional framework examined educational functions (pedagogy, engagement, content, interaction), technical functions (algorithms, models, platforms), consequential functions (evaluation, feedback, learning outcomes), and demographic contexts (participant profiles, educational settings). Findings revealed that researchers primarily focused on developing and refining AIER methodologies across diverse educational contexts. While most algorithmic models demonstrated promising accuracy in real-time applications, the generalizability of results was constrained by limited sample sizes and nascent conceptual frameworks. This review contributes valuable insights for practitioners implementing AIER solutions and identifies critical trajectories for future research in this rapidly evolving field.

Keywords: Artificial intelligence, Educational robots, Systematic Review, Real-time teaching

33.

Author: Gala Niri, Sebastian Dennerlein, Thomas Chiu, Xinyan Zhou, Jojo, Selen Galiç, Mathias Tejera and Zsolt Lavicza

Title: STEAM Education for AI Competency: A Systematic Literature Review on Theoretical Implications and Research Directions

Abstract:
This PRISMA-guided systematic review synthesises 68 peer-reviewed K-12 studies (2016–2025) that treat artificial intelligence as explicit learning content in STEAM contexts. Addressing RQ1, bibliometric analysis reveals a post-2021 publication surge (71%), regional clustering in East Asia and North America (≈80%), and a methodological bias toward qualitative case studies (54%) over experimental or longitudinal designs (<20%). Responding to RQ2, thematic coding with Chiu et al.'s five-dimension AI-competency framework shows pronounced asymmetries: nearly all studies target Technology skills (96%) and societal Impact (88%), whereas moderate treatment of Self-reflection (76%) and Ethics (60%), and limited attention to authentic human-AI Collaboration (22%). Science and Technology activities dominate interventions, while Art and Mathematics remain peripheral, constraining interdisciplinarity. Teacher reports highlight challenges in scaffolding ethical reasoning and orchestrating team-based human-AI interaction, yet emerging approaches—

arts-based storytelling, project-based co-design, collaborative robotics—offer promising routes to balanced, human-centred competence. We recommend embedding human–AI co-design studios, iterative ethics-reflection cycles, and mixed-method longitudinal evaluation to guide theory-driven STEAM curricula.

Keywords: STEAM, AI competency, systematic review, K–12 education, PRISMA

34.

Author: Bence Zsiga, Éva Nagyné Hajnal and Márta Seebauer

Title: AI Model for Gesture Recognition in Edge Applications

Abstract:
The Industry 5.0 has been emerging at an increasing pace over the past few years. While the topics of Fourth Industrial Revolution were the cyber-physical systems and process automation, the Fifth Industrial Revolution focuses on human-machine communication and on the sustainable environment. A human-centered approach means that human-machine collaboration is involved in the industrial processes. Such an approach demands human-machine interfaces (HMIs) that facilitate communication between humans and machines, ensuring an efficient and reliable interaction. Hand gestures are a natural form of human communication and therefore can be utilized as an intuitive interface in these scenarios. Despite cultural differences, certain hand signs carry shared meanings across various languages and regions. The evolution of artificial intelligence methods has enabled the development more efficient gesture recognition systems. This paper proposes a method for training an AI model for gesture recognition, which can be utilized in Industry 5.0 applications. The application employs Media Pipe to detect hand and extract biometric landmarks. The gesture classifier model consists solely of fully connected layers, making it a simple architecture suitable for edge computing devices. The hyperparameters were optimized with genetic algorithm methods. The proposed model can recognize seven hand gestures with 91% accuracy. It was trained to recognize only static gestures to ensure robustness and reliability, as these are crucial aspects of industrial applications. The application can be used in various scenarios of the industrial processes where human-machine interfaces are required. During the development, the primary focus was on the simple integration into existing systems, resulting the proposed solution highly adaptable for real-world industrial environments. Furthermore, it was important to design a cost- and resource-efficient solution.

Keywords: Neural Network, Machine Vision, Gesture Recognition, Industry 5.0

35.

