

IOCES
2026
Conference

The 1st International Online Conference on Education Sciences

15–17 June 2026 | Online

Program and Abstract Book

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The 1st International Online Conference on Education Sciences

15–17 June 2026 | Online



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Welcome from the Chair

Dear Education Sciences Community,

It is my great pleasure to welcome you to the **1st International Online Conference on Education Sciences**, taking place from **15 to 17 June 2026**. This event is proudly organized by MDPI, an open access journal, in collaboration with the journal *Education Sciences* (ISSN: 2227-7102, Impact Factor: 2.6). This fully virtual conference will focus on current and emerging research in education, spanning from early childhood to higher education.

The conference will be organized around the following topics:

- S1. Technology-Enhanced Education
- S2. Higher Education
- S3. Curriculum and Inclusive Education
- S4. Special and Inclusive Education
- S5. STEM Education
- S6. Teacher Education

This event presents a unique opportunity for scholars in education and related fields to engage with **critical topics**, exchange **diverse perspectives**, and collaborate on **innovative solutions**. It offers a chance to build new connections, strengthen our global academic community, and advance the field together. IOCES 2026 is completely **free and accessible from anywhere** in the world.

We are pleased to announce that oral presentations and posters will be considered for **conference awards**. All poster submissions will be featured in an online gallery, and presenters will be eligible for special recognition. For further details regarding submissions, please click [HERE](#).

In addition, all participants who submit an extended full manuscript to the **Special Issue** for potential publication in the *Education Sciences* will receive a **20% discount** on the article processing charge. All submissions will undergo MDPI's standard peer-review process.

We look forward to your valuable contribution and active engagement in this exciting scientific event, and we hope that IOCES 2026 will be a memorable experience for our entire community.

Regards,



Prof. Dr. Daniel Muijs
Conference Chair

Queen's University Belfast,
Northern Ireland, UK



education sciences

an Open Access Journal by MDPI

Education Sciences (ISSN 2227-7102) is a scholarly peer-reviewed international open access journal, committed to providing inclusive and equitable global access to research. It aims to relate timely high-quality research findings across a broad range of topics. Leading educational researchers are invited to be guest editors that build a community of authors and readers through Special Issues which discuss the latest research and develop new ideas and research directions.

Submissions that synthesize information from disparate backgrounds, place research findings within a broad context, extend our methodological and theoretical understanding, and have the likelihood of informing education policy and practice are preferred. The journal publishes quantitative, qualitative, and mixed-method research papers. Extended reviews of substantive research studies and/or technical reports published elsewhere are also welcome. Additionally, *Education Sciences* invites commentaries and original opinion pieces and/or analyses of issues and events of concern to education scholars that have international resonance.

Education Sciences invites the publication of extended full-length research papers that have the scope to substantively address current issues in education. Full reports of findings and methodical details should be provided. Computed data or files, if available and unable to be published in the normal way, can be deposited as supplementary material. Online features can take advantage of the variety of media made possible through electronic publishing, including the use of audio, video, complex or dynamic graphic displays, interactive sessions, performances, and other means to improve the communication of scholarly work. Features may be presented as a single article or in serial form.

Impact Factor: 2.6 (2024); 5-Year Impact Factor: 2.7 (2024)

Session Chairs



Prof. Dr. Federico Corni
Faculty of Education, Free
University of Bozen-Bolzano,
Bolzano, Italy



Prof. Dr. Garry Hornby
Institute of Education,
University of Plymouth,
Plymouth, UK



Prof. Dr. Kelum Gamage
School of Engineering,
University of Glasgow,
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Prof. Dr. Mike Joy
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Dr. Gillian Judson

Educational Leadership, SFU
Faculty of Education, SFU
Surrey Campus, Simon Fraser
University, Burnaby, BC,
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Prof. Dr. Eugenio Tufino

Department of Physics,
Informatics and Mathematics,
University of Modena and
Reggio Emilia, Modena, Italy

Invited Speakers



Dr. Johanna Fitzgerald

Educational Psychology, Inclusive
& Special Education, Mary
Immaculate College, Limerick,
Ireland



Prof. Dr. Neil Gordon

Computer Science,
School of Digital and
Physical Sciences,
University of Hull, Hull,
UK



Dr. David Mandzuk

Department of Educational
Administration, Foundations
and Psychology, Faculty of
Education, University of
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Professor Piet Kommers

UNESCO Learning Technologies,
University of Twente, Enschede,
The Netherlands



Dr. Yongliang Wang

School of Foreign
Studies, North China
University of Water
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Dr. Pietro Picerno

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Program at a Glance

TIME (CEST)	15 JUNE 2026 MONDAY	16 JUNE 2026 TUESDAY	17 JUNE 2026 WEDNESDAY	
09:00–11:30 CEST	S1. Technology- Enhanced Education	S5. STEM Education	–	
13:00–15:30 CEST	S3. Curriculum and Inclusive Education	–	–	
15:30–18:00 CEST	–	S4. Special and Inclusive Education	S6. Teacher Education (Parallel Session)	S2. Higher Education (Parallel Session)

IOCES 2026 Program

15 June 2026 (Monday)

Session S1. Technology Enhanced Education

Time: 09:00 CEST, Basel | 03:00 EDT, New York | 15:00 CST, Beijing

Time (CEST)	Speaker	Title
09:00–09:10	Prof. Dr. Daniel Muijs Event Chair	<i>Opening Ceremony from the Event Chair</i>
09:10–09:20	Prof. Dr. Mike Joy Session Chair	<i>Welcome from the S1. Session Chair</i>
09:20–09:45	Prof. Dr. Neil Gordon Invited Speaker	The Agentic University: What Happens When GenAI Runs the Academic Pipeline?
09:45–10:10	Prof. Dr. Piet Kommers Invited Speaker	Conceptual Thinking in the Era of AI Support
10:10–10:25	Samuel Yanes Luis	Use of Retrieval Augmented Generation for the Evaluation of Originality in Engineering Subjects with a Project-Based Learning System
10:25–10:40	Matija Novak	Rethinking Similarity Scores in Programming Education: A Three-Year Study Across Assignments and Detection Tools
10:40–10:55	Ghazal Ershadi-Oskoui	Large Language Models for Generating Interactive Simulations in Anatomy Education
10:55–11:10	Omar Aarab	AI-Assisted Design of Interactive Physics Simulations: A Case Study on Teaching Ohm's Law in the Scientific Common Core
11:10–11:25	Yutong Zhang	Evaluating ChatGPT and DeepSeek in AI-Assisted English-Chinese News Translation within Technology-Enhanced Education
11:25–11:40	Muhammad Hakmal Hussain	Impact of Assessment Strategies in a Digital Language Learning Context on Undergraduates' English Language Learning

15 June 2026 (Monday)

Session S3. Curriculum and Instruction

Time: 13:00 CEST, Basel | 07:00 EDT, New York | 19:00 CST, Beijing

Time (CEST)	Speaker	Title
13:00–13:10	Prof. Dr. Honggang Liu Session Chair	<i>Welcome from the S3. Session Chair</i>
13:10–13:40	Prof. Dr. Honggang Liu Keynote Speaker	<i>Pending</i>
13:40–14:05	Dr. Yongliang Wang Invited Speaker	From Access to Empowerment: Affective Driving Mechanisms in GenAI-Era Inclusive EFL Classrooms
14:05–14:20	Antonio Peña-Fernández	Gamified Mobile Learning to Strengthen Malaria Diagnostic Competence: A Case Study from Sierra Leone
14:20–14:35	Enrique Ortiz	Exploring Experienced Teachers' Awareness of Culturally Relevant Pedagogy Through a Personable Culturally Situated Mathematical Modeling Task
14:35–14:50	Guoqiang Dang	Integrating Problem-Posing and Problem-Solving within Mathematics Teaching
14:50–15:05	Rachid Bendraou	Empowering Critical Thinkers: The Role of Critical Pedagogy in Shaping Students' Analytical Skills in Moroccan Classrooms
15:05–15:20	Janelle Benitez	Pedagogical Re-engineering of Literacy and Numeracy Programs through Deweyan Constructivism Framework
15:20–15:35	Andisiwe Zandile Dumako	From Policy to Practice: Systemic Constraints Undermining Construction Learnership Implementation and Effectiveness in South

16 June 2026 (Tuesday)**Session S5. STEM Education****Time: 09:00 CEST, Basel | 03:00 EDT, New York | 15:00 CST, Beijing**

Time (CEST)	Speaker	Title
09:00–09:10	Prof. Dr. Kelum Gamage Session Chair	<i>Welcome from the S5. Session Chair</i>
09:10–09:40	Prof. Dr. Kelum Gamage Keynote Speaker	Towards a Decolonised STEM Education: Equity and Inclusion in Practice
09:40–09:55	Cameron A Straughan	Do → Reflect → Explain → Connect: A Culturally Responsive Framework for STEM Learning
09:55–10:10	Ellendea Yong Jing Foo	Connecting the Curriculum: Investigating the Impact of Competency-Based Curriculum on Concept Integration Across Chemistry Modules and Students' Self-Efficacy
10:10–10:25	Sharon Shannon	Chorus: Amplifying Student Voice through Creative, Sustainable STEAM Engagement
10:25–10:40	Daniel Martínez Pleguezuelos	Exploring Topology in Secondary Education through Game-Based Learning
10:40–10:55	Susanna Puecher	Fostering Scientific Literacy through an Educational Study: Students' Initial Perceptions of Science Communication on Social Media
10:55–11:10	Jinendrika Anushi Weliwita	Synthetic Cognition for STEM Education: A Novel Framework for Simulating STEM Learners and Discovering Misconceptions
11:10–11:25	Maeve Liston	Learning Through Engagement: What Industry Volunteers Reveal About Effective STEM Outreach in University-Industry Partnerships
11:25–11:40	Shirly Idan	From Teaching Model to Success Model: Active Learning in a Core Engineering Course

16 June 2026 (Tuesday)**S4. Special and Inclusive Education****Time: 15:30 CEST, Basel | 09:30 EDT, New York | 21:30 CST, Beijing**

Time (CEST)	Speaker	Title
15:30–15:40	Prof. Dr. Garry Hornby Session Chair	<i>Welcome from the S4. Session Chair</i>
15:40–16:05	Dr. Johanna Fitzgerald Invited Speaker	RISE to Transform: Collaborative Systems Leadership for Inclusive Education: Insights from National Research and Knowledge Engagement Strategy in Ireland
16:05–16:20	Laura Phelan	Are We on the Right PATH? An Exploration of Planning Alternative Tomorrows with Hope in Transition Planning with Autistic Students.
16:20–16:35	Ruoyun Jiao	Emotional Experiences and Support Stability among Teaching Assistants in Inclusive Education
16:35–16:50	Loredana Adriana I. Patrascioiu	The Transformative Impact of Universal Design for Learning Approach within Organizational Level of School: InclusivEduHub as Collaboration Model between Special Schools and Mainstream Schools
16:50–17:05	Ayse Tuna	Improving Communication Skills of Children with Autism Spectrum Disorder and Engage Them: Puppets vs Social Robots
17:05–17:20	Aisling Dempsey	An Exploration of Parent's and Teachers' Experiences of Shared Decision Making and Goal Setting for Students Attending Special Schools and Classes for Students with Moderate to Severe/Profound Levels of Intellectual Disability, in Ireland.
17:20–17:35	Maria Varvarigou	Inclusive Music Pedagogies in Practice: Multisensory and Learner-Centred Approaches
17:35–17:50	Philip Garner	Evidence-Based Policy: A Case Study of Stakeholder Involvement in Inclusive Education

17 June 2026 (Wednesday)**S2. Higher Education (Parallel Session)****Time: 15:30 CEST, Basel | 09:30 EDT, New York | 21:30 CST, Beijing**

Time (CEST)	Speaker	Title
15:30–15:40	Prof. Dr. Daniel Muijs Host	<i>Welcome from the host</i>
15:40–16:05	Prof. Dr. David Mandzuk Invited Speaker	Beyond Janus Effect: Social Capital and Role Conflict among Deans at Large Canadian University
16:05–16:30	Dr. Pietro Picerno Invited Speaker	From COVID-19 Emergency to Structured Integration: Which Practice-Oriented Activities in Sport Sciences Can Go Remote? Review of Evidence and Technological Framework for Online Laboratories
16:30–16:45	Hadas Levi Gamlieli	Problem-Based Learning in Engineering Differential Equations: Effects on Achievement, Motivation, and Academic Engagement
16:45–17:00	Alejandra Trillo	Embedding COIL within Comprehensive Tutorial Action Plan: Evidence from Internationalised Mentoring Model in Higher Education
17:00–17:15	Carmen Díaz-López	Framework of Indicators for Education and Sustainability (FIES): A Holistic Approach to Advancing Sustainability in Higher Education
17:15–17:30	D. Ben Ghida	From Architects to Constructors: How AI Undermines Architectural Thinking?
17:30–17:45	Thi Quynh Anh VU	A Longitudinal Analysis of Moodle Log Data during and after COVID-19: Cross-Continental Comparison of Universities in France and Vietnam
17:45–18:00	Regina Ferreira Alves	From Needs Assessment to Training Design: A Project-Based Learning Case Study on University–Community Engagement in Higher Education.
18:00–18:15	Eugene Y.H. Yeung	Use of University Directed Studies and Undergraduate Summer Student Research Programs to Create Enhanced Antibiofilms and Improve Antimicrobial Stewardship

17 June 2026 (Wednesday)**S6. Teacher Education (Parallel Session)****Time: 15:30 CEST, Basel | 09:30 EDT, New York | 21:30 CST, Beijing**

Time (CEST)	Speaker	Title
15:30–15:40	Prof. Dr. Federico Corni Session Chair	<i>Welcome from the S6. Session Chair</i>
15:40–16:10	Prof. Dr. Eugenio Tufino Keynote Speaker	When AI Can Solve Problems and Explain Physics: What Should Science Teachers Learn?
16:10–16:40	Dr. Gillian Judson Keynote Speaker	Cultivating Imagination in Pre-Service Teacher Education: A Brief Introduction to Imaginative Education
16:40–16:55	Steven S. Sexton	What Is Culturally Responsive and Sustaining Teaching Practice through Primary Science in Aotearoa New Zealand?
16:55–17:10	Valeria Cavioni	Promoting Teachers' Wellbeing through Gamified Learning: Qualitative and Quantitative Evidence from Teaching to Be Project
17:10–17:25	Stefania Moser	The Educational Potential of EduSpaces Laboratories: Multilingual and Interdisciplinary Initiative at Free University of Bozen-Bolzano (Italy)
17:25–17:40	Andrea C Borowczak	From NetLogo to LLMs: Decade of STEM Integration Professional Development and Emerging Verification Competency Model for Educators
17:40–17:55	José Cantó	Proposals for Science Education in Early Years: Implications for Teacher Training
17:55–18:10	Shu-Hua Chao	Cultivating Moral Literacy: Australian In-Service Teacher Perspectives on Ethical Reasoning and Initial Teacher Preparation
18:10–18:25	Kriti Ranjan Sahu	Smartphone-Assisted Pocket Experiments in Teacher Education for Promoting Inquiry-Based Science Learning

Session 1. Technology Enhanced Education

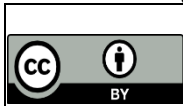
sciforum-178373: "Slacking" or "Empowering"? The Dual Impact of AI Programming Assistants on the Development of Undergraduate Students' Computational Thinking

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With the rapid penetration of generative artificial intelligence in educational scenarios, AI programming assistants have gradually been applied in STEM programming classrooms. However, whether they enhance or weaken the development of students' computational thinking remains an unclear conclusion. Therefore, in technology-enhanced STEM education, how to leverage the enabling value of AI while maintaining the core boundaries of computational thinking development has become a key issue that current student programming education urgently needs to address. This study, based on the theoretical framework of technology-enhanced education and STEM education, adopts a quasi-experimental research design. It selects undergraduate students from different universities as research subjects, sets up an AI-assisted learning group and a traditional programming teaching group, and through a one-month teaching intervention, systematically explores the dual impacts of AI programming assistants on the computational thinking of undergraduate students. This study uses methods such as computational thinking scale, programming work analysis, classroom observation, and interviews to conduct evaluations in four dimensions: abstract thinking, algorithm design, problem decomposition, and debugging and error correction. The expected results aim to reveal the dual value and boundary conditions of AI tools in university programming education and propose reasonable teaching strategies that balance efficiency and thinking cultivation, providing empirical evidence and practical references for the high-quality development of STEM education under technology empowerment.



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sciforum-173700: Open Large Language Models in Higher Education: A Framework for Technology-Enhanced Sustainable Learning

Iván Miguel García-López ^{1,*}, Jessica Nájera Ochoa ¹ and Maria Stella Castillo Perea ²

¹ Business Faculty, Universidad La Salle, Mexico City, 06170, México

² Facultad de Educación, Universidad de Salamanca USAL, Salamanca, España, 37001, Spain

The rapid expansion of generative artificial intelligence is transforming higher education by reshaping decision-making processes, institutional governance, and technology-enhanced learning ecosystems. Among these technologies, Open Large Language Models (OLLMs) have emerged as accessible infrastructures capable of supporting scalable, inclusive, and sustainable innovation in educational contexts. Despite their growing adoption, there remains limited systematic evidence regarding their organizational impact and governance implications in higher education. This study conducts a systematic literature review (SLR) to analyze the role of OLLMs in educational management and technology-enhanced learning environments. A structured and replicable search was carried out in Scopus and Web of Science, identifying an initial corpus of 616 articles published between 2020 and 2025. After applying inclusion and exclusion criteria, a final sample of 551 peer-reviewed studies was analyzed through a structured qualitative content analysis based on five research questions addressing managerial domains, governance models, levels of adoption, organizational outcomes, and associated risks. The findings reveal that OLLMs are primarily conceptualized as cognitive infrastructures that augment institutional decision-making rather than replace it, with predominant applications in strategic planning, performance evaluation, and administrative optimization. The results also show a concentration of adoption at exploratory and unit levels, indicating an emerging but uneven institutional integration. Governance discussions emphasize transparency, accountability, and risk management, particularly regarding bias, data protection, and over-reliance on automated systems. Additionally, the analysis highlights that organizational value derived from OLLMs is strongly contingent on institutional digital maturity and managerial capabilities. This study contributes to the field by providing an evidence-based framework that positions OLLMs as key components of technology-enhanced sustainable learning ecosystems, linking their adoption to governance structures and institutional capacity building. The findings offer practical implications for higher education institutions seeking to balance innovation, accessibility, and responsible AI deployment in increasingly complex educational environments.



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sciforum-178300: A New Approach to Using Generative AI as a Reflection Partner for Writing and Metacognitive Learning

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Introduction

Much of the cognitive work involved in writing, including planning, pausing, revising, and restructuring ideas, often leaves little visible evidence once a document is completed. At the same time, the rapid emergence of generative AI has created new challenges for writing instruction, with many institutions turning to automated AI detection systems despite concerns about their reliability and fairness. This study introduces an approach in which generative AI supports student reflection on the writing process, helping students examine and explain their planning strategies, revision decisions, and development of ideas.

Methods

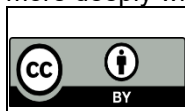
Writing process reports derived from digital revision histories capture indicators such as drafting timelines, revision patterns, editing bursts, and pauses in composing activity. These indicators can be visualized to provide an empirical representation of how a document develops over time. Building on this representation, the present study developed a structured set of reflection prompts to guide students in interpreting their writing process reports. In the freely accessible online writing process visualization platform Process Feedback (www.processfeedback.org), we implemented a “Copy for AI” feature that allows students or teachers to copy the writing process data and visualizations along with a structured reflection prompt. This copied content can then be pasted into any generative AI tool for interaction and reflective conversations.

Results

The proposed approach and implementation in the Process Feedback platform demonstrate the technical feasibility of systematically transforming writing process indicators into actionable reflection prompts that guide students in examining their composing activity. Preliminary deployment shows how generative AI can effectively translate complex process data into personalized conversations focused on reflection and learning.

Conclusions

By positioning AI as a reflection partner, this approach promotes metacognition and transparency. It provides a scalable, open-access alternative to AI detection, helping students engage more deeply with writing as a process of learning.



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sciforum-166566: Developer Education for Sustainable Web Development: Evidence from the Balkan Region

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Sustainable web development focuses on designing web pages that minimize their environmental impact by reducing digital carbon emissions while maintaining optimal website performance and user experience. This study emphasizes the necessity of adopting sustainable web development practices in the Balkan region, highlighting the role of institutional education and web developers in encouraging environmentally responsible web practices within a Technology-Enhanced Education context. A descriptive cross-country analysis was conducted on a total of 8,976 websites across five Balkan countries—Albania, Greece, Serbia, Montenegro, and North Macedonia—selected from public domain registries and categorized by sector (education, organization, government, and commercial domains). Data were collected during December, 2025. DNS verification was conducted to identify active domains, and hosting sustainability was determined through the Green Web Foundation API. “Green hosting” is operationally defined as hosting that is completely powered by renewable energy sources. Overall, the findings suggest that the prevalence of green hosting in the region is very low, at approximately 27.77%, with substantial variation across sectors. Educational institutions (.edu) and non-profit organizations (.org) have higher adoption rates, while public administrations (.gov) and small commercial websites generally fall behind. The country with the highest percentage of green hosting is Greece (64.07%), while the lowest is Albania, with less than 1%. These findings reveal significant gaps in knowledge and practices among developers and institutions, indicating an urgent need for targeted educational interventions. Crucially, this study connects empirical evidence directly to education. Recognized knowledge gaps guide curriculum development and the design of practical training modules to equip developers and institutional personnel with the skills to adopt sustainable web practices. This research establishes a regional comparative baseline and offers practical recommendations for incorporating sustainability into web development education. The findings endorse strategies and policies aimed at promoting environmentally sustainable digital infrastructure in the Balkan area.



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sciforum-173281: Embedding Coaching-Informed Design into Technology-Enhanced Learning Platforms: An Eight-Cycle Design-Based Research Study

Rihan Mustapha

Independent Researcher & Educator, Riyadh, Saudi Arabia

Technology-enhanced learning has significantly expanded access, flexibility, and scalability across higher education and professional development contexts; however, many digital implementations remain content-centered, emphasizing information delivery over developmental growth and reflective transfer. This study addresses this gap by embedding coaching-informed design principles directly into a technology-enhanced learning platform through structured reflective interfaces, dialogic coaching sequences, and adaptive feedback mechanisms.

Using a design-based research (DBR) methodology, the intervention was developed and progressively refined across eight implementation cycles over one academic year, involving 150 learners enrolled in structured professional development programs. Grounded in constructivist learning theory and reflective practice frameworks, the model integrated developmental dialogue within the digital instructional flow rather than positioning reflection as a post-task add-on. Data were collected using mixed methods, including learner-generated reflective artifacts, platform engagement analytics, structured perception surveys, and systematic facilitator observations. Cross-cycle comparative analysis informed iterative enhancements to the platform's reflective architecture and feedback design.

Findings indicate sustained and progressive increases in learner agency, depth of reflection, engagement quality, and perceived transfer to professional practice across successive iterations. Compared with content-driven digital formats, the coaching-informed design demonstrated stronger alignment between intended learning outcomes and applied professional impact.

This study advances technology-enhanced education by empirically demonstrating how developmental dialogue can be systematically embedded within digital learning architectures to strengthen engagement and applied learning. The resulting framework offers scalable, research-informed design principles for institutions seeking to enhance the developmental impact of technology-mediated instruction.



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sciforum-141340: Gamifying Environmental Toxicology: Active Learning Through a Workbook, Board Game, and Virtual Tools

Antonio Peña-Fernández

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Environmental toxicology plays a crucial role in understanding the impact of pollutants on ecosystems and public health. However, its complexity and cross-disciplinary nature can pose challenges for students, particularly at the undergraduate level. To address this gap, we have launched an innovative educational initiative at the University of Alcalá (UAH) designed to enhance engagement and comprehension through active learning strategies. The project, awarded under the Institutional Impact Innovation Actions (Ai3) programme (UAHEV/1669), combines a structured student workbook, a cooperative board game, and online resources to make toxicology accessible, practical, and engaging. The workbook introduces students to real-world environmental case studies and guides them through risk assessment exercises, integrating regulatory criteria and toxicological endpoints. The board game, currently in beta testing, immerses students in simulated contamination scenarios where they collaborate to assess exposure pathways, identify hazards, and propose remediation strategies—building communication and decision-making skills in the process. A suite of complementary digital resources, including interactive quizzes and scenario videos, supports autonomous learning and curriculum integration. This pedagogical approach is grounded in gamification and constructivist learning theory, encouraging exploration, teamwork, and critical thinking. Pilot implementation across environmental science and pharmacy modules has shown promising results, with increased student motivation, deeper conceptual understanding, and positive feedback on the applicability of toxicology to real-world public health problems. By combining physical and virtual tools, this project fosters a flexible, inclusive, and experiential approach to teaching toxicology. It offers a transferable model for other institutions seeking to modernise toxicology education and improve scientific literacy among future professionals facing the global challenges of pollution and environmental health.



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sciforum-167860: Human-Centred Artificial Intelligence in Education: A Conceptual Model of Trust, Agency and Ethics

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The growing use of Artificial Intelligence (AI) in education is transforming teaching, learning, and assessment practices. While these AI-driven systems improve efficiency and personalisation, many existing approaches often prioritise technological performance over human-centred values. This raises many concerns about diminished human agency, trust in AI systems, and ethical governance in educational contexts. Thus, this paper aims to respond to these concerns by promoting a human-centred perspective on AI in education. This study adopts a conceptual and integrative approach, drawing on interdisciplinary literature from fields such as education, AI-computer collaboration, and the intersection of ethics and AI, published in leading peer-reviewed journals and conference proceedings published in English between 2015 and 2025. Through theory development and critical synthesis, this paper develops a conceptual model that illustrates how human-centred AI principles can be integrated within technology-driven educational environments. The results present a human-centred AI framework for education around three interrelated dimensions: trust, human agency, and ethics. Transparency, explainability, and accountable governance are posited to enhance users' trust, which in turn motivates learners and educators to exercise meaningful oversight and informed decision-making. Moreover, human agency plays as a mediating mechanism that ensures AI augments rather than replaces human judgement. Ethical governance grounded in fairness, transparency, inclusivity, and accountability under which trust and agency meaningfully inform responsible practice. Overall, this proposed integrated model highlights how ethical interaction of these dimensions can foster ethically grounded human-AI collaboration while addressing ethical risks associated with over-automation and algorithmic bias. By re-centring key principles of trust, agency, and ethics, this study contributes to existing AI-enhanced educational literature. This framework offers practical guidance for educators, policymakers, and practitioners by emphasising the need to implement AI systems that respect human values and enhance ethical responsibility, empowering educational practices. Future directions are also presented.



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sciforum-173300: Integrating Artificial Intelligence into Irregular Warfare Education: A Framework for Military Learning and Training

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Artificial Intelligence is increasingly embedded in contemporary military operations, yet its effective and ethical integration depends largely on how defense institutions educate and prepare personnel. While technological advancements receive significant attention, the pedagogical systems that enable responsible adoption remain underexamined. This study examines how AI can be systematically incorporated into professional military education and training for irregular warfare. Using qualitative doctrinal analysis and thematic synthesis of United States and NATO policy documents, scholarly literature, and recent operational practices, the research develops a five layer instructional framework linking strategic alignment, doctrinal integration, operational learning, data driven intelligence education, and human AI governance. The framework demonstrates how AI competencies can be embedded within curricula, training programs, simulations, and institutional learning systems in a structured and scalable manner. Findings indicate that successful AI adoption requires coordinated reforms in doctrine, instructional design, leadership development, and ethical oversight rather than isolated technical training initiatives. The study further emphasizes the importance of experiential learning environments, interdisciplinary collaboration, scenario based exercises, and continuous professional development in cultivating AI literacy and adaptive decision making among military personnel. By reframing AI integration as a comprehensive pedagogical transformation rather than a purely technical upgrade, this research contributes to education sciences by illustrating how emerging technologies reshape professional learning ecosystems. The proposed model offers practical guidance for educators, policymakers, and training institutions seeking to enhance operational readiness while maintaining transparency, accountability, and principled human judgment.



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sciforum-145370: Perceptions of Virtual Reality as a Training Tool in Engineering Education

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Introduction: Virtual reality (VR) has increasingly been explored as a pedagogical innovation in higher education. While its benefits for enhancing motivation, visualization, and practical training are widely acknowledged, the perceptions of engineering faculty remain less documented, particularly when comparing different institutional contexts.

Methods: A survey instrument comprising 22 validated items grouped into six dimensions (competence, usability, technical aspects, drawbacks, didactic employability, and future projection) was administered to 279 engineering professors from 15 Latin American countries. Responses were analyzed using descriptive statistics, t-tests, and MANOVA to identify differences according to university type (public vs. private), gender, age, and teaching experience.

Results: Professors valued VR highly in terms of usability, technical potential, and teaching utility. However, low self-assessment of competence and lack of formal training highlighted a gap between perceived usefulness and readiness for classroom implementation. Significant differences emerged according to institutional ownership: professors in private universities tended to provide more favorable and consistent evaluations of VR's educational benefits compared to those in public universities. Gender, age, and teaching experience also influenced perceptions, although these effects varied depending on the subscale analyzed.

Conclusions: The principal results indicate that engineering faculty recognize VR as a promising resource for higher education but still lack sufficient training for its effective use. The institutional divide suggests that private universities may be more proactive in adopting immersive technologies, whereas public universities show greater skepticism. Addressing this imbalance through targeted training and resource allocation could accelerate the integration of VR into engineering education across Latin America.



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sciforum-172186: Teacher Agency in Localized AI Ecologies: Insights from Chinese University English Teachers

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While the technological capabilities of Generative Artificial Intelligence (GenAI) are extensively documented, understanding how teachers exercise professional agency in AI-mediated instruction remains underexplored, particularly in non-Western contexts where institutional structures, technological infrastructures, and policy frameworks differ markedly from settings where most existing research has been conducted. This study addresses this gap by examining how Chinese university English teachers enact agency when integrating localized AI platforms into their pedagogical practices. Drawing on the Ecological Approach to Agency (Priestley et al., 2015), this qualitative inquiry examines the lived experiences of university English teachers who employ domestically developed AI tools in their instruction. Data were collected through semi-structured interviews and teacher reflection journals, and analyzed using thematic analysis. The ecological framework enables examination of agency across multiple temporal and contextual dimensions: past technological experiences, future professional aspirations, and immediate institutional constraints. Findings reveal that teacher agency in AI-mediated contexts operates as a dynamic negotiation rather than a binary acceptance-rejection decision. Teachers demonstrate varied approaches to AI integration, shaped by factors including research performance pressures, student assessment requirements, peer knowledge networks, and ethical concerns regarding academic integrity. The study contributes empirical evidence of teacher agency beyond Western settings and highlights the role of localized technological ecologies in shaping pedagogical decision-making. These findings offer implications for professional development programs that honor teachers' situated expertise in navigating technological change, and for policies aimed at supporting context-sensitive AI integration in higher education.



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sciforum-173364: Use of Retrieval Augmented Generation for the Evaluation of Originality in Engineering Subjects with a Project-Based Learning System

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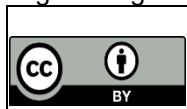
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This chapter presents a Retrieval-Augmented Generation (RAG) framework to evaluate the originality of student projects in a Project-Based Learning (PBL) context within an advanced digital systems course of a Master's degree in Electronic Engineering at the University of Seville. While PBL fosters creativity, technical competence, and active learning, assessing originality becomes increasingly complex as repositories of past projects grow and distinctions between inspiration, reuse, and plagiarism blur. Traditional plagiarism-detection tools focus on textual similarity and fail to capture conceptual novelty, especially in engineering contexts where code reuse is common.

The proposed system combines structured summarization using an open-weight large language model (DeepSeek-R1) with semantic retrieval over an indexed knowledge base of previous projects. Each historical project is automatically preprocessed and summarized into a structured format including objectives, modules, hardware, and contextual keywords. These summaries are embedded and indexed using a RAG pipeline, enabling semantic comparison between new proposals and prior work. The system generates originality scores, identifies similar projects, and provides explanatory feedback.

Validation was conducted using 91 historical projects and 10 controlled test cases spanning the full originality spectrum. The system's scores showed strong correlation with expert evaluations (Pearson $r = 0.87$, $p = 0.006$), though it tended to be slightly more conservative. Qualitative feedback from instructors and students highlighted its usefulness as a cognitive support tool that enhances transparency, reduces memory bias, and promotes reflective refinement of project ideas. Rather than replacing human judgment, the framework functions as an explainable co-evaluation assistant, offering a scalable, locally deployable, and ethically grounded approach to originality assessment in engineering education.



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sciforum-165609: AI Integration in Higher Education: A Scholarly Perspective

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The integration of artificial intelligence (AI) into higher education is accelerating, reshaping teaching practices, learning environments, and institutional decision-making. While AI is often promoted as a solution for personalization and efficiency, its educational value remains uneven and context-dependent. This study critically examines how AI technologies are currently used in higher education and assesses their pedagogical, ethical, and equity-related implications within technology-enhanced education.

The study adopts an analytical literature review methodology, drawing on peer-reviewed publications. Keywords included artificial intelligence, higher education, adaptive learning, academic integrity, and educational equity.

The review identifies four key findings. First, adaptive learning systems and intelligent tutoring tools show consistent improvements in student engagement and performance, particularly in large or heterogeneous classrooms, when supported by instructor involvement. Second, AI-driven assessment and feedback tools enhance efficiency and formative feedback but risk narrowing learning to measurable outputs if poorly aligned with pedagogy. Third, AI applications can improve accessibility for students with disabilities and non-traditional learners; however, unequal access to infrastructure and digital literacy may reinforce existing inequalities. Fourth, concerns occur in unsupervised use of AI especially in terms of data privacy, ethical scholarship and the risk of reduced critical thinking competence.

The study's contributions have to do with linking specific AI applications to clearly defined educational outcomes and risks, rather than treating AI as a uniform intervention. It concludes that responsible AI integration in higher education requires pedagogically grounded design, institutional governance, and equity-oriented implementation strategies.



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sciforum-178454: AI-Assisted Design of Interactive Physics Simulations: A Case Study on Teaching Ohm's Law in the Scientific Common Core

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Digital simulations have become an important resource in physics and chemistry education, enhancing student motivation and facilitating the visualization of abstract scientific phenomena. They also provide a practical alternative when laboratory equipment is unavailable. This study explores the integration of artificial intelligence (AI), specifically Google AI Studio, to design an interactive simulation illustrating Ohm's Law for students in the Scientific Common Core of the Moroccan educational curriculum. The simulation includes an interactive circuit visualization, adjustable voltage and resistance parameters, automatic graph generation, virtual measurement tools, and real-time observation of the linear relationship between voltage and current.

To evaluate its pedagogical effectiveness, a comparative study was conducted with two groups of students: an experimental group using the AI-assisted simulation and a control group receiving traditional instruction. Learning outcomes were assessed through a quiz administered after the instructional session. Results showed that the simulation group achieved an average score of 80%, compared to 50% for the control group. Students using the simulation also demonstrated a stronger conceptual understanding and improved graph interpretation skills. These findings suggest that AI-generated simulations can significantly enhance physics learning, particularly in contexts with limited laboratory resources, while also encouraging teachers to shift from being mere users of AI technology to innovators and designers who create and adapt AI-supported learning experiences that deepen students' understanding.



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sciforum-139336: AI-Mediated Problem-Based Language Learning: Easing the Load for Teachers, Empowering Students

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This study proposes and investigates a refined model of problem-based language learning for English as a foreign/second language instruction, integrating artificial intelligence as an active co-mediator in the learning process. Grounded in sociocultural theory, the study reimagines the teacher-AI partnership as a dynamic scaffold that supports learners' progression through ill-structured, real-world problem scenarios. The research employed an explanatory mixed-methods design involving 42 pre-intermediate university students enrolled in a General English course with an English for Specific Purposes focus on science. Over six instructional sessions, AI was used to generate, evaluate, and adapt PBL scenarios based on students' group responses. Quantitative data from repeated-measures ANOVA indicated statistically significant improvement in learner performance from pre-tests to post-test. Qualitative analysis of group responses and follow-up interviews revealed increased clarity, critical thinking, collaboration, and vocabulary development over time. Students also reported greater autonomy and engagement compared to traditional instruction. The findings culminated in the proposal of the AI-Mediated Problem-Based Language Learning Model (AI-PBLL), a six-phase cyclical framework in which AI and the teacher collaborate to provide data-driven, context-sensitive scaffolding. This model addresses both the pedagogical challenges of problem-based learning implementation and the growing need for theory-informed AI integration in language education. By demonstrating how AI can support adaptive, collaborative, and cognitively engaging learning experiences, this study contributes a practical and transferable framework for EFL/ESL instruction in the age of intelligent technologies.



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sciforum-150424: An Artificial Intelligence Competency Taxonomy: Mapping User Integration Levels and Progression Pathways

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This conceptual paper proposes an AI Competency Taxonomy that defines user integration levels of AI tools within educational contexts. The rapid advancement of Artificial Intelligence (AI) has transformed teaching, learning, and knowledge creation, particularly in higher education. While existing studies discuss AI literacy and competency, they lack a comprehensive taxonomy that provides actionable guidance for identifying competency stages and evaluating integration pathways. To address this gap, this study develops an AI Competency Taxonomy grounded in Bloom's Revised Taxonomy—Remembering, Understanding, Applying, Analyzing, Evaluating, and Creating—while synthesizing insights from diverse AI literacy and competency models published between 2021 and 2025. A concept-driven, iterative selection process identified 22 relevant sources, including 21 peer-reviewed journal articles and the UNESCO (2024) AI literacy and competency framework, which was purposefully included as an authoritative global guideline shaping educational policies and competency standards. Findings present a taxonomy comprising six progressive categories based on user roles: (i) *Learner-as-Recipient*, (ii) *Learner-as-Supported*, (iii) *Learner-as-Collaborator*, (iv) *Learner-as-Co-Designer*, (v) *Learner-as-Leader*, and (vi) *Learner-as-Strategist*. These stages represent a continuum of AI integration, ranging from basic, receptive usage to advanced, strategic engagement in academic contexts. This study further identifies key determinants influencing integration levels and outlines structured pathways for progression. The proposed taxonomy offers both a theoretical foundation and a practical framework to guide future empirical research, curriculum design, and policy development aimed at fostering responsible, creative, and effective AI use in education.



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sciforum-161352: An Evaluation of Artificial Hallucination Rates in Large Language Models for Educational Use

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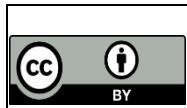
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Objective: Artificial Hallucination, termed as the “generation of plausible but factually incorrect information”, is a complication in the use of large language models (LLMs). Inappropriate reliance on LLMs, when used as an educational tool, may undermine critical thinking and risk distorting academic understanding, particularly among foundational learners in evidence-based disciplines. Systematic evaluation is therefore required to assess the extent of hallucination of publicly available LLMs for educational use.

Methods: This study evaluated the hallucination rates of four public LLMs: ChatGPT-4o, Microsoft Copilot, Google Gemini 1.5, and Claude Sonnet 3.5. A standardised, expert-validated set of multiple-choice questions, along with a standardised prompting approach, was used to assess answer accuracy, reasoning validity, and citation relevance as binary outcomes. Responses were independently reviewed by two subject experts, with discrepancies resolved by consensus. Categorical analysis, using Chi-square or Fisher-Freeman-Halton tests, was applied to gather quantitative results, and qualitative thematic analysis was used to characterise citation-related errors.

Results & Discussion: Among the four LLMs, ChatGPT-4o demonstrated the highest answer accuracy (84%) and reasoning validity (72%). While ChatGPT-4o produced the greatest number of citations, Copilot yielded the highest proportion of valid (91.8%) and relevant (48.7%) references. The most common sources of hallucination were invalid links and non-scholarly online content. However, no statistically significant difference in hallucination rates was observed among the four models ($p > 0.05$), indicating comparable susceptibility to misinformation.

Conclusion: Current LLMs do not replace human reasoning. The findings underscore the need for expert oversight, citation verification and a robust validation approach to ensure reliability and mitigate misinformation in evidence-based domains. Integrating a human-over-the-loop approach in LLM literacy initiatives may epistemically enhance and promote responsible AI adoption in higher education



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sciforum-178793: Artificial Intelligence in Higher Education Pedagogy: A Systematic Review of Emerging Educational Practices

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The rapid advancement of artificial intelligence technologies has significantly influenced contemporary educational practices, particularly within higher education. Universities are increasingly exploring the pedagogical potential of AI-driven tools to enhance teaching, learning, and assessment processes across academic disciplines. Within this evolving educational landscape, understanding how artificial intelligence is being integrated into higher education pedagogy has become an important focus of educational research. This study presents a systematic review of the scholarly literature examining emerging educational practices associated with the use of artificial intelligence in university teaching and learning contexts. A structured search was conducted in the Scopus database to identify peer-reviewed publications addressing the pedagogical applications of artificial intelligence in higher education. The selected studies were screened and analyzed according to predefined inclusion criteria to synthesize current research trends, pedagogical models, and technological approaches discussed in the literature. The review identifies several key areas in which artificial intelligence is being integrated into higher education pedagogy, including intelligent tutoring systems, adaptive learning environments, automated feedback and assessment tools, and the use of generative artificial intelligence to support student learning and academic writing. Additionally, the literature highlights emerging discussions on ethical considerations, academic integrity, and the evolving roles of instructors and learners in educational environments mediated by artificial intelligence. Overall, the findings indicate that artificial intelligence is reshaping pedagogical practices by enabling more personalized, data-informed, and interactive learning experiences. This review contributes to a deeper understanding of how artificial intelligence technologies are transforming higher education pedagogy and outlines directions for future research on responsible and effective integration of artificial intelligence in university teaching and learning.



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sciforum-169420: Bridging the Digital Divide: Scaffolding Postgraduate Academic English Proficiency Through AI-Powered Adaptive Learning Platforms

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The integration of artificial intelligence (AI) into English for Academic Purposes (EAP) instruction marks a substantial transformation in technology-enhanced education, especially for postgraduate students in need of advanced linguistic and critical thinking abilities. This study investigates the integration of an AI-driven adaptive learning platform within a compulsory postgraduate public English course at Harbin Engineering University, China, aiming to enhance personalized learning experiences and improve educational outcomes. The platform employs natural language processing to offer tailored feedback on academic writing and speaking tasks, focusing on aspects such as argumentation, lexical accuracy, and disciplinary discourse norms. Utilizing a mixed-methods approach that incorporates pre- and post-assessment scores, platform analytics, and semi-structured student interviews, the research assesses the platform's effectiveness in supporting academic English proficiency. Initial results from a semester-long study (N = 85) reveal statistically significant improvements in students' academic writing proficiency (p .05, Cohen's d = 0.62), particularly in writing coherence and disciplinary vocabulary breadth. Qualitative data indicate that immediate, personalized feedback alleviated speaking anxiety and prompted more frequent attempts at using complex language structures. Nevertheless, students with lower initial proficiency continued to face challenges, highlighting the necessity for additional instructor support. The study suggests that AI-powered tools, when integrated pedagogically, can complement traditional instructional models by providing scalable, personalized support. This may enhance linguistic proficiency while also cultivating metacognitive awareness in academic communication. The paper concludes by presenting a framework for incorporating adaptive technology into EAP curricula, highlighting the indispensable role of teachers in promoting critical digital literacy and ensuring equitable learning experiences.



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sciforum-170346: ChatGPT as a Tool for Generating Clinical Simulation Cases in Emergency Medicine Education: A Validity-Based Comparative Study

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Abstract

Artificial intelligence (AI) is increasingly integrated into higher education, offering scalable tools for developing interactive learning resources. In medical education, large language models such as ChatGPT show potential for generating clinical simulation cases; however, their educational validity and clinical reliability remain insufficiently examined. Ensuring the accuracy and pedagogical quality of AI-generated materials is essential before integrating them into formal training programs.

Methods

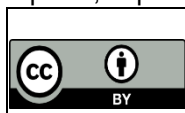
The study was conducted by: 1 author of the prompts; 2 authors of the expert (human) clinical scenarios; 5 independent expert reviewers. A comparative validity study was conducted using 50 multiple-choice clinical scenarios (MCQs) in emergency medicine: 25 developed by experienced instructors and 25 generated using ChatGPT (GPT-5 mini). The scenarios covered five core emergency topics: cardiac arrest, shock, trauma and accidents, acute coronary syndrome, and acute respiratory failure. Five independent experts evaluated all cases using ten predefined content-validity criteria, including clinical accuracy, completeness, structural clarity, realism, educational value, error-free presentation, applicability, coherence between scenario and question, uniqueness, and distractor homogeneity. Quantitative assessment included the Item Content Validity Index (I-CVI) and Aiken's V coefficient.

Results

Instructor-developed cases demonstrated significantly higher overall quality than AI-generated cases (3.8 ± 0.13 vs. 3.0 ± 0.59 ; $p = 0.001$). Expert-developed cases showed excellent content validity (I-CVI = 0.984; S-CVI/Ave = 0.99), whereas AI-generated cases demonstrated substantially lower validity (I-CVI = 0.496; S-CVI/Ave = 0.50). Aiken's V indicated very high expert agreement for instructor-developed cases (0.936) and moderate agreement for AI-generated cases (0.671). Common issues in AI-generated cases included insufficient clinical detail, heterogeneous distractors, and occasional logical inconsistencies.

Conclusion

ChatGPT can serve as an efficient support tool for the rapid generation of emergency medicine simulation cases. However, expert review and pedagogical refinement remain essential to ensure clinical accuracy and educational quality. AI-generated content should complement, rather than replace, expert-designed instructional materials.



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sciforum-164982: Collaborative Pedagogy: Communication Issues and Dynamics of co-Construction of Knowledge

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This study explores the use of information and communication technologies (ICT) by physics and chemistry teachers in the Marrakech-Safi region. A questionnaire, based on the DigCompEdu framework and adapted to the Moroccan context, was distributed to 247 teachers. The results show that interactions between teachers and students occur at least once a month, with semi-annual communications with parents and between teachers themselves. The study highlights the critical importance of technology in education to improve and facilitate communication and collaboration.

Research question: How does the use of ICT by physics and chemistry teachers in the Marrakech-Safi region improve the quality of interactions between teachers, students, parents and colleagues?

Methodology: Between October 1, 2025 and November 30, 2025, a paper questionnaire based on the DigCompEdu framework was distributed. After validation by a pre-test, the questionnaire was adapted to the Moroccan context. The data of 247 physics and chemistry teachers in the Marrakech-Safi region were statistically analyzed, guaranteeing anonymity and consent of participants. The objective was to assess teachers' perceptions of their digital skills and use of ICT in education.

Results: Interactions between teachers and students occur monthly, influenced by the type of digital tools and educational parameters. Communication with parents is biannual, in line with institutional expectations, while coordination between teachers is also biannual, often limited by administrative and time constraints.



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sciforum-169804: Connected Schools: Spatial Implications, Accessibility, and the Digital Divide in Small Towns and Rural Areas, Buenos Aires

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In recent decades, schools have ceased to be mere educational institutions and have become key nodes for territorial cohesion, especially in rural and peripheral areas. In these territories, schools are often the only center of public infrastructure, fulfilling functions such as internet access points, state services, and community meeting places. This phenomenon has given rise to the concept of the "connected school," which integrates spatial, social, technological, and educational factors to contribute to territorial cohesion, a particularly relevant challenge in Argentina, given the fragmentation in physical and digital accessibility.

Although progress has been made in the role of schools as agents of local development, research that comprehensively addresses the interaction between school infrastructure, digital connectivity, and territoriality is still lacking. Educational and technological planning has been sectoral, without considering schools as organizers of territory, especially in rural and peri-urban areas, where problems such as population seasonality and inequality in access to services limit educational quality and territorial coverage.

This project focuses on a case study in rural areas and small towns to understand how schools can promote territorial and digital equity. The research combines quantitative and qualitative approaches, using Geographic Information Systems (GIS) to map school distribution and surveys of teachers and community members about digital connectivity and its social and educational impact.

The results are expected to contribute to improved school infrastructure planning, its role in territorial cohesion, and equitable access to educational and digital resources. Preliminary findings suggest that schools with greater digital connectivity have a positive impact on educational quality and community resilience, reducing territorial and social inequalities.



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sciforum-171870: Could AI Serve as an Accelerator in the English Language Learning Process? Or a Walking Stick?

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Generative Artificial Intelligence (GenAI) is widely recognized as a powerful tool for enhancing language acquisition, particularly by improving accessibility and personalization. While existing research has explored the application of ChatGPT in educational settings, there remains a notable gap in studies investigating how foreign language learners in China engage with indigenous Chinese AI technologies to support their English learning.

This paper examines how China has integrated GenAI technology into contemporary higher education practice. Specifically, it focuses on two research questions:

What novel educational modalities and support services have indigenous Chinese GenAI technologies introduced to Chinese EFL (English as a Foreign Language) learners in contemporary higher education?

What advantages, obstacles, and challenges have arisen in the implementation of these AI technologies?

This research utilizes a mixed-methods approach. The main participants were college students from a private university in Guangdong, China. Initially, this study utilized a questionnaire survey to perform preliminary research involving 250 students, examining the impact of China's GenAI technology on their English language acquisition. The study then did a detailed analysis of how GenAI technology affects students' learning behaviors and experiences, as well as the specific problems that come up when learning English. This study was done through classroom observations and semi-structured interviews with 10 undergraduates.