Author: Istvan Jakab and Éva Nagyné Dr. Habil Hajnal

Title: Web-based VR Application Development: Opportunities and Challenges

Abstract:
As virtual reality (VR) technologies are continuously evolving, their integration into web-based platforms offers significant advantages in accessibility, platform independence, and widespread adoption. This study investigates the potential and limitations of browser-based VR application development, focusing on key enabling technologies such as WebGL, WebXR, and Progressive Web Apps (PWAs). By conducting a comprehensive literature review and analysing industry case studies, the research identifies critical benefits such as ease of distribution and cross-platform compatibility, while also addressing challenges in performance optimization, device compatibility, and user experience (UX) design. The methodology of the study applies a literature-based analysis of technological documentations and academic publications. The findings highlight that while web-based VR lowers the entry barrier to immersive experiences, it requires careful consideration of technical constraints and UX best practices. The paper concludes with insights into emerging development trends and suggests directions for future research, including the integration of artificial intelligence in web-based VR environments.

Keywords: Web-based VR, WebXR, WebGL, PWA, Immersive UX, VR development, AI-driven interactions

36.
Author: Miklos Hoffmann

Title: AI in Art Education - Anxiety, Revelation, Transfer

Abstract:
Artificial intelligence has emerged with particular emphasis in art education in recent years. Anxiety has arisen, albeit to varying degrees, among students in various art majors, while opportunities and revelatory experiences are also present around the application of AI. How can we overcome fears and turn the opportunities into positive energy in this specialized field? To what extent can we consider artificial intelligence to be creative in an artistic sense? The lecture addresses these fundamental questions, drawing on the author's experiences gained in courses taught at two universities.

Keywords: Art education, anxiety, creative AI

37.
Author: Yunhan Yang and Chenwei Zhang

Title: A Preliminary Exploration of Measuring Logical Progression of Introductions via Large Language Models

Abstract:
Effective writing styles in academic articles enhance understanding and expedite information sharing. Previous studies on writing style have primarily examined surface features, failing to adequately measure logical progression within the article introduction. To bridge this gap, we employ a Large Language Model (LLM) to read each paragraph and classify it into one of five logical functions based on established writing guidelines. Additionally, we evenly divide the introduction of each article into five sequentially connected segments to investigate the distribution of these five writing steps across the segments. Subsequently, a 5 X 5 matrix is constructed to characterize the logical progression within the introduction. Our empirical analysis of articles in information science journals demonstrates a positive correlation between the extent of topic introduction and background information provided and the subsequent impact of these articles. Utilizing Propensity Score Matching (PSM) to compare writing styles in high- and low-cited papers, our analysis reveals that highly cited papers allocate significantly greater effort to introducing the topic within the 0\%-20\% range and to providing background information in the subsequent sections across wider ranges compared to their low-cited counterparts. These findings offer valuable insights for scholars engaged in scientific writing.

Keywords: Writing style, logical progression, LLMs

38.
Author: Xiaoxuan Fang, Davy Tsz Kit Ng and Kai Wah Chu

Title: Effects of GenAI-Supported Digital Multimodal Composing Pedagogy on EFL Learners' Learning Outcomes and Experiences

Abstract:
Digital multimodal composing (DMC) has emerged as an effective approach to enhancing multiliteracies among students in English as a Foreign Language (EFL) classroom. In recent years, the integration of generative AI (GenAI) tools has gained traction, offering EFL students' opportunities to boost their motivation, engagement, and overall learning outcomes. By combining GenAI tools with DMC instruction, educators can create a promising educational method that significantly benefits students' learning experiences. Despite its potential, there is a scarcity of studies examining the impact of DMC instruction supplemented by GenAI tools on student' learning

outcomes. To address this gap, our study implemented GenAI-supported DMC instruction within an EFL context, focusing on its effectiveness for student learning. Data collected through questionnaire surveys and interviews revealed notable improvements in students' GenAI literacy, engagement, and motivation. The DMC learning process not only heightened students' interest in language learning but also fostered self-efficacy, confidence, creativity, critical thinking, collaboration skills, and vocabulary mastery. However, students encountered challenges, including limited digital capabilities, ineffective prompting techniques, struggles with originality, and time constraints. This study contributes valuable theoretical insights for developing a comprehensive framework for DMC pedagogy. It also provides pedagogical implications for designing GenAI-supported DMC instruction tailored to the EFL context and offers practical recommendations for implementing this instructional approach effectively. To further enrich our understanding of EFL students' learning outcomes, future research should employ a variety of methodologies and gather diverse perspectives from multiple stakeholders, including teachers, parents, and students across different educational levels.