Recent research indicates that Gen AI can significantly enhance EFL learners' overall English competence and serve as an effective learning "accelerator." Nonetheless, excessive dependence on these tools may diminish learners' capacity for independent learning. This study empirically examines how GenAI enhances English learning for university students and suggests relevant optimization strategies. It aims to improve understanding of GenAI in EFL contexts and offer guidance for international educators to more efficiently integrate AI into teaching and learning.



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sciforum-165116: Creating an AI-ready School Smart Diagnostics.

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Each school year begins with a strategic effort to assess the level of competence of students, an effort during which any failure to achieve sufficient acquired levels is considered intolerable. In a context where the heterogeneity of classes represents a major challenge, the integration of artificial intelligence (AI) appears as an opportunity to rethink teaching methods and build a truly "AI-ready" school. This chapter thus examines how AI tools can help improve mathematical skills and personalize learning among first-year college students.

It is with this in mind that this project aims to explore this potential research: carrying out design-based research with a group of students chosen according to a reasoned sample. The goal was to be able to design, test and refine an educational device integrating the learning platform Kwyk.fr. From a diagnostic test, this platform detects the achievements and points to work on for the student and generates an adaptive exercise path.

The analysis of the collected data reveals a notable progression in students' performance, both in terms of consolidation of mathematical skills and in terms of involvement in the proposed activities. These results highlight the potential of AI to support teachers and students in an educational transformation based on real needs, by promoting more targeted learning paths, more effective and better adapted to the diversity of profiles.



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sciforum-172943: Early Detection of Wheel-Spinning in Cognitive Tutors

Seoyeon Park

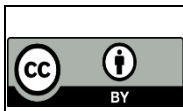
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Wheel-spinning refers to a pattern of unproductive persistence in which students repeatedly practice a skill without achieving mastery, despite receiving feedback and multiple opportunities for correction. This phenomenon poses a significant challenge for intelligent tutoring systems (ITS) and adaptive learning environments, as delayed identification of struggling learners can lead to frustration, disengagement, and attrition. Although prior studies have proposed various wheel-spinning detectors, many existing approaches rely on complex models, extensive response histories, or system-specific features, limiting their scalability and early-detection potential.

This study develops an early and simplified wheel-spinning detection model that relies exclusively on student response-sequence features. Using data from the Cognitive Model Discovery Experiment (Spring 2010) in the Carnegie Mellon University DataShop repository, the analysis included 123 students, 49 geometry skills, and over 45,000 response records. Wheel-spinning was operationalized as failure to achieve mastery—defined as three consecutive correct first attempts—within ten practice opportunities. Two models were compared: a baseline logistic regression model and an enhanced ensemble model using gradient boosted decision trees (GBDT).

Results indicate that both models achieved strong predictive performance at early practice stages. The logistic regression model demonstrated high accuracy and precision but moderate recall, identifying confirmed wheel-spinning cases while missing a subset of struggling students. In contrast, the GBDT model substantially improved recall while maintaining high accuracy, achieving over 70% accuracy and approximately 75% recall by the fifth practice opportunity. These findings suggest that ensemble learning methods are particularly effective for early identification of unproductive persistence.

Overall, the study demonstrates that lightweight, response-based models can detect wheel-spinning early and reliably without reliance on tutor-specific parameters. The proposed approach offers a scalable and interpretable solution for adaptive learning systems, enabling timely instructional interventions and more responsive learner support.



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sciforum-171953: Educators' Access to and Implementation of AI-Related Professional Development: Challenges and Barriers

Nelly-Maria Sergidou ¹ and Maria Karamanidou ^{2,*}

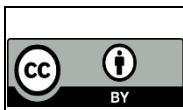
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This article examines the challenges and barriers faced by educators in two key areas: first, access to professional development opportunities and institutional support related to Artificial Intelligence (AI); and second, the effective integration of AI tools into classroom practice and instructional design. As AI technologies increasingly influence teaching and learning, teachers are expected to develop new forms of digital competence and pedagogical understanding. This study critically reviews existing theoretical frameworks and professional development models designed to support teachers' engagement with emerging technologies, with a particular focus on AI in education settings.

The review identifies a range of interconnected structural, institutional, and pedagogical barriers that hinder effective participation in AI-related professional development. These include limited availability and accessibility of relevant training opportunities, time constraints within teachers' professional workloads, disparities in digital confidence and expertise, and the frequent misalignment between professional development initiatives and the practical realities of classroom contexts. In addition, the study highlights how broader systemic factors, such as policy expectations and resource allocation, shape teachers' capacity to engage meaningfully with AI-focused learning opportunities.

Special attention is given to the role of school leadership in mediating these challenges. The findings emphasise the importance of supportive, compassionate, and visionary leadership, particularly the role of school principals, in fostering a culture that encourages professional learning, experimentation, and technology integration. This article presents strategic recommendations for teacher education, curriculum design, and institutional planning, based on current research. These recommendations support school educators in developing the competencies, confidence, and pedagogical orientations needed for the ethical and responsible integration of Artificial Intelligence (AI) into the teaching and learning process.



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sciforum-169317: Enhancing Statistical Learning in Primary Education through Scratch: An Educational Intervention Study

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This study analyses the impact of an instructional intervention based on Scratch for teaching statistical knowledge in Year 5 of Primary Education, with the aim of improving the learning of statistics (traditionally less addressed in the classroom) and promoting more active methodologies in the area of mathematics. To this end, a quasi-experimental design with a pre-test–post-test and a control group was conducted, with a sample of 47 students from a school in the Autonomous Community of Extremadura. The experimental group ($n = 23$) worked on the contents through Scratch-based activities, while the control group ($n = 24$) followed a traditional methodology supported by the textbook. The intervention addressed data collection and organisation, graphical representation, and the calculation of measures of central tendency, integrating elements of computational thinking. Likert-type questionnaires and a written test common to both groups were used for data collection. Data analysis was carried out using inferential statistical tests. The results show that students in the experimental group achieved significantly higher academic performance in learning statistical knowledge. In addition, students who used Scratch produced higher-quality definitions of fundamental statistical concepts and rated the tool as more usable and understandable than the textbook. Therefore, this study confirms Scratch as an effective instructional resource for teaching statistics in Primary Education, as it enhances academic performance, understanding of basic statistical knowledge, and a positive perception of the learning experience.



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sciforum-172404: Ethical Artificial Intelligence in Pre-Service Early Childhood Teacher Education: Implementation and Early Outcomes in the United Arab Emirates

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Introduction:

The rapid emergence of generative artificial intelligence (GenAI) has prompted the need for future teachers to balance innovation and creativity with ethics, child safety and responsible classroom practice. This study reports on the design and initial implementation of AI in Education, an undergraduate course for second-year pre-service early childhood education (ECE) students at a federal university in the United Arab Emirates. The course aims to support ethical and pedagogically grounded AI integration in future ECE classrooms, and was launched in early 2026.

Methods:

A design-based implementation approach has been used. The course combines interactive lectures, guided workshops, sandbox experimentation, and a simulated teaching practicum in which students explore child-facing and teacher-facing AI tools. This study examines course artefacts, simulated practicum evidence, student-generated lesson projects, and individually-designed AI toolkits along with students' ethical reflections. Qualitative thematic analysis examines evidence of AI literacy development, ethical awareness, and practical classroom application.

Results:

Findings indicate that structured exposure to AI concepts, ethical frameworks, and supervised simulated practicum experimentation support measurable growth in students' conceptual understanding, critical evaluation of risks and benefits, and ability to design developmentally appropriate AI-supported learning activities. Ethical reflection emerges as a central mechanism linking technological competence with responsible professional practice.

Conclusions:

Embedding ethical AI integration within teacher education through practice-based coursework offers a viable model for preparing future educators in rapidly evolving digital contexts. This course model demonstrates how structured design, supervised experimentation, and reflective artefacts can support responsible AI adoption in pre-service educators, and provides a transferable framework for similar programs internationally.



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sciforum-173170: Evaluating ChatGPT and DeepSeek in AI-Assisted English-Chinese News Translation within Technology-Enhanced Education

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With the fast-growing development of artificial intelligence (AI), large language models (LLMs) have become increasingly vital in technology-enhanced education, particularly in language learning and translation training. Tools such as ChatGPT-4o and DeepSeek V2 are increasingly used by students and educators to support bilingual communication tasks. As these systems become part of everyday academic practice, questions arise about how reliably they support learning and how differences between models may shape students' understanding of translated content.

This study presents a comparative evaluation of ChatGPT-4o and DeepSeek V2 in English-Chinese news translation. News texts are selected because they involve linguistic complexity, contextual nuance, and sensitive discourse features that challenge automated systems.

Guided by Skopos Theory, Critical Discourse Analysis, Translation Quality Assessment, and Media Framing Theory, this study adopts a mixed-methods approach combining quantitative evaluation metrics with qualitative methods. A selected corpus of recent English-language news texts across political, economic, technological, and cultural domains is translated by both models under standardized prompts. Quantitative metrics assess surface-level correspondence, while qualitative analysis examines accuracy, fluency, terminology use, tone, and handling of sensitive content.

By comparing the outputs of ChatGPT-4o and DeepSeek V2, this study seeks to clarify how different LLMs function as learning tools in AI-supported educational contexts. Differences in wording, sentence structure, and tone may influence how students interpret translated materials and complete bilingual tasks. Rather than treating AI output as automatically reliable, this study highlights the importance of critical engagement when LLMs are incorporated into translation practice and language learning activities. By identifying where model outputs are helpful and where human guidance remains necessary, the research provides practical insights for educators who integrate AI tools into coursework and classroom tasks.



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sciforum-178677: Evaluating Gamified Experiential Learning as a Mechanism to Bridge the Theory-Practice Gap in Introductory Accounting

Ty Choi * and Reid McLain

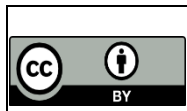
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Introduction: Traditional accounting education relies heavily on passive lectures, often struggling to garner practical application and intrinsic motivation. Simulation games present a promising technology-enhanced alternative by immersing students in realistic, experiential environments. This study investigates the pedagogical potential of the commercial simulation game Farming Simulator 22™ as an active learning tool to teach fundamental accounting concepts to undergraduate students with no prior accounting background.

Methods: An exploratory sequential mixed-methods design was employed to capture both measurable outcomes and detailed student experiences. Participants were undergraduate students enrolled in an introductory global accounting course. Quantitative data were collected via pre- and post-intervention surveys measuring engagement and learning outcomes. Qualitative insights were gathered through semi-structured interviews with eight students selected via stratified random sampling.

Results: While survey results indicated high perceived effectiveness of the gaming approach and improved understanding of accounting concepts, significant initial hurdles were identified. Students, particularly non-gamers, found the game's mechanics and the sheer volume of variables overwhelming. A critical precondition for success was overcoming this steep learning curve; only after students became comfortable with the gameplay could they successfully apply accounting principles. Furthermore, participants noted the risk of merely "playing rather than learning" without explicit connections to course material. Once these barriers were navigated, the simulation fostered exceptional autonomous engagement and effectively bridged the theory-practice gap.

Conclusions: Integrating commercial simulation games into the accounting curriculum enhances student motivation and practical comprehension, but its efficacy is highly conditional. For successful implementation, educators must carefully administer instructional scaffolding to mitigate the initial overwhelm. Providing structured guidance, worksheets, and weekly debriefing sessions that explicitly link game mechanics to theoretical accounting concepts are essential preconditions to ensure the technology serves as a robust pedagogical tool rather than just a distraction.



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sciforum-163062: Evaluating the Impact of Gamification in Chemical Engineering Education and its Relevance to Society and Employers

Eva Diaz * and Salvador Ordóñez

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Introduction

Chemical Engineering is halfway between Engineering and Chemistry, converting one thing into another. For doing this, chemical engineers have technical knowledge across different areas such as chemistry, biochemistry, engineering, materials science and information technology, as well as complementary areas such as economics, management, safety and environmental protection.

Changes into the discipline, and the professional needs of graduates, mean that Chemical Engineering education should face continuous challenges. A notable pedagogical trend is the incorporation of gamification methodologies.

The aim of this work is to analyse, based on a revision of innovation projects focused on gamification and their outcomes, how gamification-based approaches have enhanced the learning and professional performance of future chemical engineers.

Methods

A comprehensive analysis was conducted of innovation projects involving the use of gamification in Chemical Engineering Bachelor and Master at a Spanish university over the past 15 years. These projects were examined in relation to data on academic success and employer evaluations.

Results

The analysis of the numerous projects revealed that gamification in chemical engineering had a positive assessment from both students and teachers, remarking development of critical thinking, reinforcement of student self-confidence, and increased interaction between students and instructors.

However, a trend towards higher scores in the Students' Evaluation of Teaching (SET) was observed, constituting one of the outcomes of this study. This trend, according to the literature, could have a significant subjective component. By contrast, from employer assessment data, no significant improvement was detected in student maturation, which is an attribute regarded as highly relevant by employers.

Conclusions

Gamification is associated with positive perceptions but demonstrates limited measurable impact on key quality indicators. Current evidence does not suggest that employer priorities were met through these methodologies. However, notable strengths were identified, by integration with other tools such as virtual reality, creating learning environments more close real-world.



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sciforum-159026: Examination of Artificial Intelligence (AI) Use and Perspectives from Higher Education Faculty

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As artificial intelligence (AI) tools rapidly expand across higher education, instructors are navigating new opportunities and challenges. This session shares findings from a Fall 2025 survey conducted by the presenters, full-time university faculty members who examined how instructors are using AI, how they feel about its growing presence, and what factors shape their willingness to adopt it.

The study gathered data from full- and part-time faculty across disciplines, focusing on the types of AI tools used, frequency of use, perceived benefits, primary concerns, and overall attitudes toward AI. The analysis also draws associations between faculty age/experience and perceptions/likelihood of AI use. These associations will be presented in clear, practitioner-friendly language.

During the session, attendees will explore several guiding questions:

- How are faculty actually using AI?
- What benefits do instructors see for teaching, research, and productivity?
- What concerns or barriers are limiting adoption?

These insights will help participants compare national trends with their own institutional experiences and better understand the evolving role of AI in academic work.

The session will end with a brief reflective activity that invites attendees to consider how the findings apply to their own professional contexts. Participants will think through whether, and in what ways, AI could support their teaching, research, or workflow. The goal is to move from broad discussion to intentional, practice-based decision making.

This presentation ultimately offers a novel look at faculty use of AI at a pivotal moment in higher education and provides attendees with practical insights to inform their integration or questions to raise to their own university AI task forces.



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sciforum-178742: Exploration of Three Approaches to Virtual Fieldtrips for Makerspaces: Experiences and Perceptions of K-12 Educators from Rural Areas

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Makerspaces have gained increasing attention in recent years. Research shows that makerspaces have significant potential to enhance students' active learning and creative thinking skills. Professional learning opportunities, such as field trips to authentic makerspaces, enable teachers to explore maker pedagogy and technologies for innovative teaching. However, not all teachers have easy access to makerspace resources. Virtual field trips offer an alternative way to bring makerspace resources to teachers who are geographically or financially limited. In this study, we explored three approaches for virtual field trips: 1) Group A: Participants remotely operated telepresence robots to move around a makerspace and communicate with staff; 2) Group B: Used a 360° video conferencing device, Owl technology, to access makerspace resources and communicate with staff; 3) Group C: Watched a recorded video of a makerspace tour. A total of 105 teachers from the rural areas of West Georgia participated in this study. Consent forms were collected from these teachers. Results showed that participants engaged more in a virtual field trip when driving a robot or using a 360° video conferencing device—they demonstrated significantly higher levels of embodiment, social presence, and behavioral engagement than participants who watched the recorded content videos. Results of the multilinear regression analysis also showed that embodiment and social presence significantly contributed to the participants' flow experience during the field trip. The significance of the findings and their practical implications for educators, instructional designers, and researchers will be discussed in the presentation.



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sciforum-173073: From Circular Motion to Linear Paths: Teaching Mechanics with 3D Printing

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Introduction

Mathematics is essential for understanding mechanical and engineering phenomena, yet its practical applications are often underrepresented in secondary education. This study presents a teaching proposal that connects mathematical concepts—such as circular and linear motion—to real-world mechanisms. By exploring how curved paths can produce straight-line movements and vice versa, students gain insight into the mathematical principles behind everyday machines, including gears, pistons, and wheels, while developing technological competencies.

Methods

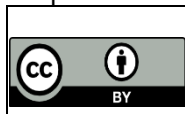
The project combined a literature review on mathematics in mechanics with hands-on, project-based learning activities. Students analyzed the mathematical relationships involved in transforming circular motion into linear trajectories. As a key component, learners designed and produced a 3D-printed model to observe and experiment with these movements directly. This approach integrates STEM/STEAM principles, linking mathematics, technology, engineering, and creativity. By working with 3D printing software and hardware, students also practiced digital design, problem-solving, and technical skills alongside mathematical reasoning.

Results

The 3D-printed model allowed students to visualize abstract concepts and test their understanding in a tangible way. Participants could connect mathematical transformations to real mechanical applications and explain how rotations translate into linear motion. Working with 3D printing and digital modeling increased engagement, promoted technological literacy, and strengthened problem-solving abilities. The combination of theory, design, and experimentation fostered both conceptual understanding and practical competence.

Conclusions

Integrating mathematics with hands-on 3D modeling and printing provides meaningful, technology-rich learning experiences. Project-based, STEM-oriented activities help students appreciate the relevance of mathematics in engineering, develop digital and technical skills, and deepen their understanding of both abstract and applied concepts.



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sciforum-139559: From the Classroom to the Courtroom: Virtual Tools and Outbreak Scenarios for Forensic Parasitology Training

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Introduction

Despite their relevance to public health and forensic science, parasites are rarely used as indicators in criminal investigations. To address this educational gap and support the development of forensic parasitology as an emerging discipline, the University of Alcalá (UAH) integrated clinical parasitology content into two undergraduate programmes during the 2023/24 academic year.

Methods

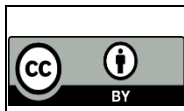
New theoretical and practical components were embedded into the Environmental Toxicology and Public Health module (BSc in Environmental Sciences) and the Forensic Toxicology module (BSc in Criminalistics). Students engaged in outbreak response simulations using a scenario based on an emerging zoonotic protozoan. Workshops incorporated the open-access virtual learning platform e-Parasitology© and the UK Recovery Handbook for Biological Incidents. Learners selected appropriate laboratory techniques for parasite identification and developed a tailored response to control the simulated outbreak.

Results

High levels of student engagement and satisfaction were observed across both programmes, despite curricular differences. Based on this positive feedback, virtual forensic parasitology case studies were developed and piloted. The first case, available via e-Parasitology©, involves the post-mortem diagnosis of *Ascaris lumbricoides* in a young girl, integrating virtual microscopy and autopsy images (http://parasitology.dmu.ac.uk/learn/case_studies/forensic_cs1/index.html). These resources are currently being evaluated for broader implementation in science and medical curricula.

Conclusions

This educational initiative demonstrates the feasibility and effectiveness of embedding parasitology into forensic and biomedical teaching. It highlights the value of virtual simulations and real-world scenarios to promote interdisciplinary thinking, diagnostic skills, and public health preparedness. Future expansions include the development of additional case studies involving protozoan, helminthic, and arthropod parasites, further consolidating forensic parasitology as a relevant educational and research tool.



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sciforum-173263: Game As Reality (GAR) Pedagogy for Planetary Health Education: A Hybrid MetaversePilot Program for Indonesian Youth

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Introduction:

Introduction: Indonesian youth face a converging syndemic crisis, with 87.8% demonstrating insufficient physical activity and elevated NCD risk intertwined with environmental degradation. Current traditional education does not provide an integrated response to these multiple and intertwined threats. So, this study develops, designs, and tests a new transformative pedagogy called Game As Reality (GAR) Education to integrate planetary health education through the use of a hybrid reality for Indonesian youth.

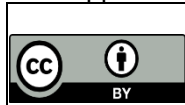
Methods

We conducted a randomized pilot study. consisted of forty university students who were randomly assigned (block randomization) to either an experimental (n = 20) or a control group (n = 20). Experimental group participants completed the Game As Reality intervention, which included a mobile VR/AR metaverse with AI-driven motion sensors to create the narrative of "Planetary Health Heroes." The control group received standard health education materials without gamified or immersive elements. Three measures of the syndemic effects were assessed: the Integrated Planetary Health Behavior Scale (IPHBS), physical activity (IPAQ) to represent active mobility, and affective engagement (PANAS), at Week 1 as baseline, and Week 5 as endpoint of intervention

Results and Conclusion

The experimental group demonstrated significant improvements across all syndemic outcomes (p 0.05). Specifically, the experimental group showed significant improvement in all seven domains of the IPHBS, such as active transportation and waste reduction. The experimental group also reported physical activity levels comparable to the WHO and exhibited a decrease in sedentary behavior. Affective engagement was 60 percent greater among the experimental group than the control group (p 0.05).

This pilot study demonstrates that GAR pedagogy effectively enhances active mobility, planetary health behaviors, and educational engagement simultaneously. The hybrid reality aspect of this approach provides a culturally relevant and scalable solution for creating "Planetary Health Citizens" that support SDGs 3, 4, and 13 in Indonesia.



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sciforum-178308: GenAI and Epistemic Practices in Science Education: Opportunities and Didactic Challenges

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Generative artificial intelligence (GenAI) is rapidly expanding across sectors and has now become embedded within educational contexts, where it is actively reshaping teaching and learning practices, especially science education. Unlike traditional digital tools, GenAI systems, particularly large language models (LLMs), can generate tailored explanations, simulations and engage students in argumentation by generating counterexamples or hypotheses in natural language. These potentials offer promising opportunities for personalized learning and effective pedagogical support. However, GenAI tools raise significant cognitive, epistemological, and ethical concerns. Science education is more sensitive to these issues because learning scientific concepts and theories requires engagement in epistemic practices such as modeling, argumentation, and evidence-based reasoning. The integration of GenAI therefore requires a critical examination of its didactic potential and implications for the teaching and learning of science. This study adopts a critical analytical approach based on a review of recent peer-reviewed articles indexed in Scopus, Web of Science, and ERIC. Articles published between 2023 and 2026 were selected using keywords related to generative artificial intelligence, science education, and epistemic practices. The analysis is grounded in key theoretical frameworks in science education research, including didactic transposition, epistemic practices, pedagogical approaches, and cognitive regulation. The analysis indicates that GenAI can support science education through personalized learning pathways, intelligent tutoring systems and feedback, automated creation of learning resources, and assistance in instructional design. At the same time, the analysis underscores substantial challenges, including risks of cognitive offloading, epistemic dependency, algorithmic bias, and the risk of confusing generated content with genuine knowledge construction. The findings indicate that the educational value of GenAI depends on its pedagogical orchestration by teachers and its alignment with disciplinary learning objectives. Instead of replacing didactic approaches, GenAI should be regarded as a didactic mediator capable of supporting epistemic practices when integrated into carefully designed science learning environments.



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sciforum-178967: Impact of Assessment Strategies in a Digital Language Learning Context on Undergraduates' English Language Learning

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This study examined the effectiveness of assessment techniques applied in an online language learning context in a Sri Lankan university on the improvement of English as a Second Language (ESL) learning of a group of undergraduates. With the increasing integration of technology in education, traditional assessment methods are being replaced or supplemented by digital tools that offer interactive, flexible, and immediate feedback. This study investigated the assessment methods used in online ESL classes and undergraduates' perception on the effectiveness of the assessment methods. It employed qualitative case study approach to investigate this contemporary phenomenon using two data sources: semi-structured interviews with twelve undergraduates and the first authors' reflective journal. Various digital assessment tools such as online quizzes, discussion forums, e-portfolios, and gamified platforms like Kahoot! were used in the assessments. The data were analyzed using thematic analysis, and the first theme includes the positive impact of the online examinations that contributed in terms of increased student engagement, motivation, and participation. The second theme included the impact of formative assessment methods, including instant feedback quizzes and peer evaluation that were found to be highly effective in improving language skills. The third theme included challenges faced by the undergraduates including technical issues, limited digital literacy, and concerns regarding academic integrity. Some undergraduates reported difficulties in adapting to fully online assessments, while others expressed concerns about fairness and reliability of them. Despite these challenges, the majority of participants preferred digital assessment methods over traditional approaches due to their flexibility and accessibility. This research suggests that digital assessment strategies are an important part of contemporary ESL teaching as they contribute to lifelong learning and skills acquisition. It suggests that the educators should implement a balanced approach between the formative and summative digital assessments with sufficient training and support given to students.



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sciforum-177936: Integrating AI-Powered Design Tools in Architecture Education: Opportunities, Challenges, and Pedagogical Implications in the Context of Bangladesh

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Artificial intelligence (AI) is rapidly reshaping architectural practice, yet its pedagogical integration remains uneven, especially in contexts where digital infrastructure, faculty training, and curriculum reform are still developing. Focusing on Bangladesh, this paper examines how AI-powered design tools can be incorporated into undergraduate architecture education in ways that expand learning while protecting foundational design competencies. The study adopts a structured literature review, analyzing scholarship on AI in architectural practice, architecture and design education, and technology-enhanced learning. Sources were selected for their relevance to four themes: types of AI tools used in design, pedagogical opportunities, educational risks, and models for curriculum integration. The review shows that tools such as Midjourney, DALL-E, Grasshopper, Dynamo, and Autodesk Forma can support broader creative exploration, faster iteration, early exposure to contemporary professional workflows, and engagement with computational and performance-driven design. At the same time, the Bangladeshi context presents significant challenges, including over-reliance on machine-generated outputs, possible weakening of freehand and spatial reasoning skills, unresolved authorship and academic integrity questions, uneven faculty preparedness, and inequitable access to hardware, internet, and paid platforms. In response, the paper proposes a four-phase pedagogical framework: foundational manual skill development in Year 1; supervised AI-assisted ideation and image critique in Year 2; performance-based generative and parametric applications in Year 3; and ethically reflective, professionally oriented AI integration in senior studios. By framing AI adoption as a pedagogical and institutional issue rather than a purely technical one, the paper offers a context-sensitive model for balancing innovation, equity, and disciplinary values in architecture education.



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sciforum-178617: Large Language Models for Generating Interactive Simulations in Anatomy Education

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Introduction

Human anatomy forms the foundation of medical education and has traditionally been taught through cadaveric dissection and prosected specimens. Over time, anatomy teaching has evolved with the integration of imaging modalities such as X-ray, CT, and MRI, as well as digital tools including three-dimensional (3D) software, virtual reality, and augmented reality. More recently, artificial intelligence (AI) and large language models (LLMs) have been explored for applications such as personalised learning, tutoring systems, and assessment support. However, the potential use of LLMs to generate interactive simulation-based learning resources remains underexplored.

Methods

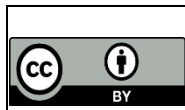
This study investigated whether LLM platforms can support the development of interactive web-based anatomy simulations from structured expert input. Three models — Codex, Gemini, and Claude — were evaluated for their ability to translate anatomy knowledge into code capable of generating interactive simulation modules. Generated outputs were refined and implemented within a simple web-based environment. The simulations were then qualitatively reviewed by anatomy educators to assess clarity, clinical relevance, and educational usability.

Results

All three LLM platforms demonstrated the ability to convert structured anatomical knowledge into functional interactive simulation scripts. The generated outputs successfully supported interactive learning tasks linking clinical signs to underlying anatomical mechanisms. While LLMs showed strong capability in generating schematic representations and interactive logic, they remain limited in producing accurate anatomical imagery for complex visual simulations. Educator feedback highlighted the potential value of these tools for developing innovative learning resources.

Conclusions

LLMs show promising potential as tools for generating interactive simulation-based learning materials in anatomy education. When combined with expert oversight, this approach may offer a scalable method for educators to develop structured simulations while promoting responsible and innovative use of AI in medical teaching.



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sciforum-173085: Lichens and Education: Integrating GIS Technology and Montessori Pedagogy for Urban Environmental Awareness

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Lichens are sensitive bioindicators for environmental disturbances and air pollution [1]. This research investigates the synergy between digital tools and the Parco del Pineto naturalistic site in Rome [2], grounded in Maria Montessori's pedagogy and its inclusive, student-centred outdoor education [3]. The study involved 43 third and fourth-year students from High School L.A. Seneca in Rome. The methodology followed a multi-phase scientific approach: field observation, photographic documentation, and specimen collection. Students utilised Pl@ntNet, an AI-based identification tool [4], alongside expert guidance to foster Citizen Science [5]. Google Earth served as the primary mapping base for recording positions via .kml files, enabling the management of three-dimensional geospatial data. Using open-source GIS software, students plotted coordinates and associated each location with specific data sheets and original photographs for laboratory-based species classification. Educational outcomes were documented through group dynamics observation and a qualitative survey evaluating the efficacy of merging outdoor education with technological resources. The primary outcome was a comprehensive GIS-based mapping system documenting the territory's ecological recovery following the 2022 fire, particularly within wetland areas. Beyond scientific findings, results indicate that students significantly strengthened their teamwork and rigorous scientific working methods. This project bridges the gap between scientific theory and environmental protection, providing a scalable model for urban heritage management and illustrating that technology is a vital ally in cultivating a deeper respect for our planet.

(References in additional comments)



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sciforum-173197: Mapping the Knowledge Landscape of Artificial Intelligence and Learning Disability Research: A Bibliometric Analysis (2015–2026)

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Artificial Intelligence (AI) has emerged as a transformative force in education, healthcare, and assistive technologies, offering significant potential to support individuals with learning disabilities through personalized learning, early identification, and adaptive interventions. Despite the rapid growth of research in this interdisciplinary domain, a comprehensive understanding of its intellectual structure, research trends, and global contributions remains limited. This study conducts a bibliometric analysis of global research on artificial intelligence and learning disability published between 2015 and 2026. Bibliographic data were retrieved from the Scopus database using structured search strategies and analyzed using VOSviewer, Biblioshiny (R package), and Microsoft Excel. The analysis examined publication trends, influential authors, journals, institutions, countries, collaboration networks, keyword co-occurrence, and thematic evolution. The findings reveal a significant increase in research activity after 2020, with Saudi Arabia, the United States, and the United Kingdom emerging as leading contributors. The results also identify key research themes, including inclusive education, assistive technologies, adaptive learning, and machine learning applications. However, collaboration networks remain limited, indicating that the field is still developing. This study provides a comprehensive overview of the knowledge landscape, identifies research gaps, and highlights emerging research directions. The findings contribute to advancing interdisciplinary research, informing educational practices, and supporting the development of AI-driven inclusive educational technologies for individuals with learning disabilities.



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sciforum-173404: Metaverse Adoption in Built Environment Education: A Kirkpatrick Model-Based Evaluation of Educator Training Outcomes

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The rapid digitalisation of the construction and built environment sectors has increased demand for innovative teaching methods in higher education. Among emerging digital tools, Metaverse applications offer immersive and interactive learning environments with the potential to transform traditional pedagogical practices. This study evaluates the adoption of the metaverse application (EON-XR) in built environment education by examining educator training outcomes using the Kirkpatrick model. The evaluation focused on a structured training workshop designed to equip built environment educators with skills to integrate metaverse-based applications into first-year teaching modules. A post-training evaluation employed a Google Forms survey instrument explicitly aligned with Kirkpatrick's four evaluation levels: reaction, learning, behaviour, and results. The instrument captured educators' perceptions of usability, relevance, pedagogical value, behavioural intention to apply acquired skills, and the broader institutional and disciplinary implications of metaverse adoption. Both qualitative and quantitative data were analysed to assess the training programme's effectiveness across these four dimensions. Findings indicate a generally positive reaction to the metaverse training, with educators recognising the relevance and user-friendliness of the EON-XR application. Evidence of learning was demonstrated by increased confidence and perceived competence in applying metaverse tools for teaching. At the behavioural level, participants expressed strong intentions to integrate metaverse applications into their teaching practice. At the results level, the training was perceived as enhancing teaching engagement, stimulating interest in construction digitalisation, and contributing to the institutional standing of higher education providers. The study concludes that metaverse-based educator training can play a critical role in advancing digital pedagogy within built environment education. By applying the Kirkpatrick model, this research provides a structured, replicable framework for evaluating the adoption of immersive technology in higher education contexts.



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sciforum-167854: Pedagogical Adaptation in the Age of Short-Form Digital Media: Challenges for the Education Industry

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This article presents a systematic analysis (2020-2025) of the pressing need for the education industry to adapt to the cognitive paradigm shaped by the dominance of algorithm-driven, short-form media platforms such as TikTok, Instagram Reels, and YouTube Shorts. The pervasive consumption of rapid, fragmented content has fundamentally recalibrated the attentional patterns of digital-native learners, creating a significant disconnect with traditional pedagogical models designed for prolonged, linear engagement. Through a systematic review of contemporary literature, empirical studies, and documented pedagogical interventions, this research synthesizes the core challenges emerging from this new media landscape. These include the fragmentation of student attention spans, the diminished capacity for deep focus, and the consequent gap between conventional teaching methods and student expectations.

In response, the analysis identifies and evaluates a spectrum of adaptive pedagogical strategies that seek to bridge this divide. These strategies move beyond mere digital tool adoption to propose a critical redesign of instructional practice. Effective adaptations involve the intentional integration of micro-learning modules, visual storytelling techniques, and interactive, gamified elements that mirror the engagement logic of short-form media while steering it toward sustained cognitive goals. The study concludes that for the education industry to remain relevant and effective, a systemic pedagogical evolution is imperative. This evolution must be socially responsive and media-literate, strategically leveraging the mechanics of the attention economy to foster deeper analytical thinking and resilient learning in an era defined by digital fragmentation.



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sciforum-169054: Perceived Impact of Social Networks on the Cognitive Functions of University Students.

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The increasing presence of social media in students' everyday lives has generated growing interest in its perceived influence on learning processes and cognitive functioning within educational contexts. This research forms part of an ongoing doctoral project that builds on previous work conducted with university students and is currently being expanded to different educational stages and national contexts.

The initial phase of the research explored university students' perceptions of the impact of social media use on cognitive functioning, academic performance, study organisation, and rest. This phase employed an online self-report questionnaire distributed via Google Forms, complemented by qualitative data collected through semi-structured interviews. Drawing on the findings and methodological foundations of this earlier work, the doctoral project now adopts a broader and comparative perspective.

At present, two complementary research plans are being developed. The first continues data collection with university students in Spain, allowing for the replication and extension of previous results. The second extends the study to secondary education contexts in England, incorporating both the original questionnaire and the Teenage Executive Functioning Inventory (TEXI) to explore perceived cognitive and learning-related processes across educational stages.

The overall research design follows a non-experimental, mixed-methods approach and focuses on students' perceptions rather than objective performance measures. By examining how learners at different educational levels perceive the role of social media in relation to their learning and everyday cognitive functioning, this study contributes to current discussions in technology-enhanced education. The research aims to inform educational practice and future research by highlighting the importance of self-regulation, digital awareness, and students' perspectives in contemporary learning environments.



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sciforum-170506: Pre-service Teachers' Perceptions of Artificial Intelligence in Primary Mathematics Education

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The integration of Artificial Intelligence (AI) into Primary Education poses a pedagogical dilemma between technological efficiency and the development of logical reasoning. This qualitative study examines the perceptions and lived experiences of 32 pre-service teachers enrolled in the Primary Education Degree at the Faculty of Education and Psychology (University of Extremadura). Through content analysis supported by RLQDA software, participants' narratives regarding the deployment of AI in mathematics education were coded to identify patterns in curricular articulation and professional identity.

The results reveal a dualistic perception of technology. On the one hand, future teachers positively value AI as a tool for inclusion and personalization, highlighting its ability to reduce abstraction in content blocks such as geometry and fractions through dynamic visualizations and immediate feedback. Conversely, a transversal concern emerges regarding "cognitive dependency" and the risk of students substituting intellectual effort with automated results. Furthermore, a gap is observed between the participants' personal use of AI (instrumental and administrative, e.g., using ChatGPT for summarizing or planning) and the didactic use they project for the classroom (gamification and level adaptation). The study concludes that while pre-service teachers do not reject the technology, they demand training that empowers them to lead its ethical use, reaffirming their irreplaceable role as guides against the automation of learning.



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sciforum-167957: Privacy Policies of the Top 100 Educational Apps: A Transparency and Ethics Analysis

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As digital transformation in education accelerates, mobile applications have become fundamental to modern learning environments. However, the massive collection of student data by these platforms raises critical ethical concerns regarding privacy and transparency. This study aims to evaluate the privacy policies of the top 100 educational applications on major digital marketplaces to determine their alignment with ethical standards and global data protection regulations such as GDPR and COPPA. The research utilizes a qualitative content analysis and document analysis methodology. The selected applications are evaluated based on four primary dimensions: (1) accessibility and readability, (2) clarity of data collection purposes, (3) disclosure of third-party data sharing, and (4) specific protections for minor users. To assess readability, the Flesch-Kincaid scale is employed to determine whether these legal documents are comprehensible to the average parent or student. The study expects to find a "transparency gap" in the EdTech industry. Many apps use difficult legal terms that make it hard for users to know how their personal information is being used, especially with new AI features. The results of this research will show the current state of data ethics in education. Finally, the study offers suggestions for developers and schools on how to make digital learning safer and more transparent. By focusing on these issues, the research helps to protect the digital rights of learners in the 21st century.



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sciforum-165266: Promoting Sustainable Use of LLM Through Mindful Prompting and Gamification

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Large Language Models (LLMs) can help students learn effectively. However, its use can introduce several issues, including ethical breaches and environmental harms. While ethical breaches have been extensively addressed, the environmental harms receive little attention. LLMs require substantial computational power, harming the environment. One LLM prompt results in a carbon footprint four times that of a Google search. There are a few studies that focus on informing LLMs' environmental harms in education. However, many of those are designed as course materials or general guidance. Students might not have time to learn the course materials and may find the guidance limited in relevance to their own context.

We present an online platform that bootstraps LLMs, promoting the sustainable use through mindful prompting and gamification. Mindful prompting is encouraged by applying course-relevant pre-prompts, setting minimum prompt length, limiting one prompt per minute, and recommending the reuse of similar prompt responses. The first two aim for effective prompt interactions, while the last two aim to minimise environmental harm. Gamification is applied by reducing the incentive for students using LLMs excessively. For each assessment, students will get 100 game points if their use of LLMs (measured in the total number of words in prompts and responses) is no more than 25% higher than the average. Otherwise, they will have game points deducted based on a proportion of excessive use.

The platform is being evaluated in an informatics course (60 students) via a quasi-experiment. Our platform will be evaluated based on students' awareness of the sustainable use of LLMs, the number of reused prompt responses, the number of words in prompts and responses, and their perception of the platform. Other indirect metrics will also be discussed, including academic performance, prompt analysis and response similarity.



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sciforum-172061: Prompting Competency in Web Programming Education: Is Prompting a Skill, or Just Typing?

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The rapid integration of generative artificial intelligence (AI) tools in programming education has transformed how students approach coding tasks. In web development courses, students increasingly rely on AI systems to generate, refine, and debug code. This shift raises an important pedagogical question: does effective prompting represent a meaningful cognitive skill, or is it merely the act of entering instructions into an AI system? This study investigates prompting competency as a measurable construct and examines its relationship with student project performance in undergraduate web programming education. The research was conducted in a web development course in which students individually designed and developed an educational hybrid game. A mixed-methods approach was employed, combining analysis of students' AI prompt logs, project performance assessments, and reflective reports. Prompting competency was operationalized through a Prompting Competency Index (PCI) consisting of five dimensions: 1) prompt specificity, 2) contextual framing, 3) iterative refinement, 4) debugging strategy, and 5) critical evaluation of AI-generated outputs. Quantitative analysis examined the relationship between PCI scores and project performance, while qualitative analysis explored students' metacognitive strategies during prompt formulation. The findings indicate that higher-performing students demonstrate structured, iterative, and reflective prompting behaviours. These behaviours align with higher-order cognitive processes such as computational thinking, debugging strategies, and self-regulated learning. The results suggest that prompting is not merely mechanical interaction with AI systems, but an emergent form of digital literacy that can be observed and assessed, highlighting the importance of developing students' awareness of effective prompting strategies in AI-assisted programming tasks. This study contributes to ongoing discussions on AI-assisted learning by positioning prompting competency as a pedagogically relevant capability in contemporary computing education.



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sciforum-178730: Prompting Your Way to Better Learning: How Generative AI Empowers Educators to Create Interactive, Accessible Teaching Materials

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Generative AI has fundamentally changed who can create with technology. Educators who have never written a line of code can now use natural-language prompting to produce interactive learning materials in minutes. This paper explores how that shift enables a new approach to teaching material design: using large language models (LLMs) to convert static PDFs and PowerPoint slides into interactive HTML resources that enhance the learning experience for every student. The resulting materials feature explorable figures, self-check activities, adjustable themes, and responsive layouts. These are not accommodations for a subset of learners; they are better learning experiences by design, aligned with Universal Design for Learning (UDL). The fact that they also meet WCAG 2.1 AA accessibility standards is a natural by-product, not an additional task. PowerPoint, while familiar, is limited as a learning medium: slides enforce linear delivery and offer minimal interactivity. Meanwhile, virtual learning environments such as Blackboard support direct HTML embedding, meaning educators can deliver interactive content within the platforms students already use, maximising capabilities that often go underutilised.

Through case studies from my own mathematics teaching, I demonstrate how prompting-based workflows can transform static problem exercises into self-checking activities, convert static plots and graphs into interactive explorable versions, and create interactive diagrams and virtual lab equipment. Early student feedback suggests increased engagement with the interactive versions compared to their static predecessors.

This work contributes to technology-enhanced education by demonstrating that generative AI does not merely automate existing workflows, but enables educators to create fundamentally better learning experiences that were previously out of reach without specialist technical skills. When every educator can produce interactive HTML as easily as they currently produce a PowerPoint, the result is a better experience for all learners, and a more accessible one too.



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sciforum-172883: Ready4Disasters: A Scalable 3D Mobile Gamification Framework for Multi-Hazard Emergency Response Training

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Introduction

Gamification improves memory by turning passive instruction into active learning. 3D simulations specifically replicate complex environments, building the spatial awareness and immersion needed for high-stakes training. This study evaluates the "Ready4Disasters" mobile application - an interactive platform developed within an Erasmus+ project - as a digital tool for simulating high-stress disaster scenarios.

Methods

By utilizing a modularized pedagogical approach, mobile applications facilitate the delivery of specialized disaster response training through several key instructional modalities: Scenario-Based Simulations, Gamified Engagement, and Just-in-Time Training. This framework promotes robust information encoding and mitigates the decay of technical competencies across critical hazard domains, specifically indoor fire, floods, and landslides.

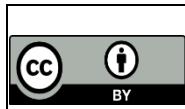
The study employed a mixed-methods research design to establish a baseline for disaster response competencies. A 33 questions with a 5-point Likert scale was administered via MS Forms and Google Forms to a total sample of 159 experienced volunteers and trainers across Turkey (n=51), Italy (n=51), Greece (n=36), and Georgia (n=21). Analysis involved descriptive statistics to identify priority training areas and thematic coding of expert comments to drive iterative refinement of the 3D modules. Knowledge transfer was defined as the shift from theoretical instruction to applied procedural readiness, measured by analyzing the delta between initial competency gaps and final performance within the simulation.

Results

Pilot data prioritized Safety (66%) and Leadership (62%), revealing a 61% deficit in existing flood-response tools. Furthermore, 38% of participants (ages 18–25) rejected traditional manuals in favor of digital solutions. Final evaluations confirmed significant gains in knowledge transfer and high application usability (>80%), particularly regarding landslide and flood scenarios.

Conclusions

The Ready4Disasters framework validates 3D mobile gamification as a cost-effective, scalable training solution for multi-hazard preparedness. The results indicate that immersive environments effectively bridge the gap between theoretical instruction and applied response capability for decentralized volunteer networks



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sciforum-172656: Refining Instructional Communication Through the Dialogic Examination of Learner Reasoning in Online Coding Classes with Students from Thailand and Myanmar

Hanspeter Amend

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Introduction

This work is guided by the question: What is going on in a learner's mind? To explore this question, online coding classes with up to 60 students were conducted over four years, combining large-group instruction with one-on-one support from a lead instructor and assistant teachers.

Methods

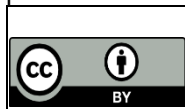
Students worked with structured online coding materials while most learning time was devoted to problem-solving. Teachers observed students' code in real time and engaged them in individual dialogue focused on their reasoning. Students were invited to articulate their thinking to make visible where their understanding departed from the intended logic. Ten interactions were selected and coded from a larger pool of over 100. Analysis used a qualitative, dialog-based comparative framework examining degrees of non-directive instructional communication and their influence on learner reasoning and engagement. When difficulties arose, teachers used targeted, non-directive questions to guide students toward recognizing unproductive reasoning paths or misaligned assumptions. Post-class reviews of recorded interactions informed iterative refinement of communicative strategies.

Results

Systematic analysis revealed recurring patterns in instructional communication, identifying effective dialogic strategies that support learner reasoning. Over time, teachers developed increasingly concise communicative moves that were associated with more productive reasoning paths. Two recurring reflective questions supported this process: What prevented you from doing it correctly? What can you do to prevent this from happening again? Clarification-oriented questions accounted for the vast majority of student inquiries, while questions aimed at application, generalization, or transfer remained comparatively rare.

Conclusions

Systematic examination of learner reasoning proved invaluable for refining instructional communication. The online environment, by enabling real-time visibility of individual student processes, was particularly conducive to this dialogic approach. A central long-term objective is to cultivate conditions that increasingly encourage transfer-oriented questioning alongside immediate problem clarification.



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sciforum-164346: Remixing Historical Sound Archives with AI to Support Creative Inquiry in Early Childhood

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This qualitative case study examines how artificial intelligence (AI)–enhanced musical play can foster creativity, cultural awareness, and historical inquiry in early childhood classrooms. Drawing on constructionist theory, culturally responsive pedagogy, and distributed creativity, the study explores preschool children’s engagement with Citizen DJ, an AI-supported digital remix platform that enables users to search, select, and remix public-domain historical audio. Over four weeks, fifteen four-year-old children participated in guided and child-directed remixing activities that emphasized playful exploration, inquiry, and multimodal meaning-making rather than performance outcomes. Data sources included video recordings, field notes, educator reflective journals, semi-structured child interviews, and children’s original digital sound compositions. Analysis focused on children’s creative processes, sound selection patterns, and emerging cultural and historical dialogue. Findings indicate that children demonstrated originality and divergent thinking in their musical remixes, frequently drawing on spoken word, animal sounds, and archival recordings. Network analysis revealed fluid movement across thematic sound categories, while a cultural engagement heatmap highlighted sustained interaction with culturally meaningful audio, including folk music, nursery rhymes, and historical speech. These encounters often prompted children’s questions about sound origins, sparking conversations about culture, history, and identity. Educators reported increased confidence in integrating technology-enhanced music activities and described AI-supported remixing as an accessible entry point for inquiry-based, culturally responsive pedagogy. The study contributes to education research by illustrating how AI-driven tools can support developmentally appropriate, play-based engagement with cultural heritage, positioning young children as creative agents and meaning-makers. Implications are discussed for early childhood curriculum design, teacher education, and inclusive approaches to technology-enhanced learning.



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sciforum-173008: Rethinking Similarity Scores in Programming Education: A Three-Year Study Across Assignments and Detection Tools

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Code similarity tools are widely used in programming courses to support academic integrity, yet fixed percentage cutoffs are often applied without considering how score distributions change over time, vary by assignment type, or differ across detection tools. This study examines similarity patterns over three academic years (2023/2024–2025/2026) using two programming assignments, with approximately 50 students per assignment each year, and multiple similarity detection tools. For each assignment–year–tool combination, we analyzed distributional indicators including mean, median, quartiles, standard deviation, 99th percentile, and maximum to capture central tendency, spread, and upper-tail behavior.

The results show that similarity dynamics are not uniform. In one assignment pattern, central values rose consistently over time (e.g., increasing medians and lower quartiles), indicating that the shift was not driven only by a small number of extreme submissions. In the other pattern, similarity levels started higher and then showed mild increases or stabilization, depending on the tool. Across both patterns, extreme values and upper-tail indicators generally declined in later years, accompanied by lower variability, suggesting a transition toward higher baseline similarity with fewer outlier-heavy cases.

These findings support a more context-aware interpretation of similarity scores in programming education. Rather than relying on a single fixed threshold, educators may benefit from distribution-based reading of results that accounts for assignment characteristics, year-to-year shifts, and tool-specific behavior. This perspective provides a more robust basis for course-level monitoring and more defensible decision-making in integrity and assessment workflows.



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sciforum-178658: Scaffolding Verification-Oriented Risk Reasoning with Generative AI in Higher-Education STEM: Evidence from a Civil Engineering Safety Module

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As Generative Artificial Intelligence (GenAI) rapidly permeates higher education, its application in safety-critical STEM fields—such as civil engineering—has raised significant concerns regarding "false mastery." This phenomenon occurs when students produce plausible-sounding answers via AI that lack mechanism-based reasoning or verifiable evidence. To address this, this study proposes and evaluates a technology-enhanced scaffolding workflow designed to operationalize verification-oriented risk reasoning within a civil engineering construction safety module (N = 50).