Keywords: Digital multimodal composing, EFL learning, GenAI literacy, human-AI collaborative learning, multimedia learning

39.

Author: Sulakna Weerasinghe, Ovindu Guanthunga, Warthula Dewpura, Sanduni Fernando, Dharshana Kasthurirathna and Samadhi, Rathnayake

Title: Beyond CLIP Cost-Effective Multimodal Retrieval for Education

Abstract:
Multimodal retrieval systems have gained significant attention due to their ability to process and cross-retrieve data containing images and text. However, the factors such as high cost of development, limitation on resources, and the proper addressing of the modality gap, the inherent representational differences between modalities pose a challenge to building effective and efficient retrieval models. In this work, we propose a low-resource, cost-efficient hybrid multimodal retrieval model that integrates CLIP and All-MiniLM-L6-v2 to create a shared embedding space while storing raw images in an unstructured database. Our primary contributions include (1) the development of a hybrid model that outperforms CLIP-native retrieval, (2) a novel bidirectional neural network alignment technique that brings textual and visual modalities closer together, and (3) a comprehensive analysis of the modality gap's impact on downstream retrieval performance. Through proper evaluation using transparent techniques such as Mean Reciprocal Rank (MRR) and Cosine-Weighted MRR, our method demonstrates improved retrieval accuracy over baseline approaches. Experimental results exhibit that a lower modality gap does not always prove to be efficient on the downstream retrieval.

Our findings pave the way for more efficient, adaptable, and cost-effective multimodal retrieval methodologies in low-resource environments, not limited to the education domain.

Keywords: Multimodal Retrieval, Modality Gap, CLIP, Hybrid model, Low-resource, Low-cost, Neural Network, Education, Domain-Specific Data, Embedding Space, Cross Modal Retrieval

40.
Author: Dániel Kiss and Andrea Tick

Title: Security Risks of AI Responses to Educational Challenges, and Managing Emerging Questions and Conflicts

Abstract:
The COVID-19 pandemic has significantly transformed the world. Fortunately, digitalization and artificial intelligence (AI) are helping to overcome the challenges posed by the pandemic. Their growing impact and dominance are evident across nearly all age groups, from the youngest to the oldest. This is why my chosen research area is education. Integrating AI technology into education not only helps young people understand what AI technologies are and how they work, but it also complements their daily lives and prepares them for future workplace demands. Despite their educational benefits, the use of AI applications also comes with social and ethical drawbacks. Therefore, my goal is to examine both the advantages and disadvantages, and to review the arguments for and against their use, as they affect students, teachers, and staff. Numerous challenges arise, with many seeing the digital world as a potential solution, while others hold the opposite view. One thing is certain: if these systems become part of our daily lives, it's far from guaranteed that they will be as secure as we might think. This is what I aim to review in my article.

Keywords: oktatás, mesterséges intelligencia, biztonság

41. (Withdrawn)

42.
Author: Julie Lindsay

Title: Learning With AI: Cosmogogical Collaboration in the Human-AI-World Ecosystem

Abstract:
As generative AI enters the mainstream of higher education, this paper explores a transformative vision for AI not as a tool, but as a co-learner embedded in global, interdisciplinary collaboration. Grounded in the Online Global Collaborative Learning Framework and the Cosmogogical principle of learning with rather than about the world, it introduces the Human-AI-World ecosystem as a foundation for designing participatory, ethically grounded educational experiences. This work-in-progress documents an evolving practice of creating AI agents that support asynchronous, cross-time-zone student groups through reflection, continuity, and culturally sensitive provocation. Central to this exploration is the Global Collaborator Mindset, which articulates four core learner and educator attributes—Connection, Openness, Innovation, and Autonomy—that enable meaningful engagement in AI-augmented, flat learning contexts. The paper investigates how these attributes intersect with AI capabilities to emphasise ethical reflexivity, intercultural understanding, and adaptive, real-world problem-solving. Rather than offering fixed solutions, the paper shares insights from ongoing implementation and invites further inquiry into how AI agents might evolve as ethical collaborators within the Human-AI-World triad. It aims to provoke discussion around pedagogy, agency, and knowledge co-creation in the GenAI era—pointing toward a future where AI and humans learn, adapt, and innovate together.