The study structures student-GenAI interaction into five staged prompts and artifacts to ensure logical depth: (1) Scenario Interpretation and Boundary Setting: Defining problem parameters to prevent hallucinations or irrelevant AI generation. (2) Mechanism-Based Hazard Identification: Requiring students to analyze the underlying physical or causal mechanisms of potential accidents. (3) Likelihood-Severity Justification: Providing logical or quantitative defenses for assigned risk levels. (4) Control Selection: Aligning mitigation strategies strictly with the Hierarchy of Controls. (5) Verification-Oriented Reflection: Mandating uncertainty marking, evidence/source cross-checking, and detailed revision logs.

Assessment via rubric-based scoring and behavioral coding revealed significant improvements in reasoning transparency and a stronger coupling between hazard mechanisms and control logic. Furthermore, students demonstrated increased explicit verification practices, such as active uncertainty labeling and revision tracing. This study contributes a transferable GenAI-enabled learning design and assessment package—including prompt templates, expected artifacts, and scoring signals—to cultivate measurable verification literacy in safety-critical engineering education.



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sciforum-170775: Social Media as a Catalyst for Change in EFL Education: A Thematic Study at Moulay Ismail University

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The use of social media in education, especially in English as a Foreign Language (EFL) classrooms, continues to generate discussion among educators and researchers. Although many institutions have integrated social media into teaching for communication, collaboration, and access to learning materials, its actual influence on students' academic performance remains uncertain. Most previous studies have examined social media in education more broadly, with limited attention to how EFL learners specifically use these platforms to support their language learning. To address this research gap, this study investigates social media as a developing educational tool among EFL students, focusing on their perceptions, preferred platforms, patterns of use, time management, and account ownership, in order to understand its role in their academic development. The study adopted a mixed-methods approach, using an online questionnaire to gather quantitative data and identify key trends, alongside semi-structured interviews to provide deeper insights into students' experiences. The findings reveal that although students recognize the educational value of social media, they mainly use it for entertainment. They rely on different platforms for different purposes, with Google, YouTube, and WhatsApp emerging as the most frequently used for academic activities. Additionally, the results indicate that distance learning is still developing and faces several challenges, leading students to favor a blended learning model that combines traditional classroom instruction with online resources for a more balanced learning experience.



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sciforum-173005: Supporting Didactic Evaluation of Mathematics and Science Concepts Through Automatic Short-Answer Grading

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Automatic Short-Answer Grading (ASAG) has become an increasingly relevant research area within technology-enhanced STEM education, where short open-ended responses are frequently used to evaluate students' conceptual understanding. However, authentic classroom datasets often present low-resource characteristics, including small sample sizes, lexical sparsity, and class imbalance, which pose significant challenges for reliable model evaluation, didactic usability, and reproducibility.

This work presents a reproducible and didactically oriented machine learning pipeline designed to support the evaluation of short open-ended student responses under low-resource educational conditions. Rather than proposing novel algorithms, the study emphasizes methodological transparency by integrating established linear classifiers—Logistic Regression, Multinomial Naïve Bayes, and Linear Support Vector Machines—within a unified and interpretable evaluation framework. Textual responses are represented using TF-IDF features, while model performance is assessed through adaptive stratified cross-validation to ensure robust accuracy estimation and minimize information leakage.

The pipeline is evaluated across multiple concept-specific datasets derived from undergraduate teacher education contexts in mathematics and science. Results demonstrate stable performance across classifiers and conceptual domains, supporting the viability of interpretable linear models for small-scale classroom datasets. Additionally, the framework enables token-level inspection of discriminative lexical features, facilitating formative didactic feedback and supporting educators in monitoring students' conceptual development.

By prioritizing reproducibility, interpretability, and didactic applicability, the proposed framework provides a transparent methodological reference for applied ASAG research. Furthermore, the pipeline establishes a foundation for future studies exploring automated feedback mechanisms and classroom-oriented learning analytics in STEM education.



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sciforum-173222: Technology-Enhanced Learning through Smartphone Experiments: Teaching Optical Absorption in Resource-Limited Classrooms

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Introduction: Technology-enhanced education offers inclusive pathways to strengthen student engagement and research orientation, particularly in resource-constrained laboratories. This study presents a low-cost, smartphone-assisted classroom experiment to estimate the absorption coefficient (α) of transparent polymeric sheets and glass using the Beer–Lambert law, which describes exponential attenuation of light in homogeneous media [1]. By integrating luminance sensing with theory, the activity promotes interdisciplinary learning across physics, chemistry, and life sciences.

Methods: A compact setup was built using a paper box, colored transparent poly-paper of varying thickness (x), a black circular ring/disc target, and a smartphone running the phyphox (free) app [2]. Reflected luminance was recorded without (I_0) and with (I) the sample covering the target. The absorption coefficient was computed as $\alpha = \ln(I_0/I)/x$. Measurements were repeated for different colors and thicknesses to probe wavelength-dependent attenuation.

Results and Discussion: The observed attenuation followed the Beer–Lambert trend, and estimated α values showed clear wavelength dependence, reinforcing concepts of optical absorption and material response. Students demonstrated gains in conceptual clarity, quantitative reasoning, and experimental design. The approach also shows promise for low-cost exploratory screening of surface changes in plant leaves, indicating potential for interdisciplinary extensions in biology and environmental science.

Conclusions: The proposed method provides an accessible, inclusive, and cost-effective pathway to teach optical absorption using everyday devices. It supports inquiry-based learning, boosts engagement in under-resourced settings, and aligns with technology-enhanced education for Special and Inclusive Education contexts.

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sciforum-178579: The Integration of Artificial Intelligence in Higher Education for Communication, Film, and Media Studies

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The rapid technological transformations of recent decades have profoundly reshaped educational practices in higher education, and artificial intelligence (AI) is increasingly becoming a relevant tool for innovating teaching and learning methods. In fields such as communication, film, and media studies, the integration of AI opens up new pedagogical opportunities, facilitating both the personalization of the educational process and the development of students' creative, analytical, and digital skills. This paper aims to analyze how AI-based technologies can be utilized within university programs in these fields, both as a support for teaching activities and as an environment for creative and critical exploration. It discusses AI applications in the development of course materials, the simulation of real-world professional contexts, the generation and analysis of visual and audiovisual content, as well as in providing rapid feedback tailored to students' individual needs. At the same time, the research highlights the impact of these tools on the relationship between the teacher, the student, and the educational process, emphasizing the need to redefine the teacher's role in the current digital context. This study employs a quantitative methodology, using an online questionnaire administered via Google Forms. The questionnaire items were formulated using a Likert scale to measure respondents' level of agreement or disagreement with a series of statements relevant to the topic under investigation. The research sample consisted of 100 students from the Film, Photography, Media, and Communication programs. The findings suggest that AI tools can enhance student attention, facilitate the understanding of complex concepts, and contribute to more engaging learning experiences in technology-enhanced education.



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sciforum-169491: The Relationship Between Positive Youth Development and Attitudes Toward Artificial Intelligence.

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Introduction: Understanding how young people perceive Artificial Intelligence (AI) is crucial for promoting its ethical and responsible adoption. The Positive Youth Development (PYD) framework proposes a strength-based approach centered on the 5Cs, which promote overall well-being. While PYD has proven effective in mitigating various digital risks, its role in shaping AI-related attitudes remains largely unexplored. Therefore, this study analyzed the relationship between these attitudes and the 5Cs of PYD within the university context.

Method: The sample consisted of 407 Spanish undergraduate students (63.1% women; $M = 21.93$) enrolled in 10 universities in Andalusia (Spain). Participants completed the PYD-SF and AIAS-4 scales during the year 2025.

Results: The findings indicated a weak but significant correlation between both constructs, suggesting that specific PYD dimensions are aligned with a favorable view of AI. Hierarchical regression models found that higher levels of Confidence, Competence, and degree area emerged as significant positive predictors of AI favorability. Conversely, Character showed a negative association. Students in Science, Engineering, and Architecture reported the most favorable attitudes compared to their peers in Arts and Humanities, who obtained the lowest scores. Competence and degree area were found to be significant predictors of the perception of AI as a positive technology for humanity. No significant gender differences were observed.

Discussion: These results suggest that certain strengths, such as self-efficacy (Competence) and self-esteem (Confidence), facilitate technology adoption. However, students with higher moral awareness (Character) appear to maintain a more critical stance regarding ethical risks and social inequalities. Future research should address the limitations of this cross-sectional design and explore specific AI applications. Finally, practical implications underscore the need for governments to increase transparency in AI regulation to foster public trust.



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sciforum-172718: Towards a Sustainable Clinical Teaching in Resource-Limited Settings: the Potential Role of an Artificial Intelligence (AI)-Generated Visual Clinic

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Background: Clinical teaching involves two essential parts, theory and clinical experience. The latter requires students to have adequate level of contacts with patients, but it can be affected by limited resources such as inadequate clinical facilities and months of industrial actions by healthcare workers in countries such as Nigeria. Although such a loss in learning opportunities can be lessened in other climes with the use of clinical simulation tools, lack of such resources is a challenge in resource-limited settings. **Aim:** The aim of this article is to present the use artificial intelligence (AI)-generated visual clinic, consisting of videos on the management of different diseases/ conditions. **Method:** In this paper, topmedia AI (<https://www.topmediai.com/app/text-to-video/>) was used to generate videos of patients with stroke performing constraint induced movement therapy (CIMT), motor imagery, sit to stand exercise, over-ground gait training and treadmill gait training using text prompts. After that, these different videos were combined together to form a stroke rehabilitation clinic. **Result:** A video of seemingly high quality showing patients undergoing stroke rehabilitation was produced. **Conclusion:** It is possible to generate videos on different diseases/ conditions using AI, as it is very efficient, and catalogue them as a clinic for use in place of, or as an adjunct to traditional clinical teaching. This may provide advantages for adequate clinical experience, access to rare and under-referred conditions/diseases, serving as succor during industrial actions, and as a means to reduce students' exposure to dangers such as infections and harms. In addition, unlike the traditional clinical hours, the AI-generated visual clinic will be opened for use to students 24 hourly.



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sciforum-171972: Transforming Digital Pedagogy with Agentic AI and Secure Cloud Systems

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The rapid evolution of agentic artificial intelligence (AI) and cloud-native architectures is redefining the possibilities of Technology-Enhanced Education. This paper introduces a framework that integrates **agentic AI systems, secure distributed platforms, and generative models** to deliver scalable, adaptive, and inclusive learning experiences. By orchestrating autonomous AI agents within cloud environments, the framework enables personalized instruction, automated assessment, and real-time feedback loops that respond dynamically to learner progress. Drawing on enterprise-scale implementations in financial services and retail, the work demonstrates how intelligent orchestration can improve accessibility, optimize resource allocation, and enhance trust through compliance-driven design.

The proposed approach emphasizes **scalability and inclusivity**, ensuring that digital pedagogy can meet diverse learner needs while maintaining rigorous standards of privacy and security. Key contributions include: (1) a model for deploying agentic AI in education that balances personalization with institutional governance, (2) strategies for embedding adaptive learning systems into cloud-native infrastructures, and (3) evidence of improved learner outcomes through AI-driven search and conversational interfaces.

By bridging technical innovation with pedagogical practice, this paper highlights pathways for transforming classrooms into **data-informed ecosystems** that support both educators and learners. The findings aim to provide actionable insights for researchers, practitioners, and policymakers seeking to harness AI responsibly in advancing teaching effectiveness, learner engagement, and equitable access to education.



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sciforum-178726: Trust but Verify: AI Policy Clarity Across the STEM Pipeline — Engineering Undergraduates and K-12 Educators

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Introduction. Engineering students report the lowest AI policy clarity in courses that say nothing — even lower than courses that ban AI. This finding emerged from a dataset spanning nine semesters and 128 course experiences at a large public research university. The authors' prior work on technology integration across the K-12-to-university pipeline has shown that the framing around a technology predicts practitioner confidence more reliably than the technology itself. This study extends that principle to AI policy and asks whether the Clarity Gap observed among engineering undergraduates appears in K-12 STEM educators encountering AI tools through professional development.

Methods. Two datasets ground the analysis. The university dataset captures student-reported AI policy clarity, tool adoption, and verification behavior across five policy categories (Disallowed, Allowed-Informal, Allowed-Formal, Encouraged, and Critical Use) from 2023 through 2025. The educator dataset draws from a multi-session PD series delivered to STEM educators, scaffolding a progression from AI-assisted curriculum design through structured verification of AI-generated content to hands-on programming with LLM assistance — a direct translation of the "Trust but Verify" framework validated on the university side. Earlier PD sessions using micro:bit devices provide a longitudinal baseline.

Results. Allowed-Informal courses — where AI use was permitted without explicit guidance — produce clarity scores significantly below prohibition. Preliminary educator data indicate a parallel pattern: educators whose schools have issued explicit AI guidance report higher baseline verification confidence than those operating without institutional direction.

Conclusions. Despite widespread AI adoption, policies governing its classroom use remain underdeveloped. Policy silence is the primary barrier to productive AI integration in both collegiate and K-12 classrooms. Mandating explicit AI guidance, at the course level for universities, at the school or district level for K-12, addresses AI integration ambiguity directly. The authors posit that a specific policy stance matters less than its existence for effective educator and student use.



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Session 2. Higher Education

sciforum-172978: Cultural literacy in an Australian Multicultural Higher Education Setting: The Case of Doctoral Students

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Introduction: Australia is a highly multicultural society, with 51.5% of its population being born overseas or having at least one parent born overseas (Australian Government, Department of Home Affairs, 2024). The cultural and linguistic diversity of the Australian population is an invaluable asset, but it can also pose obstacles on the path to reconciling one's native cultural background with the norms of the Western world, which is the domain of cultural literacy (Hirsch, 1987). Challenges related to cultural literacy, among other settings, are noticeable among Australian students, including those who pursue doctoral degrees.

Methods: The current paper presents a research project that aimed to investigate the challenges that Western Sydney University (WSU) students encounter during their candidature in the domain of cultural adaptation to the educational setting, that is, to a greater or lesser extent, different to their original cultural norms. The study is based on semi-structured interviews with 28 postgraduate research students, both domestic and international, and 12 supervisors from WSU. The collected data was analysed in the NVivo 15 platform by means of thematic analysis.

Results: The results indicate that numerous aspects of postgraduate research students' candidature can be affected by insufficient adaptation to Western academic norms. Some of them are challenges with adjusting to writing conventions applicable in Western academia, challenges within the domain of research skills, such as critical thinking and analysis, as well as challenges in interpersonal relationships within the candidate-supervisor dyad. This shows that cultural literacy is related to and can affect candidates' academic/non-academic communication skills and research skills.

Conclusions: Based on the results, the paper offers recommendations for universities on how to improve their postgraduate research students' cultural literacy through systematic and continuous institutional support.



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sciforum-170688: *Engaged much?* An applied Perspective of Classroom Practices Used to Engage Students at the University Level in England

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Student engagement (SE) is a significant priority for HEIs across the globe, one which is perceived as reflecting education quality as well as influencing outcomes such as 'student success, retention [and] learning outcomes' (Shomotova and Ibrahim, 2025, p.1206). Existing studies reveal a 'paucity of research on the position of academics [...] on how they could enhance student engagement' in HE (Owusu-Agyeman, 2022, p.661). As such, our paper makes an exploratory contribution by investigating classroom practice designed to stimulate SE at an operational level.

Empirically, our paper reports on a small, institutionally-approved qualitative study of activities/strategies that were identified by academics (n=19) as 'engaging' for students across the degree portfolio (both home and international) when in the university classroom. With taught representation from all levels of study in a School of Education, participants from a research-intensive university in South West England took part in a small group activity during a School training session on SE, generating original documents (n=152) in the form of individual paper 'strategy squares'.

Richly informed by BERA (2024), retrospective consent was sought to rigorously analyse the documents using thematic analysis (Naeem et al., 2023). Thoughtful reflections in our paper follow an illustrative presentation of four main themes.

Collectively, the research reveals fresh insight into the variety of *dynamic* pedagogical strategies (Dominguez, 2024) utilised in the School. Despite the limited scope and generalisability of the findings, the data analysis recognises SE to be a complex and multi-dimensional construct, prompting critical questions regarding the depth and quality of such engagement. Our paper concludes by acknowledging the influence of cultural background on students' receptivity to different pedagogical approaches, as well as the role of instructor-student relationships in shaping supportive and effective learning environments. Given the localised nature of the sample and the exploratory design, we appreciate that our conclusions should be interpreted with appropriate caution.



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sciforum-139556: Empowering Students through One Health Parasitology: An Intensive Hands-on Summer Course on Emerging Parasites at the University of Alcalá, Spain

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Emerging parasitic diseases remain a major global health concern, yet parasitology is often underrepresented in higher education. To address this gap, the University of Alcalá (UAH) launched in 2025 an eight-day intensive summer course, “Advanced Diagnosis of Emerging Parasites in Humans and Animals,” designed to provide interdisciplinary training in diagnostic techniques, outbreak response, and One Health strategies. We report a single-cohort educational innovation attended by seven students. The course integrated interactive lectures with hands-on laboratory workshops using real clinical and veterinary specimens and digital resources (e-Parasitology®). Training covered parasite life cycles and pathogenesis; classical parasitological methods (sedimentation and flotation); molecular diagnostics (PCR); immunodiagnosics (including monoclonal antibody development); and applied activities in environmental decontamination and antiparasitic formulation. Participant outcomes were evaluated using routinely collected university quality-assurance feedback, provided to instructors exclusively in fully anonymised, aggregated form (no identifiable data accessed). Descriptive analysis of the institutional survey (3/7 respondents) showed high satisfaction across key domains (mean scores on a 1–5 scale: content planning 4.67; teaching quality 4.67; perceived learning 4.33; workload 4.33; expectations met 5.00), and open-ended comments highlighted the value of the practical component. To strengthen the evidence base in the next edition, we will implement a structured evaluation framework including reach indicators (uptake/completion), aligned pre/post knowledge checks, rubric-based assessment of practical competencies, and an anonymous post-course survey capturing satisfaction and self-efficacy, with paired pre/post analyses and cohort-level comparisons where feasible. Overall, this course offers a feasible and scalable model of practice-based, interdisciplinary parasitology training aligned with One Health preparedness and competency development.



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sciforum-172893: Problem-Based Learning in Engineering Differential Equations: Effects on Achievement, Motivation, and Academic Engagement

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Differential equations courses in engineering are often perceived as abstract and of limited practical relevance. This study examined the impact of integrating Problem-Based Learning (PBL) into course lectures, compared with traditional frontal instruction, while maintaining an identical syllabus, tutorials, and assessment structure.

The study included 59 students enrolled in electronics, chemistry, and polymer engineering programs (31 control; 28 PBL). Academic performance indicators were collected (mean assignment grades, midterm, and final exam grades), along with persistence measures (attendance and assignment submission rates) and motivation questionnaire data (N = 49). Group differences, correlations, and linear regression predicting the final course grade were analyzed.

Findings indicate a consistent pattern favoring the PBL group across achievement measures. A statistically significant difference was found in mean assignment grades and submission rates, and a consistent positive trend was observed in exam grades and overall course grade, although statistical significance was not reached. In both groups, attendance was positively associated with achievement; however, this association was stronger under traditional instruction, suggesting reduced reliance on frontal attendance in the PBL environment. Regression analysis identified mean assignment grades as the primary predictor of the final course grade.

Statistically significant differences favoring PBL were found across all motivation dimensions, including self-efficacy, interest and enjoyment, value and relevance, and persistence, indicating a broad and consistent impact on engagement, perceived value, and learner responsibility.

These findings emphasize that integrating PBL into engineering mathematics primarily affects learning processes and motivation, sharpening the distinction between learning as a process and achievement as a summative outcome. The study contributes to mathematics instruction in higher education by proposing a framework that distinguishes formal achievement from learning processes and engagement as complementary components of academic success, and by reinforcing the need to reconsider success metrics so that they reflect not only examination outcomes but also depth of learning and learner responsibility.



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sciforum-165074: Educational Digital Twins for Sustainability Competences in Engineering and Architecture: Integrating Level(s) and the New European Bauhaus through a Spain–Chile SWOT–CAME Analysis and the ERI Readiness Index

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Educational Digital Twins (EDTs) are emerging as a powerful pedagogical framework to accelerate the development of sustainability competences in engineering and architecture education. This contribution conceptualizes EDTs as interactive learning ecosystems that connect metrics (e.g., Level(s) indicators), values (the New European Bauhaus principles—sustainable, inclusive, and beautiful), and digital platforms (simulation, data-driven decision support, and collaborative learning environments). We present a comparative perspective between Spain and Chile, chosen for their cultural proximity and complementary strengths: Spain offers a policy- and framework-driven pathway aligned with European sustainability agendas, while Chile provides a context-driven approach shaped by resilience challenges and applied innovation in the built environment. Methodologically, the work combines a targeted literature review (2018–2025) with a SWOT–CAME strategy pipeline to move from diagnosis (strengths, weaknesses, opportunities, threats) to actionable measures (correct, address, maintain, exploit) in curriculum design, faculty development, institutional governance, and international cooperation. As a key output, we propose the Educational Digital Twin Readiness Index (ERI) to assess institutional capacity across four domains: (1) governance and policy alignment, (2) digital infrastructure and interoperability, (3) pedagogical and interdisciplinary capability, and (4) equity, accessibility, and inclusion. The resulting roadmap supports a replicable Ibero-American hybrid model that combines Spain's regulatory robustness with Chile's applied experimentation, highlighting open-source innovation, reduction of digital divides, and cross-border partnerships as enabling conditions for scaling EDTs in higher education.



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sciforum-177636: Belongingness and Academic Achievement of Sub-Saharan African Students in Higher Education

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A sense of belonging is widely recognized as a critical psychosocial factor that influences student engagement, persistence, and academic success in higher education. However, the relationship between sense of belonging and academic achievement has not been sufficiently explored in non-Western contexts, particularly among Sub-Saharan African students enrolled in Moroccan universities. The present study addresses this gap by examining the association between sense of belonging and academic achievement within this underrepresented population. This study combines the Sense of Belonging Theory and Maslow's Hierarchy of Needs to understand belonging as a basic mental state that helps start stronger motivation. Specifically, belonging helps meet psychological needs, which then trigger motivation that leads to involvement and better results. This approach shows belonging as more than just a social feeling but as an important step in the motivation process toward success. A quantitative correlational design was utilized. Data were collected from undergraduate students using an adapted version of the Sense of Belonging Instrument (SOBI), which was refined for contextual relevance and cultural sensitivity while maintaining psychometric validity. Academic achievement was measured using grade point averages, and Pearson correlation analysis was performed. The results show a clear positive link between feeling like you belong and doing well in school, underscoring the importance of social and psychological connections for student success. These findings suggest that universities should use inclusive practices to help students feel they belong, such as special orientation programs, peer mentoring, and teaching methods that include everyone. In the broader discussion of inclusive education and student diversity, this study emphasizes that colleges need to offer not just access but also fair and supportive learning environments for students from other countries.



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sciforum-173277: Between Policy Mandate and Institutional Autonomy: A Collaborative Reflective Analysis of CCMAS Implementation in a Nigerian Public University

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The introduction of the Core Curriculum and Minimum Academic Standards (CCMAS) marks a major policy shift in the governance of undergraduate education in Nigeria which redefines the balance between regulatory control by the National Universities Commission (NUC) and institutional curriculum autonomy offered by relevant enabling laws. While implementation commenced across many universities in 2023, variations in institutional timelines reveal the complex realities of policy enactment within higher education systems. This paper presents a collaborative reflective analysis of the early-stage implementation of CCMAS in a Nigerian public university-the Obafemi Awolowo University, Ile-Ife that began formal rollout in October 2025-almost two years after the latest timeline for kick-off. This present work which is conceptually anchored in policy enactment theory and the micropolitics of educational reform, interprets implementation as a negotiated process shaped by institutional culture, governance structures, and professional identities. The study whichDrawing on the authors' positionality as academic participants within the reform process, the paper critically examines how policy mandates are translated, mediated, and adapted within institutional contexts. The reflective analysis surfaces key thematic concerns, including tensions between compliance and autonomy, institutional readiness, procedural and bureaucratic layering, stakeholder sense-making, and emergent pedagogical and administrative challenges. By positioning delayed implementation not as inertia but as an instance of institutional interpretation and strategic adaptation, the paper contributes to theoretical conversations on policy translation, organisational change, and curriculum governance in higher education. It further illuminates how reform is enacted through situated practices and negotiated meanings, offering insider-informed insights into the dynamics of large-scale curriculum transformation in resource-constrained and tradition-oriented university settings.



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sciforum-173184: Embedding COIL within a Comprehensive Tutorial Action Plan: Evidence from an Internationalised Mentoring Model in Higher Education

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Introduction

In today's higher education landscape, universities face increasing pressure to implement inclusive internationalization strategies that extend beyond physical mobility and support students' holistic development. While Collaborative Online International Learning (COIL) has shown potential to enhance intercultural and digital competencies, there is limited empirical evidence on its integration into structured academic support systems such as Tutorial Action Plans (TAPs). In particular, few studies have examined how embedding COIL within a longitudinal mentoring framework may influence personal development, academic self-efficacy, and career orientation. Addressing this gap, the present study, grounded in experiential learning theory as proposed by Kolb (2014), evaluates whether integrating COIL into a TAP improves personal, academic, and vocational outcomes, as well as student satisfaction.

Methods

A comparative study was conducted with 48 senior undergraduate students. Twenty-seven participated in a COIL initiative involving a Spanish and a Dutch university, while twenty-one followed a traditional tutoring format. Group assignment was based on organizational criteria, reflecting a non-randomized quasi-experimental design. The relatively small sample size is attributable to the progressive implementation of the COIL program over five years, with annual cohorts of 4–6 students. Data were collected using the validated scale developed by Sáiz-Manzanares et al. (2019), assessing satisfaction with the Final Degree Project, academic self-efficacy, and perceived impact and future orientation. Internal consistency indices were examined. Independent samples t-tests were conducted, with assumptions of normality (Shapiro-Wilk test) and homogeneity of variance (Levene test) verified.

Results

Preliminary results indicate that students in the COIL track reported significantly higher levels of personal development, professional skill improvement, and overall satisfaction than those in the traditional track ($p < .03$ across all dimensions). These findings suggest that structured virtual international collaboration may enhance self-awareness, communication skills, and perceived professional readiness.

Conclusions

Integrating COIL into mentoring frameworks appears to support internationalization at home while strengthening mentoring effectiveness. However, findings should be interpreted cautiously given the small sample and non-randomized design. Future research should employ longitudinal and multi-institutional approaches to assess scalability and long-term impact.



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sciforum-173262: Evaluating the Effectiveness of Institutional End-of-Semester Surveys: Perspectives of Postgraduate Computing Students

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Institutional end-of-semester surveys are widely used in higher education to gather students' evaluations of modules and teaching practices and to inform quality enhancement processes. However, existing research has largely focused on quantitative satisfaction measures, with limited qualitative exploration of how students interpret and engage with feedback systems, particularly within discipline-specific contexts such as postgraduate computing education.

This study explores postgraduate computing students' experiences of end-of-semester survey effectiveness through a thematic analysis of qualitative data collected via Microsoft Forms. A survey link and QR code were distributed to students enrolled in two postgraduate computing modules, resulting in 52 responses. The questionnaire included open-ended items examining perceived usefulness, clarity and relevance of questions, impact on the teaching–learning environment, influence on academic satisfaction, timing of administration, and strategies to enhance engagement. Thematic analysis identified five themes: perceived benefits of feedback, clarity and relevance of survey questions, the role of timing in feedback collection, students' need for guidance in providing meaningful feedback, and strategies to improve engagement. The findings indicate that while students recognise the potential value of surveys, their effectiveness is shaped by the relevance of questions, transparency in how feedback is used, and support for meaningful student participation. This study provides qualitative insight into how feedback systems are experienced within postgraduate computing education and highlights the importance of feedback literacy, contextualised survey design, and institutional transparency in enhancing the effectiveness of student evaluation processes.



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sciforum-145371: Exploring the Role of Information and Communication Technologies in Higher Education

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Introduction: Information and Communication Technologies (ICT) have become essential components of teaching and learning processes in higher education. Their adoption has been accelerated by global digitalization trends, yet disparities remain in terms of institutional support, training, and user experience. This study examines how students and professors in Latin American universities perceive the impact of ICT on educational quality, learning, and professional development.

Methods: A cross-sectional survey was conducted with a sample of 1,050 participants, including both students and teachers from various countries in Latin America. The instrument, validated through expert review and reliability testing, comprised multiple dimensions such as usability, accessibility, pedagogical contribution, and professional relevance. Descriptive analyses were complemented with inferential tests (t-tests and ANOVA) to explore differences by gender, age, institutional ownership, and academic role.

Results: The findings revealed that both students and faculty value ICT as an essential facilitator of communication, information access, and academic innovation. Nevertheless, important differences emerged: professors in private universities expressed greater satisfaction with ICT integration, while those in public institutions reported more barriers related to infrastructure and training. Gender and age differences were also evident, with younger participants showing higher confidence in adopting ICT tools. Despite these challenges, both groups recognized ICT as indispensable for improving higher education outcomes.

Conclusions: ICT adoption in Latin American universities is perceived as a driver of quality and modernization, yet its potential is hindered by inequalities in institutional support and digital competence. Expanding training opportunities and reducing infrastructural gaps are crucial steps to promote inclusive and effective ICT integration across the region's higher education systems.



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sciforum-178357: Feasibility of a Language Intelligence Major at a Science and Technology University: A Case Study from China

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Introduction: In China, demand is growing for professionals who combine linguistic expertise with computational skills. Yet traditional language programs at science and technology universities often lack such integration. This study explores the feasibility of establishing a Language Intelligence major with a structured curriculum integrating linguistics, AI engineering, and domain applications.

Methods: This empirical study is based on first-hand analysis of a program offered by the authors' own department. Three methods were applied. 1. Directed content analysis of six Chinese national policy documents (2018-2025) using pre-defined themes: AI-education integration and interdisciplinary talent development. 2. To assess labor market demand, we reviewed 2024 industry reports, which show NLP positions ranking first in AI role growth, with severe shortages of hybrid-skill candidates. 3. A single case study of a real-world program: the English AI Pilot Program at Harbin Engineering University. Data sources include program curriculum documents, course lists, expert evaluations, and student feedback collected directly from the program.

Results: Three findings emerged. First, policy supports "AI+X" education, but traditional language curricula lack mathematics, programming, computational linguistics, and corpus training--specific gaps in technical terminology processing and multilingual annotation. Second, market data confirm rapid NLP growth and a hybrid talent shortage. Third, the case program demonstrates feasibility: it compresses traditional language courses, adds math/programming, and offers specialized courses. Experts call it "precisely positioned at the interdisciplinary frontier"; students report that data mining and language intelligence training build core competencies.

Conclusions: A Language Intelligence major offers a promising response to labor market needs. The model--a tripartite curriculum (linguistic theory, AI engineering, domain knowledge)--provides a preliminary reference for other universities facing similar humanities-technology disconnects. However, the program has operated only one year, and findings are exploratory. Longitudinal research is needed to validate long-term effectiveness.



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sciforum-177461: Pedagogical Innovation in Higher Education: Integrating Social Entrepreneurship Frameworks to Address Substance Use and Social Harm

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Higher education institutions increasingly face pressure to demonstrate social relevance while navigating growing oversight, epistemic policing, and constraints on academic freedom. There remains limited empirical research on how Collaborative Online International Learning (COIL), when integrated with social entrepreneurship frameworks, facilitates critical engagement with socially sensitive issues such as addiction, stigma, and reintegration. Grounded in transformative learning theory and global citizenship education, this qualitative study examines student reflections from a COIL module involving students from Malaysian and United States universities. The module integrated social entrepreneurship tools; Mission Model Canvas into coursework focused on real-world social problems such as substance use disorder and HIV-related stigma. Data were drawn from 30 student discussion board reflections collected over a five week COIL module. Reflections were guided by structured prompts focusing on problem analysis, intercultural learning, and solution design. Using thematic analysis, following a systematic coding process involving multiple coders, three key themes emerged. First, structured problem analysis, where students reported that frameworks such as the Mission Model Canvas enabled them to transform abstract social issues into structured intervention strategies. Second, global perspective and contextual awareness, as exposure to cross-cultural discussions highlighted how substance abuse and crime-related harms are shaped by cultural and institutional contexts. Third, pedagogical challenges in digital collaboration, including time-zone barriers and unfamiliarity with digital platforms, limited deeper international engagement but still facilitated indirect intercultural learning. The findings suggest that structured innovation tools can act as mediating pedagogical mechanisms that translate critical reflection into applied problem-solving, supporting deeper transformative learning processes. This study contributes theoretically by bridging COIL pedagogy with social entrepreneurship and transformative learning frameworks, offering a more integrated model of intercultural, practice-oriented education. Practically, it highlights key design considerations for implementing COIL modules across institutional contexts, including the need for culturally responsive, and strategies to mitigate digital collaboration constraints.



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sciforum-165276: Relationship Between Students' Perception About Teachers' feedback, Assessment for Learning, and Learning Approaches

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This study investigates the relationship between teacher feedback, assessment for learning (AfL), and students' learning approaches in Pakistan's higher education context. Despite a policy emphasis on formative assessment, classroom practices remain largely examination-oriented, limiting the effective use of feedback. Data were collected through a structured questionnaire from 294 students. Descriptive statistics, correlations, mean difference tests, and mediation analysis were employed. Results indicated that feedback types such as verification, directive, scaffolding, and praise were positively associated with AfL, while criticism showed no significant link. AfL strongly predicted students' adoption of constructive learning approaches, underscoring its role in fostering deep engagement. Gender differences were negligible, although female students reported greater use of constructive learning strategies. Minimal age-related effects were observed, with older students valuing directive feedback more. Mediation analysis revealed that AfL partially mediated the relationship between teacher feedback and learning approaches. These findings highlight the importance of embedding AfL practices in classrooms and strengthening feedback literacy to shift learners beyond rote memorization towards deeper understanding and critical thinking. Overall, the study provides empirical evidence from a developing country context and helps clarify how feedback processes operate within existing assessment practices in higher education settings within contemporary teaching and learning environments in Pakistan.



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sciforum-178192: The Impact of Scientific Research on the Development of Higher Education Institutions

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Background: Scientific research is a cornerstone of higher education, contributing not only to knowledge creation but also to the advancement and reputation of universities. Universities are increasingly expected to balance teaching with active research, fostering innovation, critical thinking, and evidence-based practices. The impact of research on higher education institutions is multifaceted, influencing academic quality, institutional policies, and student development. Strengthening research capacities is therefore essential for sustainable growth and international competitiveness.

Aim: This study aims to explore the impact of scientific research on the development of higher education institutions, focusing on how research activities contribute to academic excellence, institutional growth, and the professional development of students and faculty.

Methods: A descriptive and analytical approach was applied, combining a review of current literature with structured questionnaires administered to academic staff and students at various universities. The analysis examined research engagement, institutional support, and perceptions of research's influence on teaching quality, academic reputation, and innovation.

Results: The findings indicate that active participation in scientific research significantly enhances institutional development by improving teaching quality, fostering innovation, and strengthening the academic profile of universities. Challenges such as limited funding, insufficient infrastructure, and inadequate research policies can hinder research productivity. The study emphasizes the need for comprehensive research strategies, targeted funding, and a supportive academic culture to maximize the benefits of scientific research in higher education.



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sciforum-173076: The Role of AI Assistant Tools in Turkish Language Acquisition among Syrian Multilingual Pharmacy Students in Higher Education in Northern Cyprus

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Introduction

Understanding the role of Artificial Intelligence (AI) in language acquisition is fundamental for multilinguals studying in North Cyprus. The current study examines Syrian students' perceptions of learning Turkish, the effects of AI and contextual exposure, challenges encountered in the acquisition process (grammar, vocabulary, speaking, and pronunciation), AI support for language skills, and their recommendations for using AI to learn Turkish efficiently. Thus, this investigation drew on Krashen's input hypothesis, Swain's output hypothesis, and the SAMR model.

Methods

This study used semi-structured interviews as a qualitative approach to collect the data. The developed questions were organized into four main themes: perceptions, AI and contextual factors, challenges and AI support, and future suggestions. Due to exam schedules, female participants could not be reached, whereas thirteen male pharmacy students, ranging from freshmen to seniors, were interviewed online in Arabic. The transcriptions were generated using digital tools (TurboScribe, Google Docs, and Copilot), and the original Arabic transcripts were manually reviewed to ensure translation validity and reliability. The data were analysed using qualitative content analysis with MAXQDA Pro 2.0 software, applying the deductive coding approach based on the pre-set categories.

Results

The participants generally expressed positive perceptions of learning Turkish. AI supported language acquisition (e.g., serving as a personal teacher), while immersion remained the key factor in language learning. Although the students addressed several challenges pertaining to language acquisition (e.g., Turkish vowel pronunciation and suffixes), AI tools assisted them in overcoming some issues. ChatGPT and Gemini were the most suggested AI tools among the participants, along with practicing sentence structure before real-life conversation.

Conclusion

This study highlights digital assistants' role in Turkish language acquisition, improving learners' proficiency and confidence, despite limitations related to sample type and context. It also provides practical implications and future suggestions for integrating AI in Turkish language learning.



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sciforum-171014: Use of University Directed Studies and Undergraduate Summer Student Research Programs to Create Enhanced Antibiograms and Improve Antimicrobial Stewardship

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Although hospital antibiograms are widely available to guide antimicrobial selection, they may overcall resistance when extrapolated to common community acquired infections, such as meningitis, pneumonia, cystitis, and skin and soft tissue infections. Clinical & Laboratory Standards Institute (CLSI) has called for the need for enhanced community antibiograms but acknowledges the challenges due to lack of centralized laboratories to take on this responsibility. LifeLabs British Columbia (BC), a regional laboratory network with 129 collection centres in rural and urban BC communities, is uniquely positioned to address this challenge. In summer 2025, we recruited 10 university undergraduate students from various disciplines (medicine, pharmacy, and neuroscience) through the University of British Columbia directed studies and undergraduate summer student research programs to create enhanced antibiograms to address community needs. Under supervision of a clinical assistant professor and using data collected at LifeLabs regional microbiology laboratories, the students statistically analyzed results for the benefit of community healthcare, public health, and antimicrobial stewardship teams. These antibiogram topics range from blood culture, bacterial meningitis pathogens, pediatric urine culture, sexually transmitted infections, carbapenem resistant organisms, ear pathogens, and tetracycline baseline resistance rates in various communities. We acknowledge that many of the published infectious disease guidelines are based on American data which are not always applicable to the BC and Canadian population. An evaluation is required to determine whether these clinical guidelines are still within the Canadian context based on local BC community data. This presentation will share our successes and challenges in this journey and hope to influence colleagues in academia and clinical laboratories to start the same initiative. We successfully conducted 10 different antibiogram projects during the summer, some of which have already been accepted for peer-reviewed journal publications. This experience demonstrated how we can make use of the resources in education to go the extra mile for patients and the community.



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sciforum-177990: A Comparative Analysis of Educational Barriers Between Pakistan and Malaysia

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Introduction:

With evolving landscape of global higher education, it is imperative to analyse and understand specific friction points for systemic improvement. This paper provides comparative analysis of primary educational barriers faced by higher education students in Pakistan and Malaysia. Human Capital Theory (HCT) frames education as an investment that is aimed at providing employment and better income-prospects, while Bronfenbrenner's Ecological Systems Theory categorises barriers across microsystem, mesosystem, exosystem, and macrosystem levels to capture structural influences at each level.

Methods:

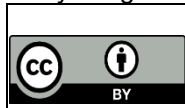
This study employed cross-sectional, mixed-methods survey design, selected for enabling synchronic comparison across two national contexts. Participants were recruited through purposive and snowball sampling, distributed via WhatsApp student groups, targeting undergraduate and graduate students in Pakistan and Malaysia. A total of 102 valid responses were collected. Likert-scale items were analysed using frequency distributions and descriptive statistics, while open-ended responses underwent inductive thematic analysis through open-coding and theme clustering. Bronfenbrenner's levels structured barrier categorisation and HCT informed interpretation of student motivations.

Results:

Unanimously at mesosystem-level, both cohorts identified cost of education and mental health pressure as dominant shared barriers, consistent with HCT's premise that financial strain undermines educational investment returns. Structural barriers diverged at microsystem and exosystem levels. Pakistani students reported frustration with rote memorisation, rigid structures, and outdated assessments, reflecting deeply rooted examination based credentialism at the macrosystem level. Malaysian students identified lack of personalisation and curriculum-industry misalignment as primary exosystem-level barriers. Both cohorts preferred project-based learning, reflecting HCT aligned demand for market relevant skills, while Malaysian respondents additionally favoured hybrid work-study models reflecting macrosystem-level academic industry expectations.

Conclusion:

Shared financial and psychological burdens reflect HCT consistent expectations of economic returns from education. Reform in Pakistan should prioritise competency-based progression over exam-focused structures, while Malaysia should advance personalised learning and hybrid work-study integration to align academic outcomes with industry demands.



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sciforum-175547: A Data-Driven Framework for Assessing Placement Readiness among Undergraduate Engineering Students

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Introduction

In engineering education, placement readiness is often assessed primarily through academic performance; however, academic scores alone may not adequately represent a student's preparedness for industry roles. Engineering graduates are expected to demonstrate practical exposure, technical competence, and career-oriented engagement in addition to theoretical knowledge. This study aims to develop a structured, data-driven framework to evaluate placement readiness among undergraduate engineering students and identify key predictors influencing employability preparedness.

Methods

An exploratory pilot study was conducted using data collected from 11 undergraduate engineering students through a structured self-assessment instrument. The questionnaire captured academic indicators (CGPA, backlogs), programming proficiency, coding practice intensity, internship participation, mini-project involvement, resume readiness, and hackathon participation. Categorical responses were converted into numerical values, and a Composite Placement Readiness Score (PRS) was calculated by aggregating weighted academic and experiential indicators. Descriptive statistics and correlation analysis were performed to identify relationships between individual factors and overall readiness.

Results

The mean PRS indicated moderate overall preparedness within the cohort. Correlation analysis revealed that academic performance ($r \approx 0.73$), internship participation ($r \approx 0.47$), and mini-project involvement ($r \approx 0.52$) showed the strongest positive associations with placement readiness. Students with internship and project exposure consistently demonstrated higher readiness scores compared to those without such experience.

Conclusions

The findings suggest that placement readiness among engineering students is multidimensional and strongly influenced by experiential learning components alongside academic consistency. This pilot framework demonstrates the feasibility of structured educational analytics for early identification of readiness gaps and supports the integration of practical exposure within engineering curricula to enhance employability outcomes.



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sciforum-171871: A Longitudinal Analysis of Moodle Log Data during and after Covid-19: A Cross-Continental Comparison of Universities in France and Vietnam

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Introduction

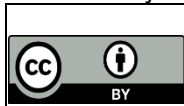
Although learning management systems (LMS) emerged in the late 1990s, their adoption in higher education accelerated sharply during the COVID-19 pandemic. The sudden shift to online teaching drew scholars' attention to technology acceptance in crisis or emergency contexts (Alturki & Aldraiweesh, 2021). While the "new normal" appears to have influenced students' LMS use (Misiejuk et al., 2023), continuance use, understood as sustained post-adoption usage (Bhattacharjee, 2001), has received limited attention. Moreover, international comparisons remain relatively scarce and often insufficiently account for cultural and institutional differences, leaving an important research gap. This study therefore examines how students' LMS behaviors differ across cultural contexts across two stages of environmental change: during and after COVID-19.

Method

This study uses longitudinal analysis of students' behavior in an LMS, comparing two higher-education contexts (Carvalho et al., 2026): Université Côte d'Azur (France) and the University of Da Nang (Vietnam). We measure students' Moodle use across two periods (during and after COVID-19), enabling us to observe behavioral change over time and examine dynamic relationships. Three analyses will be conducted: (1) Behavioral analysis: intensity, diversity, and relative engagement; (2) Trajectory modeling: multilevel growth-curve models and latent class growth analysis; (3) Cross-institution comparison: comparing the distribution of trajectory types.

Result

Our expected contributions are twofold. First, we provide a typology of LMS-use trajectories that characterizes patterns of digital learning practices over time. Second, we offer evidence on how contextual factors (including learning culture, course design, and pedagogical practices) shape the sustainability of these practices in higher education.



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sciforum-169771: Bridging Secondary School and STEM Higher Education Through Interdisciplinary and Technology-Enhanced Interventions

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The transition from secondary school to STEM higher education constitutes a critical stage that frequently exposes gaps in students' foundational scientific competencies, including data interpretation, mathematical reasoning, measurement, modeling, and scientific communication. These difficulties significantly affect students' academic trajectories and contribute to early dropout in science and technology degree programs. This paper presents an interdisciplinary educational intervention designed to support secondary school students during the transition to STEM higher education through a series of seven structured workshops complemented by technology-enhanced domiciliary activities. The intervention integrates core concepts from physics, chemistry, mathematics, and biology, emphasizing active learning, collaborative problem-solving, and the development of transversal scientific skills. A distinctive feature of the proposal is the guided and critical use of artificial intelligence tools in extracurricular activities carried out outside the classroom. Students are encouraged to compare their own problem-solving processes with AI-generated outputs, identify conceptual and methodological errors, and reflect on the epistemic limits, risks, and potential of AI in scientific learning. This approach promotes metacognitive awareness and responsible use of emerging technologies. Implemented within a university extension framework, the model fosters institutional articulation between secondary schools and higher education, supports inclusive access to STEM careers, and positions extension-based interventions as effective pedagogical strategies for strengthening STEM readiness prior to university entry.



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sciforum-178738: Designing an e-Portfolio Framework for Competency-Based Assessment in a Master's-Level Instructional Design Program

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Graduate programs in instructional design increasingly face the challenge of aligning academic learning outcomes with competencies expected in professional practice. Traditional assessment approaches, such as written comprehensive examinations, may not fully capture the applied skills and authentic work products developed by master's-level students preparing for industry-oriented careers. As a result, there is growing interest in alternative assessment models that can better document students' professional competencies and developmental progress.

This study presents the design and pilot implementation of an e-portfolio-based assessment framework for a master's-level Instructional Design and Development (IDD) program. The proposed framework aims to support competency-based program assessment while also helping students document and showcase professional artifacts that demonstrate their instructional design capabilities. The framework is grounded in the competency standards developed by the International Board of Standards for Training, Performance and Instruction (IBSTPI), which serve as the foundation for mapping program learning outcomes and organizing portfolio artifacts.

A mixed-methods research design guides the development and evaluation of the e-portfolio framework. Data will be collected through surveys, open-ended responses, and interviews with key stakeholders including current students, alumni, faculty members, and industry partners. These data will inform the identification and validation of program learning outcomes and the development of portfolio assessment criteria. This project adapts an iterative pilot implementation with current master students, during which participatory design cycle are used to refine the e-portfolio design.

The project is expected to produce an IBSTPI-aligned e-portfolio assessment model, validated competency-based evaluation criteria, and a practical guideline for portfolio development and evaluation. The findings contribute to improving program-level assessment and strengthening the alignment between graduate education and industry expectations in instructional design.



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sciforum-177392: Digital Academic Leadership in Kazakhstan: Exploring Academic Perspectives

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In the face of rapid digital transformation, higher education institutions are increasingly expected to adapt to technological advances that impact teaching, learning, research, and governance. Although digital leadership has gained more attention in educational research, studies exploring how digital academic leadership is understood within academic communities remain limited, especially in emerging educational settings like Kazakhstan.

This study aims to examine how academics in higher education and school settings conceptualize and understand digital academic leadership. Their experiences offer valuable insights into the skills, opportunities, and challenges related to digital academic leadership in modern educational institutions.

The study used a qualitative phenomenological research approach to investigate the lived experiences and perceptions of academics about digital academic leadership. Phenomenology was chosen as the methodological framework because it emphasizes understanding individuals' lived experiences and the meanings they assign to a specific phenomenon. In this research, the phenomenon examined was the concept and practice of digital academic leadership within educational settings.

The participants comprised 35 academics based in Astana, Kazakhstan. They were chosen through purposive sampling to include individuals who actively incorporate digital technologies into educational contexts. The group included professionals from a range of academic disciplines, many of whom held roles such as associate professors and lecturers at universities and other educational institutions. Their varied disciplinary backgrounds enabled the study to gain a broader understanding of how digital academic leadership is perceived across different fields.

Data were collected through open-ended questions, allowing participants to express their perspectives and experiences in detail. This approach enabled the researchers to obtain rich qualitative data reflecting participants' authentic views on digital leadership practices, required competencies, and the role of digital technologies in educational leadership. The collected data were analyzed using content analysis, which involved systematic coding, categorization, and interpretation of participants' responses to identify key themes and patterns.



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sciforum-152030: Digital Student Partnership in Quality Assurance: Measuring Impact on Program Quality and Employability

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This study synthesizes recent scholarship and policy guidance to propose a practical, measurable model for digitally enabled student partnership in higher education quality assurance (QA). Traditionally, institutions have measured student engagement by activity volume rather than its genuine impact on educational outcomes. This research maps how digital feedback and participation platforms—embedded within transparent governance structures—can shift QA from compliance-focused processes toward demonstrable improvements in program quality, student experience, and employability outcomes.