Keywords: collaborative learning, Artificial Intelligence, global learning, higher education

43.
Author: Qurat Ul Ain

Title: An EEG-Driven Machine Learning System for Alzheimer's Disease: Diagnosis and Treatment

Abstract:
In the recent years, AI-based methods have been progressing in order to interpret the mysteries of neuroscience. Alzheimer's a malignant and complex neurological condition, driven by oxidative and metabolic stress resulting in mTOR pathway and p-tau super phosphorylated tangles. This condition causes a great cognitive and memory loss. Therefore, this poster aims to leverage AI to assist in 3D neural networks and bioscaffolds for generation of neural synapses after decoding brain signals using AI.

Keywords: Artificial Intelligence, Machine Learning, Neuroscience

44.
Author: László Ady, Dániel Tokody, Péter János Varga, György Schuster

Title: Enhancing STEM Education: Teaching Fuzzy Decision Systems using AI chatbots

Abstract:
The integration of artificial intelligence (AI) chatbots into higher education presents a transformative opportunity for teaching complex STEM subjects, such as fuzzy decision systems. This paper explores an innovative pedagogical approach where AI chatbots serve as interactive tutors, assisting university students in understanding fuzzy logic, decision-making under uncertainty, and real-world applications. By leveraging natural language processing and adaptive learning, chatbots provide personalized explanations, problem-solving guidance, and instant feedback, fostering deeper engagement and comprehension. We discuss the design of chatbot-assisted learning modules, evaluate their effectiveness through student performance and feedback, and highlight challenges and future directions for AI-enhanced STEM education. The findings suggest that AI chatbots can significantly improve accessibility, interactivity, and conceptual mastery in teaching fuzzy decision systems, preparing students for advanced applications in AI, robotics, and data science.

Keywords: Fuzzy decision systems, AI chatbots, STEM education, adaptive learning, university teaching, artificial intelligence in education

45.
Author: Milena Krumova

Title: STEM Teaching 5.0 framework: AI-Based Teaching and STEM Lessons Design

Abstract:
Contemporary teaching practices in the context of AI are increasingly open to innovation and experimentation, aiming to improve efficiency and achieve higher educational outcomes. With the rapid development of artificial intelligence (AI), educators have the opportunity to create diverse learning pathways for students and to design interactive and challenging STEM lessons that incorporate problem-based learning, foster STEM competencies, and encourage the creation of rich and varied STEM artefacts as tangible learning outcomes.

This article presents the STEM Teaching 5.0 framework—an AI-based model for teaching and designing STEM lessons. The article begins with a brief overview of STEM education, including the core principles of effective STEM lesson design. The second section explores the benefits of using AI tools for teachers and analyses how AI

can support and transform STEM lesson planning. The third section provides a detailed presentation of the Teaching 5.0 framework, followed by a fourth section that presents and analyses the results of a case study involving teacher training for STEM lesson design using AI. The training took place in May 2025, with a total of 83 teachers participating from various high schools across different regions of Bulgaria. The article concludes with a summary of the main contributions and suggestions for future research.

Keywords: STEM Teaching 5.0 framework, AI-Based Teaching, STEM lesson design, Artificial intelligence (AI), Teacher training

46.