Drawing on European QA practice, Jisc sector-wide data, UNESCO ethical guidelines for AI and digital tools, and peer-reviewed studies on Students as Partners (SaP) and employability, the study develops testable propositions, a comprehensive implementation playbook, and key performance indicators (KPIs) with operational definitions and measurable targets. Utilizing a synthesis methodology combined with realist Context-Mechanism-Outcome (CMO) mapping, it integrates evidence from 2012 to 2025, emphasizing ethical oversight, equity, and human agency in digital engagement processes.

The research addresses critical gaps in current practice where student voice initiatives often lack systematic evaluation and fail to demonstrate tangible impact on educational quality. This model offers institutions and policymakers a clear, evidence-based roadmap for embedding authentic student partnership through digitally supported and ethically governed systems that are accountable, inclusive, and outcome-focused—advancing meaningful student involvement as a strategic driver of continuous quality enhancement and labor market relevance in contemporary higher education.



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sciforum-153415: Educators Under Pressure: Lifestyle Changes, Stress, and Anxiety During COVID-19

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Introduction: The COVID-19 pandemic forced educators to rapidly adapt to remote teaching, profoundly affecting their professional and personal lives. These abrupt changes disrupted daily routines, heightened stress, and raised concerns about long-term well-being. Understanding how teachers' lifestyles and mental health were impacted is crucial for designing effective support strategies during crises.

Methods: A cross-sectional quantitative study was conducted with 105 teachers using an online questionnaire. Data collected included sociodemographic characteristics, lifestyle habits (Fantastic Lifestyle Questionnaire), and psychological indicators (Depression, Anxiety, and Stress Scale – EADS-21). The intervention component focused on promoting healthy eating behaviors.

Results: Most participants were female (88.6%), over 51 years of age (60%), and had more than 15 years of teaching experience (86.7%). Remote teaching required 93.3% of respondents to reorganize work schedules, while 89.5% reported modifying lifestyle and family routines. Over half expressed dissatisfaction with teleworking. Results from the EADS-21 revealed that stress showed the highest mean score (0.98), indicating a considerable burden compared with depression and anxiety. These findings suggest that lifestyle disruptions and professional pressures contributed to increased stress levels among teachers.

Conclusions: Educators experienced significant lifestyle changes, high stress, and dissatisfaction with telework during the COVID-19 pandemic. The results highlight the urgent need for targeted health promotion programs, particularly those addressing stress management and healthy lifestyle behaviors. Future research should focus on the long-term effects of such interventions on teachers' mental health, resilience, and professional performance.



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sciforum-173079: Embedding Structured Publication in MSc Food Science and Nutrition Education: A Research-Integrated Teaching Model with Scholarly Outcomes

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This study describes an innovative research-integrated teaching model implemented in an MSc course in Food Science and Nutrition, designed to strengthen postgraduate students' scholarly writing, critical appraisal skills, and publication readiness. Rather than relying solely on traditional lectures and examinations, the course adopted a structured, mentored group-based review paper approach. Students were organized into small research teams and guided to select contemporary, high-impact topics within food science and nutrition. Throughout the semester, continuous monitoring was ensured through scheduled meetings to discuss selected materials, evaluate literature quality, refine research questions, and review successive manuscript drafts. Students completed the full scholarly review process, including systematic database searches, critical synthesis of evidence, identification of research gaps, and preparation of manuscripts aligned with target journal guidelines. Drafts underwent iterative supervisory feedback and were also evaluated by independent faculty members to simulate external peer review and strengthen scientific rigor. In addition, students delivered formal presentations of their topics and key findings at the end of the course, enhancing scientific communication and academic confidence. The model fostered research ownership, teamwork, leadership, and advanced analytical thinking. Importantly, it produced tangible scholarly outcomes: two student-led review papers have already been published in Q1-ranked journals in Food Science and Nutrition, with several additional manuscripts currently under preparation and submission. This experience demonstrates that embedding structured publication training within MSc coursework enhances educational impact while generating meaningful scientific contributions. Future studies should assess the long-term effects of this model on research productivity and career development across different academic settings.



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sciforum-174475: Foreign Language Education for Specific Purposes in the Context of Sustainable Development

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This paper conceptualizes the integration of sustainable development principles into foreign language education for specific purposes through the methodological lens of the five core sustainability competencies. Education for sustainable development is approached as a transformative pedagogical paradigm that fosters critical thinking, systems awareness, anticipatory competence, ethical responsibility, and collaborative problem-solving, thereby shaping students' long-term professional identities and decision-making capacities. In this perspective, foreign language education is not limited to linguistic proficiency but becomes a medium for cultivating sustainability-oriented knowledge, values, and skills relevant to contemporary global challenges. The study is grounded in an educational action research framework focusing on foreign language course and curriculum development in higher education. It offers a systematic justification of course structure, intended learning outcomes aligned with sustainability objectives, instructional strategies, and pedagogical interventions designed to promote active and reflective learning. Empirical data were collected from students at Vilnius University and Mykolas Romeris University (Lithuania), complemented by expert insights from environmental law specialists. The findings suggest that embedding sustainable development into Business English curricula enhances students' professional preparedness, global awareness, and employability in increasingly sustainability-driven labour markets. Students highlighted the value of integrative, collaborative, experiential, and practice-oriented approaches, while experts identified both strategic benefits and methodological limitations. To sum up, the study underscores the strategic importance of integrating sustainability competencies into foreign language education for specific purposes within higher education.



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sciforum-174927: Framework of Indicators for Education and Sustainability (FIES): A Holistic Approach to Advancing Sustainability in Higher Education

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The urgent need to address climate change and sustainability challenges has positioned higher education institutions (HEIs) as critical agents of transformation. However, existing evaluation models such as UI GreenMetric, AASHE-STARS, and THE Impact Rankings tend to prioritize environmental and infrastructural dimensions while neglecting pedagogical innovation, social engagement, and justice-oriented perspectives. This study introduces the **Framework of Indicators for Education and Sustainability (FIES)**, designed to provide a holistic and transformative approach to assessing sustainability in HEIs.

The research employed a **sequential mixed-methods design**, combining a systematic literature and policy review, Delphi-based expert validation, and institutional case studies. The process resulted in the development and validation of **68 indicators** across five dimensions: Academic Curriculum, Research and Innovation, Institutional Management, Infrastructure and Resources, and Social Engagement. Unlike existing rankings, FIES balances environmental, social, cultural, and ethical considerations while integrating quantitative and qualitative measures.

Findings demonstrate that FIES offers not only a monitoring tool but also a strategic roadmap for embedding sustainability within HEIs. The validated indicators highlight governance, curriculum reform, interdisciplinary research, and community partnerships as levers for systemic change. By addressing gaps in current frameworks, FIES strengthens the role of higher education in advancing the Sustainable Development Goals (SDGs) and fostering a just, resilient, and inclusive transition towards sustainability.



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sciforum-173271: From Architects to Constructors: How AI Undermines Architectural Thinking?

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This exploratory case study examines how text-to-image AI tools intersect with concept generation, the phase where students translate architectural theory into concrete decisions about space, form, structure, and function, in a 3rd year design studio. The research was conducted during Fall 2024 at a Central Asian university with 40 architecture students developing a cultural center project. All participants received identical instruction on concept development; AI tools were neither assigned nor prohibited.

Documentation included semester-long observation, desk critiques, and analysis of midterm and final submissions.

Three modes of engagement emerged from observed working methods. 38% of students independently incorporated text-to-image tools; 16% showed limited engagement; 46% pursued research, abstraction, and iterative development without AI assistance. These groupings reflect behavioral patterns rather than assigned categories.

Students in the non-AI group demonstrated growing capacity to connect theoretical references to design decisions. Those using AI tools produced visually developed proposals, though the relationship between their stated concepts and subsequent spatial, formal, or functional decisions was less traceable within this single-semester context. The limited-engagement group showed minimal advancement.

At final review, differences were most apparent in how students explained the path from concept to design decisions. While individual trajectories varied, the association between mode of engagement and development of design reasoning was consistent across observed cases. These findings are specific to this studio context; they suggest questions about pedagogical sequencing when AI tools enter design education, but broader claims would require further research.



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sciforum-177656: From Needs Assessment to Training Design: A Project-Based Learning Case Study on University–Community Engagement in Higher Education.

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Introduction: Higher education institutions face increasing pressure to bridge the gap between academic preparation and real-world professional demands. Project-based learning (PBL) has been recognised as a promising pedagogical strategy to foster authentic competency development and strengthen university–community connections. However, empirical evidence on its systematic implementation in Education Sciences undergraduate programmes remains relatively scarce. This study reports a case study on the redesign of a higher education course unit, through a PBL framework anchored in real organisational contexts.

Methods: A descriptive case study was conducted. Twenty-five undergraduate students enrolled in an evening programme collaborated with five community organisations (two private companies and three non-profit social institutions) across a structured five-phase process: organisational characterisation, needs diagnosis, intermediate assessment, training plan design, and professional presentation. Data sources included a course evaluation questionnaire ($n = 25$), group self- and peer-assessment forms, student-produced outputs (five needs assessment reports and five training plans), and brief written reflections collected at key moments of the learning process. Descriptive statistics and qualitative content analysis were applied.

Results: Students demonstrated competence in translating real organisational needs into structured, contextualised training plans. Overall course satisfaction was high ($M=8.75/10$; $SD=1.15$), with consistently positive scores across teaching quality ($M=4.47/5$), assessment criteria ($M=4.67/5$), and perceived learning impact ($M=4.36/5$). Qualitative data revealed themes of reflexivity, knowledge construction, and professional growth. Self- and peer-assessment data also pointed to high perceived engagement and collaborative contribution.

Conclusions: This case study suggests that PBL structured around real community partnerships can support professional learning, and university–community engagement in undergraduate Education. The findings also highlight the value of curriculum redesign grounded in authentic organisational contexts.

Acknowledgments: This paper was created within the framework of the scientific projects (2022.02524.CEECIND/CP1718/CT0026) and (CIEC | UMinho, UID/00317/2025), both funded by the Foundation for Science and Technology — FCT (Portuguese Ministry of Education and Science).



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sciforum-178825: Genre Naivety and the Essay Type Assessment: A Genre Analysis of Writing Challenges Among Undergraduate Law Students

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This study examines recurring writing challenges among undergraduate law students through the lens of Genre Theory. Grounded in the work of Swales (1990) and Bhatia (1993), Genre Theory conceptualises academic writing as a socially recognised and purposeful communicative practice shaped by specific rhetorical structures, conventions, and disciplinary norms. The present analysis applies this framework to a corpus of 30 essay-type assessment submissions from second-year Bachelor of Laws students, who were required to discuss the importance of understanding communication context in workplace settings as part of the Communication Skills III.

From a genre perspective, the essay constitutes a structured academic form requiring a sequence of rhetorical moves, including the establishment of a conceptual framework, development of a coherent argument, integration of supporting evidence, and articulation of a reasoned conclusion. However, analysis of the submissions reveals that many students demonstrated limited awareness of these genre conventions. Rather than constructing analytical arguments, a significant proportion relied on descriptive listing of content, reflecting what Swales identifies as “genre naivety,” where writers lack the schematic knowledge necessary to reproduce expected communicative structures. These structural limitations were further reinforced by linguistic challenges. Bhatia’s concept of lexicogrammatical features as defining elements of genre highlights issues such as informal register, inconsistent syntax, and imprecise vocabulary evident across the essays. Students used everyday communicative norms rather than those associated with academic or legal discourse, suggesting incomplete genre acquisition. Moreover, weaknesses in citation and referencing practices indicate limited engagement with intertextual conventions, a key feature of Swales’ notion of discourse community. Overall, these findings suggest that students’ difficulties extend beyond surface-level errors and reflect a deeper unfamiliarity with academic genre expectations. The study therefore underscores the need for explicit genre-based instruction, including model text analysis, rhetorical move awareness, and scaffolded writing, to support students in developing effective academic and legal communication skills.



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sciforum-178650: Improving Medical Students' Understanding of Glucose Metabolism through Clinically Oriented Teaching Approaches

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Understanding glucose metabolism is essential for medical students because disorders of glucose homeostasis, particularly hyperglycemia, are involved in the pathogenesis and progression of many diseases. In medical education, it is important not only to provide theoretical knowledge about biochemical pathways, but also to orient students toward the practical outcomes of their future professional activity in the diagnosis and treatment of pathological conditions.

A clinically oriented teaching approach may improve students' comprehension of metabolic processes by connecting theoretical concepts with real or modelled clinical situations. In particular, students tend to better perceive and retain information when they are shown how experimental findings, including preclinical and clinical research data as well as examples from international scientific practice, can be applied to the assessment of a patient's condition. Such an approach helps students understand the relevance of biochemical markers, the mechanisms underlying hyperglycemia, and the metabolic basis of disease development and treatment strategies.

The integration of clinically oriented discussion, research-based examples, and interpretation of metabolic indicators may increase students' motivation, improve critical thinking, and promote a deeper understanding of glucose metabolism compared with traditional theory-centered teaching alone.

In conclusion, clinically oriented teaching approaches can enhance medical students' understanding of glucose metabolism by linking fundamental biochemical knowledge with practical diagnostic and therapeutic relevance. This approach may contribute to more effective training of future physicians and to a better understanding of metabolic disturbances in clinical practice.



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sciforum-177674: Integrated Inclusive Model with AI for Challenges (MIIA-R): Validation through Participatory Action Research in a Virtual University Environment

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Introduction:

The rapid incorporation of generative AI into teacher education has outpaced the development of inclusive pedagogical frameworks. This study aims to validate the Integrated Inclusive Model with AI for Challenges (MIIA-R), which combines Universal Design for Learning, challenge-based learning focused on authentic professional problems, and Participatory Action Research to guide accessible instructional design in a virtual postgraduate context.

Methods:

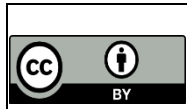
A mixed-methods Participatory Action Research design was implemented across three iterative cycles with 83 master's students, analysing 80 challenge proposals. Data were collected through an analytic rubric, a creativity scale, reflective group journals, and a satisfaction survey to examine proposal quality, pedagogical uses of AI, and patterns of creativity.

Results:

Overall proposal quality exceeded the functional threshold ($M = 3.29/5$), confirming the model's applicability. However, a gap emerged between feasibility ($M = 4.18$) and pedagogical use of AI ($M = 2.39$), suggesting that technical adoption does not guarantee inclusive integration. Creativity followed an inverted U-shaped trajectory: it increased during guided design but declined at the public challenge fair, where evaluative pressure acted as a pedagogical selection mechanism between instrumental uses of AI and more reflective applications. In the final cycle, diversity of AI tools correlated significantly with creativity ($\rho = 0.527$; $p = 0.001$), supporting the view that natural-language tools function as conditional catalysts rather than automatic drivers of innovation.

Conclusions:

The MIIA-R model offers a reproducible framework that extends previous approaches by integrating AI, UDL, and challenge-based learning into a reflective and ethically grounded design process. Its main contribution is to demonstrate that inclusive pedagogical creativity depends less on the number of tools used than on prior pedagogical scaffolding and critical reflection, reinforcing its relevance for teacher education in virtual environments.



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sciforum-168336: Intercultural Competence and Inclusive Practices in EFL Higher Education

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Intercultural competence refers to the ability to communicate effectively and appropriately with individuals from diverse backgrounds. In an increasingly globalized world, this competence has become essential in English as a Foreign Language (EFL) context, where learners are expected to engage in intercultural communication settings. This study highlights the importance of integrating intercultural perspectives into English language education. Foreign language teachers can help students understand cultural diversity better by using a transcultural approach. This approach encourages students to be more flexible, ethno-relative, and aware of cultural differences. In course design, the integration of ICC skills promotes inclusive learning environments, shifting the focus from language accuracy to evaluating students' ability to analyze and integrate cross-cultural understandings. Hence, our work emphasizes the importance of cultural values, communication styles, and social identity and attempts to improve EFL learning outcomes. Our research is conducted at Ibn Khaldoun University of Tiaret with a sample of ninety Master's students (Linguistics specialty); and adopts a mixed-methods approach using an online questionnaire with reflective written responses and qualitative analysis of selected learner discourse. The findings revealed that many participants unintentionally use ethnocentric expressions, which can raise sensitivity and prejudice in the classroom. Qualitative insights further show that such expressions often emerge from limited intercultural awareness rather than deliberate exclusionary intent. By integrating intercultural communication assessment into EFL teaching, teachers can empower students to use language not only as a means for interaction, but also as a medium for cultural exchange, identity expression, and mutual understanding. Therefore, this investigation provides transferable pedagogical implications for EFL contexts beyond the local setting; further, it contributes to ongoing international discussions on intercultural education.



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sciforum-172461: Learning Strategies Among High-Performing Students in a First-Year Scientific Foundations of Medicine Course: A Descriptive Study

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Background:

The Scientific Foundations of Medicine (SFM) course is the first foundational course in our medical curriculum and is heavily rooted in biochemistry and molecular mechanisms. As one of the earliest and most academically demanding courses in the first year, a significant proportion of students struggle with the volume and conceptual depth of the material. In contrast, a small subset of students consistently achieve top-tier performance. Understanding the learning strategies of these high-performing students may provide actionable insights to support future cohorts. **This study aims to identify the self-reported study behaviors and learning strategies most commonly used by top-performing students in the SFM course.**

Methods:

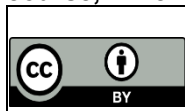
We designed a cross-sectional descriptive study targeting the top-performing students (>90% grade in the course; around 15 students) in the SFM course. Participants will complete an 18-item Likert-scale survey examining study structure, use of active learning strategies, resource utilization, lecture engagement, peer collaboration, test-taking approaches, and self-attribution of success. Items were selected to focus on modifiable study behaviors rather than fixed characteristics. **Planned analyses will include descriptive statistics summarizing response distributions (means, frequencies, and percentages) for each survey item to identify commonly endorsed learning behaviors among high-performing students.**

Results:

Data collection is currently underway. Results will be available prior to the conference and will include summary statistics of endorsed learning behaviors and patterns that characterize high-performing students.

Conclusion:

Identifying the self-reported strategies of top-performing students may inform targeted academic support interventions and early guidance for incoming medical students in this rigorous foundational science course. **Findings should be interpreted in light of the study's limitations, including the small sample size and the focus on a select group of high-performing students from a single course, which may limit generalizability.**



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sciforum-178188: Mental Health and Academic Stress among University Students

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Background: University life is often associated with multiple academic demands, competitive environments, and social expectations that can significantly affect students' mental health. Academic stress has become an increasing concern in higher education institutions worldwide, as excessive stress may lead to anxiety, depression, burnout, and reduced academic performance. Understanding the relationship between academic stress and mental health is essential for developing effective support systems for students and improving their overall well-being.

Aim: This study aims to examine the relationship between academic stress and mental health among university students, as well as to identify the main academic and psychosocial factors that contribute to stress and psychological distress.

Methods: A cross-sectional study was conducted among university students using structured questionnaires. Standardized instruments such as the Perceived Stress Scale (PSS) and validated mental health assessment tools were used to evaluate levels of stress, anxiety, and emotional well-being. The analysis focused on academic workload, time management, social support, and coping strategies among students.

Results: The findings indicate that many university students experience moderate to high levels of academic stress, which is significantly associated with symptoms of anxiety and reduced psychological well-being. Factors such as heavy academic workload, examination pressure, and limited coping strategies contribute to increased stress levels. The results highlight the importance of implementing institutional support systems, mental health services, and stress management programs within universities.



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sciforum-172840: Micro-Credentials and Employment Readiness: Evidence from Higher Education Stakeholders in the UAE.

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The evolving demands of the global workforce have intensified the need for flexible, competency-based models within higher education. Micro-credentials have emerged as a promising mechanism to bridge the gap between academic qualifications and industry requirements by offering clearly defined competencies. This study examines the integration of micro-credentials into undergraduate programmes at a higher education institution in the United Arab Emirates (UAE), focusing on their role in enhancing graduate employment readiness. Adopting a pragmatic research paradigm and an explanatory sequential mixed-methods design, the study first analyses quantitative data and subsequently interprets these findings through qualitative inquiry. It explores the perceptions of students, faculty, and employers regarding the acceptance, perceived benefits, and implementation challenges of micro-credentials, while identifying priority skills considered critical for workforce alignment. The findings highlight broad stakeholder support for micro-credentials as instruments for enhancing employability, alongside concerns related to quality assurance, standardisation, recognition, and institutional integration. Situated within the UAE's national strategies for economic diversification and human capital development, the study provides context-sensitive insights into the governance and sustainability of alternative credential models. By offering an empirically grounded, multi-stakeholder analysis, this research contributes to the growing scholarship on micro-credentials in higher education and presents actionable recommendations for policymakers and institutional leaders seeking to strengthen workforce readiness through modular credentialing frameworks.



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sciforum-170981: Multilingual Educational Environment as a Factor of Communication Quality and Teamwork Efficiency in Emergency Medical Training

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Background:

In emergency and urgent care, communication errors can jeopardize patient safety. Multilingual educational settings may intensify these risks by complicating teamwork and rapid clinical decision-making. Kazakhstan's trilingual higher-education policy (Kazakh–Russian–English) provides a relevant context to examine how the language of instruction shapes students' interaction and perceived communication clarity.

Aim:

This study examined how different language tracks influence teamwork, perceived communication barriers, and intergroup integration among emergency medical students.

Methods:

A descriptive cross-sectional survey was conducted among 248 third- to fifth-year medical students enrolled in English (n=82), Kazakh (n=78), and Russian (n=88) programs at a university emergency care department. A structured questionnaire (10-point Likert items plus one open-ended question) demonstrated good internal consistency (Cronbach's $\alpha=0.82$). Group differences were tested using χ^2 with Cramer's V, and relative risks (RR) were calculated (p0.05).

Results:

Intergroup interaction differed by language track ($\chi^2=42.90$, p0.001; V=0.416). English-medium students showed the highest interaction (86.4%) compared with Russian-medium (37.5%; RR=2.31, 95% CI: 1.74–3.06). Communication clarity also varied (p0.001): misunderstandings were more common in English- and Kazakh-medium groups, while Russian-medium students more often reported none. Barriers differed—language difficulties dominated in English/Kazakh tracks, whereas low motivation was typical for Russian-medium students. Mixed-team simulations and project-based learning were viewed as the most effective integration methods.

Conclusion:

Multilingual emergency medicine education is both a challenge and a resource. Structured intergroup activities—especially mixed-language simulation training—can improve teamwork, communication accuracy, and intercultural competence, while also reinforcing students' readiness to work in linguistically diverse clinical settings.



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sciforum-178739: Multiple-Choice Question (MCQ)–Based Assessment and Learning Depth in Undergraduate Health Sciences Education

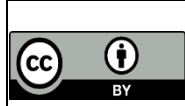
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Many higher education institutions have experienced a significant expansion in the use of standardized, centralized assessments based on multiple-choice questions (MCQ) to assess large numbers of students. This type of assessment offers organizational efficiency and standardization of evaluation criteria. However, educational literature indicates that the nature of the assessment system can directly influence students' learning strategies. In some educational settings, the heavy reliance on multiple-choice questions may lead students to focus on memorizing past exam questions or relying on online question banks rather than developing a deep conceptual understanding of the subject matter.

This exploratory study aims to examine the relationship between the structure of multiple-choice assessments and the learning approaches of undergraduate students in health science programs. The study will employ a descriptive design based on an analysis of students' test preparation patterns

It will also assess their ability to apply scientific concepts to novel conceptual questions outside the traditional multiple-choice format. The results of this study are expected to contribute to a deeper understanding of the impact of assessment styles on students' learning behaviors. This may support the development of more balanced assessment strategies that promote conceptual understanding and analytical thinking in higher education while preserving practical efficiency needed in large-enrollment courses.



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sciforum-172750: Pedagogy for non-Pedagogues: Analysis of the Pedagogical Impact and Training Needs in the Diploma in Curriculum Design and Management of the Faculty of Health Sciences- National University of Formosa, 2025. Argentina.

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University teaching in Northeast Argentina is primarily a position held by professionals with technical training and no formal pedagogical preparation. This study evaluated the pedagogical impact and relevance of the Diploma in Curriculum Design and Management (2025), a postgraduate course offered by the Faculty of Health Sciences at the National University of Formosa.

The cohort included 104 professionals from various disciplines (engineering, law, accounting, higher education teaching, and health). A mixed-methods approach was used: semi-structured digital surveys were administered to the 61 graduates of the program, with a 100% response rate, to assess satisfaction with the content and teaching performance. Simultaneously, a dropout rate of 41.3% (43 participants) was recorded, and semi-structured interviews were conducted with those who dropped out to explore the reasons for leaving. Distinguishing between graduates and dropouts allowed for the identification of specific barriers to learning and potential selection bias factors in the results.