Author: Patrik P. Süli, Bence Marczisák, Tamás Csibrák, György Eigner, Zsombor Zrubka

Title: Augmenting virtual brainstorming workshops via agentic AI

Abstract:
Since the public launch of ChatGPT in 2022, the use of large language models and generative AI have surged for moderating group ideation, brainstorming or other creative processes. We aimed to develop a generic modular AI agent that is capable of facilitating online virtual brainstorming workshop sessions by following workshop designs pre-specified by workshop owners. We added a chatbot agent based OpenAI's GPT o4 on to the Discord platform, a social platform where individuals can create channels and share text, voice or even media data along their common interests. We prompted the chatbot to moderate workshops in repeating cycles as follows: A) open a time-limited brainstorming phase, encouraging unfettered idea submission and logging every entry; B) cluster ideas under succinct thematic labels; C) deliver a concise synthesis of each cluster; D) elicit participant feedback via discussion, quick polls or emoji voting to rank priorities; E) via repeated focused sub-brainstorming or multi-criteria scoring rounds, iterate until a shared decision or action plan is reached. The modular structure allows the design of bespoke workshops following user needs. We tested the prototype in a small-scale experiment comparing the quality and quantity of ideas collected via traditional face-to-face and AI-augmented methods. Our study underpins the promise of using LLMs to augment group creativity.

Keywords: Large Language Models (LLMs), AI-facilitated brainstorming, Virtual workshop moderation, Agentic artificial intelligence, Group creativity augmentation

47.

Author: Gábor Soós, Leticia Ramirez Diarte

Title: Co-Prompting AI: Bildung, Ethics, and Silent Acts of Creation in the Age of GenAI

Abstract:
As generative AI transforms how humans learn, create, and interact, the need for ethical frameworks rooted in education and cultural wisdom has never been more urgent. This contribution introduces Co-Prompting AI—a new field of regenerative intelligence grounded in the TOLMA (Topo-Logos-Materia) framework: a Topo-Sophical Intelligence Field. Drawing on traditions from Socratic maieutics to Indigenous knowledge systems, and from Romantic poetics to contemporary AI ethics, it proposes BluePrompt and GreenPrompt as pedagogical and civic tools to shape AI with care, context, and conscience.In this spirit, the article aligns with ICGAL 2025's emphasis on GenAI-specific literacies, echoing the work of keynote contributors such as Professor Samuel Chu, and integrating insights from LinkedIn's 2025 Skills Report, which ranks AI literacy as the fastest-growing global competency. Building on the methodology, developed by Gábor Soós on the basis of his TOLMA framework and in cooperation with relevant stakeholders, of the ongoing "AI WITH UNESCO" Challenge piloted by the Hungarian National Commission for UNESCO, the contribution demonstrates how AI can enhance and amplify rather than replace human wisdom. The argument unfolds genealogically, tracing Bildung across interfaith and intercultural histories, major philosophical traditions (Plato, Heidegger, Levinas, Merleau-Ponty among other) and connecting them to the evolution of intangible heritage, endangered languages, and planetary stewardship. It culminates in a conceptual and practical outline of the Co-Prompting AI platform: a space for students, educators, communities, and researchers to co-create intelligence through ethical, poetic, and dialogical acts. Responding to the call for multidisciplinary research (Arnold et al., 2021), it offers a participatory digital commons for GenAI literacy and planetary consciousness in the age of the Anthropocene.

Keywords: AI Literacy / GenAI / Co-Prompting AI, TOLMA (Topo-Logos-Materia), STEAM Education, Ethical Prompting, BluePrompt / GreenPrompt, Bildung / Human–AI Co-Creation, World Heritage / Intangible Cultural Heritage, Multidisciplinary Learning, Planetary Consciousness / Anthropocene

48.
Author: Mark Chan

Title: AI in race for definition of new era economy

Abstract:

AI essence of endurance for exuberance in use

While AI fundamentally comprises algorithms to mimic cognitive processes of responsive conversations and apply problem-solving through learning of systems data, robotics are expected to become an inextricable tributary of AI focuses on designing and constructing machines to carry out autonomous tasks or under minimal user assistance.

Two constituents are expected attribute to the lead in AI, in which commonality in recognition of performance must begin with indisputable real-world knowledge in accumulation of applications. Success of AI attributes to propagation in application, in which data security is essential throughout all AI operations.

Up to now, the AI industry is in multitudinous development of race and very much in analogy to the internet at its outset. The AI leader will find acknowledgement in the following facets:

1.assurance of data security,

2.integrity with ease to understand in use by users,

3.overwhelming user base of considerable commercial value.

Commercial operation

Unlike commercialization of other technologies that boosted world living in a sweeping scale (e.g.electricity, lighting, telephone, computerization with internet), AI race in global lead is comparable to the steam engine that catapulted civilization to an upper horizon by the tagged first comer. Advantages followed through are witnessed on the foundation of standards, such as engineering units employed with convergence in transportation tools. Market adoption of projects with ensuing compliance by other AI players will establish a platform of reverence to be developed upon. Strategic launch of commodities to service the AI user that demonstrate the above three traits:

1.hack-proof verification of user in relation to authorization of time based limitation,

2.data security of total privacy protection without third party presence,

3.noteworthy contribution for dissemination of AI operations to daily user activities and infusion to the universal market.

Avoidance of meandering paths will save limited resources in the AI race through recognition in selected commodities of service, in which the associated commercial values are only attainable in market proven applications.

Keywords: user authentication / data security / market bondage

49.

Author: Shen Qiao, Samuel Kai Wah Chu

Title: Improving ESL primary school teachers' readiness for using GenAI technologies in English language classrooms: A design thinking approach

Abstract:
Design thinking, defined as “an analytic and creative process that engages a person in opportunities to experiment, create and prototype models, gather feedback, and redesign” (Razzouk & Shute, 2012, p. 330), has gained increasing recognition in educational settings. However, little research has examined its role in preparing in-service English language teachers to adopt generative AI (GenAI) technologies. To address this gap, this study implemented a professional development (PD) program using a design thinking approach for in-service English language teachers in Hong Kong. A total of 4 primary school English language teachers who teach English as a second language (ESL) were recruited and received 13 workshops on designing AI-supported language learning activities. Guided by a design thinking framework, participants worked through the five key stages—empathy, definition, ideation, prototyping, and testing—to design AI-enhanced language learning activities. At the end of the PD program, participating teachers provided overwhelmingly positive feedback in terms of its format and content. The presentation will discuss the findings regarding their perceptions of the approach and their readiness to integrate GenAI into their teaching practices.

Keywords: Design thinking / AI-supported language teaching / Professional development

50.
Author: Billy Hui, Esther Lok

Title: Leveraging NLP and Generative AI for Enhancing English Oral Proficiency in Hong Kong Junior Secondary Students

Abstract:
This pilot study explores the integration of Natural Language Processing (NLP) and Generative AI technologies to enhance English oral skills among junior secondary school students in Hong Kong, addressing the need for innovative, scalable language learning solutions. It investigates how NLP-driven speech recognition and Generative Al-powered conversational chatbot can provide real-time feedback, personalized dialogue practice, and contextually relevant prompts to improve fluency, pronunciation, and learner confidence in English as a Foreign Language (EFL) setting. The study defines effective NLP and Generative AI tools by their ability to accurately process diverse accents, adapt responses to learners' proficiency levels, and deliver culturally relevant content, evaluated through metrics such as response, coherence, feedback specificity, and user engagement. Conducted over three months with a focus group of 20 students, the research employs a qualitative methodology, utilizing semi-structured interviews and surveys to capture student experiences and perceptions of AI-driven

learning. The study also explores fine-tuning NLP models for localization to handle Cantonese-influenced English accents, leveraging region-specific datasets to enhance speech recognition accuracy, and employs Generative AI with Recurrent Neural Networks (RNNs) and Mel-Frequency Cepstral Coefficients (MFCC) features for standardized assessment of content, fluency, and grammar based on International English Language Testing System (IELTS). From a technical perspective, this research offers insights into optimizing NLP and Generative AI for EFL oral skills development, contributing to the advancement of technology-enhanced language education.

Keywords: Artificial Intelligence / AI chatbot / Natural Language Processing (NLP) / Generative AI / Author keywords English Oral Skills / Speech Recognition / Language Learning Technology / Education Technology / Gamification for Learning