Graduates expressed satisfaction with the content and teaching; however, the high dropout rate suggests limitations in the suitability of the methodology and course structure to the participants' needs. Among the obstacles identified, the so-called "blank page syndrome" stood out, especially among the heads of practical work, who experienced difficulties in developing curricula. Demands were also noted for the integration of Artificial Intelligence in curriculum design, the use of the CVar (Argentine Curriculum Vitae) system, and the development of a "situated pedagogy" that addresses digital fatigue and the use of digital tools in hybrid and distance learning modalities.

It is concluded that the results suggest the need to make administrative structures more flexible and adapt pedagogical methodologies to the characteristics of the participating professionals, incorporating emerging technologies and strengthening pedagogical training. The findings are specific to the context of the evaluated program and should not be generalized to other institutions or regions without complementary studies.



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sciforum-173280: Perception of the Use of ChatGPT on Academic Work among Undergraduate Students in Obafemi Awolowo University, Ile-Ife, Nigeria

Oyeboode Stephen Oyetoro * and Taiwo Esther Eludini

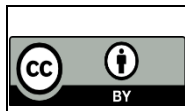
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This study investigated undergraduate students' awareness and utilization of ChatGPT for academic purposes among undergraduate students in Obafemi Awolowo University. It also determined their perceptions of the benefits and challenges of using ChatGPT for academic work; how the students perceive the influence of ChatGPT on their academic performance and their development of critical skills and; students' level of awareness of ethical issues and concerns in integrating ChatGPT's outputs into their academic activities.

The descriptive survey research design was employed. The sample comprised of 380 students selected across more than eight of the 14 faculties in the study area. Data was collected through the use of an instrument that captured the demographic details, awareness and usage patterns, perceived benefits and challenges, and ethical concerns of ChatGPT for academic work. Data were analysed using descriptive statistics.

Findings revealed that awareness of ChatGPT was nearly universal, with 93% of respondents reporting familiarity or use. ChatGPT emerged as the most widely adopted AI tool, primarily employed for research assistance (69%), writing assignments (57%), summarizing articles (42%), and examination preparation (39%). Students perceived notable academic benefits, with 74% reporting improved performance and 77% recognizing contributions to skill development, although most rated these improvements as moderate. Challenges included inaccurate or misleading outputs (47%), difficulties in generating effective prompts (37%), and contextual irrelevance (56%), alongside concerns about over-reliance and infrastructural barriers. Ethical awareness was relatively high, with 66% acknowledging the implications of AI use, yet ambiguity persisted, as only 43% viewed unacknowledged GPT use as plagiarism while others disagreed or were uncertain.

The study concludes that ChatGPT is widely perceived as beneficial but moderated by accuracy, ethical, and infrastructural concerns. It recommends the widespread dissemination and deployment of institutional AI policies, the integration of digital literacy programs, and investment in digital infrastructure to ensure responsible and equitable use in higher education.



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sciforum-160860: Perceptions of Different Assessments Formats by Students from Global Master's Programmes at Karolinska Institutet

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Assessment design plays a pivotal role in shaping students' learning behaviours, influencing both the depth and direction of study in higher education. This mixed-methods study examined perceptions of oral summative, written summative, and formative assessments among 33 students enrolled in three international master's programmes at Karolinska Institutet - Translational Physiology and Pharmacology, Bioentrepreneurship, and Global Health - comprising learners from diverse geographic and disciplinary backgrounds.

Quantitative Likert-scale data indicated that written summative assessments were consistently perceived as more effective for consolidating factual knowledge (median = 4), whereas oral summative assessments received more varied ratings for supporting deeper understanding (median = 3) but were clearly valued for encouraging reflection (median = 4). Oral summative formats were moderately motivating (median = 3) and perceived as more stressful than written formats, although reported stress levels remained moderate overall (median = 3). Formative assessments demonstrated the strongest consensus across the cohort (median = 4), with students highlighting clarity, feedback, interaction, and a low-stakes structure as key drivers of engagement.

Qualitative findings reinforced these patterns, illustrating how oral summative assessments foster real-time reasoning and communication, written summative tasks promote clarity and precision, and formative activities cultivate confidence and continuous improvement. In the context of increasing use of Generative AI, oral assessment formats may also support academic integrity by enabling more authentic evaluation of student understanding. Subgroup analyses further indicated that engagement - but not stress - modulated perceptions of professional relevance, with highly engaged students more strongly recognising the authenticity of oral formative assessment practices.

Overall, the findings underscore the pedagogical value of integrating diverse assessment formats to support cognitive depth, emotional regulation, inclusive learning practices, and career preparedness in global biomedical higher education.



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sciforum-168357: Personal Epistemologies and Debate in Higher Education: An Interpretive Study of International Competitive Debaters in the MENA Region

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University education is increasingly expected to foster advanced forms of identity, social, and professional development that address contemporary societal challenges. Among these are the limitations of traditional epistemological models, which Morin criticizes, and the growing diffusion of social polarization and radicalism. In this context, studying personal epistemologies – the beliefs individuals hold about the nature of knowledge and how it is acquired – offers a valuable lens for monitoring formative processes and responding to these challenges. Personal epistemologies shape whether knowledge is conceived, and their transformation involves not only cognitive change but also identity and relational dispositions. Crucially, their development is socio-cultural rather than biological, highlighting their relevance in higher education.

The relationship between personal epistemologies and academic practices, particularly competitive debate has recently attracted scholarly interest. Debate is a ruled, argumentative confrontation between teams defending incompatible positions and occurs in both tournament and classroom settings. It is widely recognized for fostering critical-argumentative skills and civic competences, closely associated with more advanced personal epistemologies.

Building on this premise, the study aims to provide a nuanced account of how academic debaters represent their personal epistemologies in international competitive debate. Grounded in a constructivist and interpretive epistemological framework, it employs a qualitative design combining thematic and discourse analysis, supported by cross-case matrix comparisons. Data are collected through in-depth interviews with 4–6 participants per country across 5–6 MENA countries, and with debate coaches to examine how epistemic orientations are transmitted through training and pedagogy. Three regional, multi-country focus groups further explore collective epistemic tensions and convergences. Supplementary materials – including training resources, university documents, and *munāẓara* texts – are analyzed to contextualize personal, public, and traditional epistemologies. Ultimately, the study examines the consistency between personal epistemologies and those fostered by debate practices, and their positioning relative to traditional and institutional epistemologies.



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sciforum-173091: Predictors of Academic Burnout: The role of Self-Efficacy, Self-Determination, and Boredom among Health Sciences Students in Northern Chile.

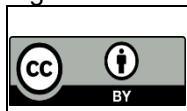
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Academic burnout has become a growing concern in health sciences education, where high academic and emotional demands place students at particular risk of emotional exhaustion. Drawing on Social Cognitive Theory and the Control-Value Theory of Achievement Emotions, this cross-sectional, descriptive-correlational study examined the role of motivational resources (self-efficacy and self-determination) and achievement emotions (boredom) in predicting emotional exhaustion among 442 undergraduate students from a public university in northern Chile. Participants completed validated scales assessing all four constructs, and data were analyzed using confirmatory factor analysis and hierarchical linear regression. Descriptive results indicated moderate-to-high levels of self-efficacy and self-determination, moderate levels of emotional exhaustion, and moderate-to-low levels of boredom. Bivariate analyses revealed that self-efficacy and self-determination were positively correlated ($r = .517$, $p = .001$), and both showed negative correlations with boredom ($r = -.245$ and $r = -.180$, respectively; $p = .001$). Emotional exhaustion was positively and moderately correlated with boredom ($r = .392$, $p = .001$) and negatively correlated with self-efficacy ($r = -.192$, $p = .001$), whereas its correlation with self-determination was not statistically significant ($r = .032$, $p > .05$). Hierarchical regression identified boredom as the strongest predictor of emotional exhaustion ($\beta = .379$, $p = .001$), with the full model explaining 19.5% of its variance ($R^2 = .195$, adjusted $R^2 = .189$). Self-efficacy emerged as a significant protective factor ($\beta = -.206$, $p = .001$), whereas self-determination showed a suppression effect in the full model. These findings highlight the central role of boredom as an emotional pathway to exhaustion in health sciences students and underscore self-efficacy as a key protective resource, with implications for early psychoeducational interventions in regional university contexts.



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sciforum-170878: Quality Improvement and Innovation in Higher Education Systems

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Background:

Higher education systems worldwide are facing increasing pressure to improve quality, promote innovation, and respond to the evolving demands of society and the labor market. Universities are expected to adopt modern educational strategies, strengthen institutional management, and enhance teaching and learning processes to ensure high academic standards and better outcomes for students and professionals.

Aim:

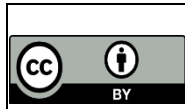
This study aims to analyze the role of quality improvement and innovation in higher education systems, focusing on strategies that enhance teaching effectiveness, institutional performance, and student learning outcomes.

Methods:

The study is based on a literature review of scientific publications, institutional reports, and policy documents related to quality assurance, innovation, and development strategies in higher education institutions.

Conclusions:

The findings suggest that continuous quality improvement and the adoption of innovative practices significantly contribute to enhanced academic performance, improved institutional effectiveness, and stronger collaboration between universities and society. However, several challenges remain, including limited resources, resistance to organizational change, and the need for continuous professional development among academic staff. Strengthening quality assurance mechanisms and promoting innovative educational approaches are essential for the sustainable development of higher education systems and for preparing institutions to respond effectively to future educational and professional demands in a rapidly changing global academic environment.



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sciforum-174998: Reconfiguring Academic Labor in Evaluative Universities: Organizational Designs and the Distribution of Institutional Pressure

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Introduction:

Debates on academic work have largely focused on workload and individual well-being, overlooking the institutional architecture shaping task distribution. This study examines whether academic intensification in Spain reflects increased workload or an integrated organizational model under growing evaluative formalization. Drawing on sociological and organizational perspectives on professional bureaucracies and hybrid governance, the study reframes intensification as a structural phenomenon.

Methods:

This is a conceptual study based on a structured review of existing empirical literature on academic work in Spain (including time-use and workload studies) and comparative research on higher education governance. Countries (Spain, the United States, and selected European systems) were selected to represent contrasting organizational configurations of academic work. The analysis focuses on two dimensions: functional differentiation and evaluative formalization.

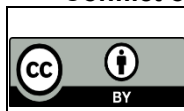
Results:

Spain combines low functional differentiation with high evaluative formalization, concentrating multiple roles within one position. This configuration accumulates institutional pressure and has been associated with emotional exhaustion and reduced well-being. In contrast, the U.S. redistributes pressure through contractual segmentation, while European systems rely on professionalized support roles.

Conclusions:

Academic intensification is shaped by organizational design. Where evaluation expands without redistribution, pressure concentrates, increasing burnout risk and challenging academic sustainability.

Conflict of Interest: The authors declare no conflicts of interest.



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sciforum-173137: Relationship between Social-Emotional Learning (SEL) Competencies and Academic Performance among B.Ed. Student Teachers

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The cultivation of socially and emotionally proficient teachers is increasingly acknowledged as vital for effective classroom management and sustainable educational achievements. Social-Emotional Learning (SEL) competencies such as self-awareness, self-regulation, social awareness, relationship skills, and responsible decision-making play a pivotal role in influencing teacher trainees' academic engagement, professional preparedness, and overall effectiveness. This quantitative study investigates the association between Social-Emotional Learning (SEL) competencies and academic achievement among B.Ed. student teachers. The research employs a descriptive–correlational design. The population includes all B.Ed. student teachers enrolled in Tamil Nadu Teacher Education University (TNTEU)-accredited colleges of education in Tamil Nadu during the 2024–2026 academic year. A sample of approximately 500 student teachers will be drawn using stratified random sampling to ensure balanced representation across gender and subject specialization. The independent variable is SEL competencies, assessed via a standardized Social-Emotional Learning Competency Scale encompassing the five fundamental domains. The dependent variable is academic achievement, operationalized through semester examination scores, internal assessment results, and practicum performance evaluations. Data analysis will involve Pearson's product–moment correlation and multiple regression techniques to ascertain the strength and predictive capacity of SEL competencies on academic outcomes. The hypothesis posits that elevated levels of SEL competencies will significantly and positively associate with enhanced academic performance among B.Ed. student teachers. The anticipated findings aim to furnish empirical support for the incorporation of structured SEL training within teacher education programs. This study offers practical recommendations for curriculum developers, teacher educators, and policymakers seeking to improve the comprehensive professional development of future educators.



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sciforum-174035: Scaffolded Design Integration Across Program Levels in Undergraduate Engineering Education

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Introduction:

Engineering curricula often introduce applied design experiences without clearly calibrating their intensity to students' developmental stage within the program. This study examines how design integration can be scaffolded across curricular levels to progressively support conceptual transfer and system-level reasoning.

Methods:

Two civil engineering courses at different stages of the undergraduate program were analyzed. In a second–third year Fluid Mechanics course, students completed a structured design application accounting for 10% of the course grade, focused on applying hydrostatics, buoyancy, and kinematic principles within constrained parameters. In contrast, an upper-level Hydraulic Engineering course incorporated sustained weekly team-based design laboratories representing 30% of the course grade. These laboratories required iterative water distribution network modeling, open-ended decision making, and technical documentation. Instructional structure, assessment weighting, and qualitative student feedback were comparatively examined.

Results:

Findings suggest that limited, highly structured design components are effective in reinforcing targeted theory-to-application transfer at intermediate program levels. In contrast, higher-weighted, sustained design integration in advanced courses appears to promote greater autonomy, collaborative reasoning, and system-level synthesis. Student evaluations in the upper-level course emphasized appreciation for evolving laboratory challenges and authentic professional relevance.

Conclusions:

The results indicate that effective curriculum design may require progressive escalation of design intensity aligned with student maturity. Rather than uniformly increasing project weight across courses, scaffolded integration may better support cognitive development and engagement in higher education engineering programs.



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sciforum-170172: Teach One, Do One, Then Do It Again: Preparing a Practice-Ready Social Work Workforce Through Online Education

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Online social work education has rapidly expanded in response to workforce shortages and the need to increase access to professional preparation. However, a central challenge remains ensuring that students in online programs are adequately prepared for the relational and in-person realities of social work practice. This session examines human services curriculum development through a “Teach One, Do One, Then Do It Again” instructional framework, demonstrating how online programs can intentionally bridge the gap between virtual learning and real-world practice at both the Bachelor’s and Master’s levels in efforts to increase the number of these professionals.

The session highlights how iterative learning cycles that combine instruction, applied practice, and repeated skill rehearsal support the development of competency, professional judgment, and readiness for face-to-face client interactions. Participants will explore strategies designed to simulate the complexities of in-person practice, including scaffolded skill demonstrations, role-play, case-based learning, simulated client interactions, multimodal content delivery, and a consistent course structure. Particular attention is given to how these approaches address common online learning limitations, such as reduced opportunities for spontaneous and synchronous interaction, embodied communication, and real-time feedback.

While recognizing the growing demand for social workers in rural and underserved Midwestern communities, this model reflects models at the University of Missouri that expand online Bachelor’s and Master’s level education while maintaining rigorous preparation for practice. This session illustrates how thoughtfully designed online curricula can strengthen human service workforce pipelines, support licensure readiness, and ensure graduates are equipped to navigate the interpersonal and contextual demands of in-person social work.



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sciforum-166548: The Effect of Creative Thinking on Clinical Decision-Making in Nursing Students

Hatice Nur BOZKUŞ

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Background: Clinical decision-making is a fundamental competence in nursing practice and directly affects patient safety and quality of care. In recent years, creative thinking has been emphasized as a cognitive skill that enables nursing students to generate flexible, innovative, and effective solutions in complex clinical situations. However, empirical evidence examining the relationship between creative thinking and clinical decision-making among nursing students remains limited.

Aim: This study aimed to examine the effect of creative thinking tendencies on clinical decision-making levels in nursing students and to identify related factors influencing this relationship. **Methods:** This research was conducted as a descriptive, cross-sectional, and correlational study. The study sample consisted of nursing students enrolled in a health sciences faculty. Data were collected using the Student Information Form, the Marmara Creative Thinking Dispositions Scale, and the Clinical Decision-Making in Nursing Scale. Descriptive statistics, correlation analysis, and appropriate comparative tests were used to analyze the data.

Results: The findings indicated that nursing students demonstrated moderate levels of creative thinking and clinical decision-making. A statistically significant positive relationship was found between creative thinking dispositions and clinical decision-making levels. Students with higher creative thinking scores showed more effective and confident clinical decision-making abilities. Additionally, certain sociodemographic and educational variables were found to influence both creative thinking and clinical decision-making skills.

Conclusion: The results of this study suggest that creative thinking plays an important role in enhancing clinical decision-making skills among nursing students. Integrating educational strategies that promote creative thinking into nursing curricula may contribute to the development of students' clinical judgment and decision-making competencies. These findings provide valuable evidence for nursing education programs aiming to improve clinical performance and prepare students for complex healthcare environments.

Keywords: Nursing students, creative thinking, clinical decision-making, nursing education



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sciforum-169722: The Prosody analysis on Min Thu Wun's Pyinma Ngout To(ပျဉ်းမငုတ်တို့) Poem of Higher Education First Year Syllabus

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This paper will explore the Min Thu Wun's Pyinma Ngout To(ပျဉ်းမငုတ်တို့) poem of Higher Education first year Syllabus in Myanmar aspects of the prosody. Prosody in linguistics refers to the study of all the elements speech like intonation, stress, rhythm, and loudness that contribute to the acoustic and rhythmic patterns of language. The aim of this paper is to show that "Pyinma Ngout To" is not just a poem about a tree in the woods, it is a political metaphor for a survivor. By studying the "stress" and "intonation," the poet is effectively described the tone of the national struggle at that time (11.1.1949) and it reflects the present perspective views of point. The research questions are (1) How do the specific prosodic features namely stress, loudness, rhythm, and intonation, manifest in the phonetic structure of Min Thu Wun's "Pyinma Ngout To"? (2) How does the poem's rhythmic structure serve as a metaphor for Myanmar's political endurance from a modern (present) perspective? (3) How does analyzing the prosody of this poem help First-Year Higher Education students understand the evolution of modern Burmese literature and present political issues? This research will focus on a qualitative research design, using a combination of rhythmic and descriptive methods to analyze Min Thuwan's poem "Pyin Ma Ngo To". This study uses a rhythmic analysis to establish a scientific and linguistic framework to assess how Burmese poetry functions as a vocal art form (focusing on stress, volume, and rhythm). By teaching the poem, students studying in Myanmar's crisis can experience and appreciate Pyin Ma Ngo To's powerful ability to express the energy, resilience, and unwavering determination of life.



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sciforum-168702: The Role of International NGOs in Strengthening Education and Health Systems in Afghanistan (2020–2025): Lessons for Inclusive Education Development

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This article critically analyzes the evolving role of International Non-Governmental Organizations (INGOs) in supporting Afghanistan's education and health systems between 2020 and 2025, with an emphasis on lessons for inclusive education development. Operating amid severe political instability, humanitarian crises, and shifting governance structures, INGOs have remained central to sustaining essential services for vulnerable populations. The study examines how these organizations have adapted their operational strategies to address access, equity, and quality through service delivery, institutional capacity building, policy advocacy, and community-based engagement. Drawing on recent empirical data and relevant scholarly literature, the article assesses the extent to which INGO interventions have contributed to system resilience, particularly for marginalized groups such as girls, children with disabilities, and rural communities. While notable achievements are identified, including continuity of basic services and localized innovation, persistent challenges—such as funding constraints, security risks, and limitations on inclusive participation—are also highlighted. Based on this analysis, the article offers practical recommendations aimed at strengthening inclusive and sustainable education frameworks in fragile and post-conflict settings. Ultimately, the study seeks to distill transferable insights that can inform global policy and practice in advancing comprehensive inclusive education under crisis conditions.

Overall, INGO experiences in Afghanistan offer vital lessons for inclusive education in crises.



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sciforum-178744: University Professors' Emotional Competencies and Students' Academic Well-being: A Qualitative Study of Student Perspectives

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In contemporary higher education, university professors' emotional competencies-such as empathy, emotional regulation, relational sensitivity, and effective emotion management-are increasingly recognized as essential professional skills that extend beyond disciplinary expertise. These competencies influence students' academic engagement, motivation, psychological well-being, and overall satisfaction with their learning experience.

Drawing on the ability model of Emotional Intelligence (Salovey & Mayer, 1990) and the situated concept of emotional competence (Saarni, 1999), this qualitative study builds on a recent systematic review (Brandao De Souza & Jacomuzzi, 2025) to explore how university students perceive and experience these competencies in everyday academic interactions. Data were collected through 21 in-depth semi-structured interviews with undergraduate and master's students enrolled in humanities programs (philosophy, pedagogy, and related fields) at an Italian university in northern Italy. Interviews were conducted shortly after lectures or examinations to capture emotionally salient experiences. All interviews were audio-recorded, transcribed verbatim, anonymized, and analyzed through reflexive thematic analysis (Braun & Clarke, 2006).

The analysis identified five interconnected themes. First, empathy and the humanization of the professor-student relationship emerged as central elements, with attentive listening, emotional availability, and reduced power distance fostering trust and a stronger sense of belonging. Second, relational and communicative styles were found to shape classroom climate: passionate, dialogical, and respectful communication enhanced motivation and engagement, whereas rigid or impersonal styles generated emotional distance and stress. Third, emotional regulation during high-stress contexts, particularly examinations, played a crucial role in mitigating anxiety and supporting students' confidence and performance. Fourth, students perceived disciplinary and contextual differences, with humanities and in-person teaching generally facilitating more relational dynamics than scientific fields or online formats. Finally, participants emphasized the need for balanced emotional openness, constructive approaches to error, and institutional initiatives supporting the development of these competencies as learnable professional skills.



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sciforum-154374: Using Artificial Intelligence (AI) Applications for Productivity and Efficiency in Higher Education

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Artificial Intelligence (AI) is rapidly reshaping higher education, offering new opportunities for enhancing productivity and efficiency, while also raising important challenges for instructors. No longer a theoretical concept, AI is now embedded in the daily practices of teaching, research, advising, and administrative work. AI tools such as ChatGPT, Gemini, and MagicSchool AI are becoming increasingly common as faculty seek ways to manage demanding workloads more efficiently.

This presentation shares findings from a Fall 2025 study conducted by full-time university faculty members, examining how instructors in higher education are currently using AI for productivity and efficiency. Using survey methodology, the research team collected responses from full- and part-time faculty regarding the types of AI tools they use, how often they use them, and their perceptions of the benefits and concerns related to AI integration in academic settings. The session will present key data from the study, alongside real-world examples of how higher education instructors are incorporating AI into their work. Attendees will explore how the research compares to their own experiences and consider practical steps for future AI implementation.

By the end of this session, participants will be able to describe current trends in AI usage among faculty, including the most commonly used tools and patterns of use. They will be able to identify concerns and benefits associated with AI adoption in higher education. Finally, they will be able to develop a personalized plan for integrating AI into their own teaching practice.



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sciforum-178420: Using Mind Mapping to Assess Student Understanding in a Business School

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Higher education increasingly encourages teaching approaches that promote student engagement and deeper understanding of course content. In business schools, instructors are often challenged to design learning activities that help students not only remember theoretical concepts but also organize and connect them in a meaningful way. In this perspective, active learning strategies can play an important role in supporting students' cognitive development. Bloom's taxonomy provides a useful framework to understand how different learning activities can stimulate several levels of thinking, from remembering and understanding to analyzing relationships between concepts.

This paper presents the use of mind mapping as an active learning and formative assessment tool implemented with a group of 40 first-year students in a marketing course at HESTIM Business School in Morocco. The activity was introduced at the beginning of a class session to assess students' understanding of the concepts discussed during the previous lecture. Students were asked to create a mind map illustrating the main ideas of the course and the connections between these notions.

Through this exercise, students were encouraged to recall previously learned concepts, demonstrate their understanding, and analyze how different marketing notions are related. Classroom observations showed that the activity helped students structure their knowledge more clearly and enabled the instructor to identify possible misunderstandings. The exercise also encouraged participation and interaction among students.

These observations highlight the value of mind mapping as a simple yet effective tool to support active learning and formative assessment in business education.



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sciforum-163820: Virtual Language Exchange as Internationalization at Home: From Initial Expectations to Perceived Outcomes

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This quantitative study investigates students' perceptions of a virtual language exchange implemented between two higher education institutions. By examining two successive cohorts, the research aimed to identify shared patterns, institutional differences, and changes over the duration of the exchange.

Data were collected through two opinion questionnaires administered at the beginning and at the end of the exchange in each academic period. Quantitative analyses included descriptive statistics, independent-samples *t*-tests, chi-square tests, and Pearson correlation analyses. Results were examined globally, by institution, and longitudinally to capture overall trends and contextual variation.

Across both successive cohorts, students entered the exchange with strong initial motivation, particularly a desire for intercultural openness, alongside comparatively low self-confidence in the target language. By the end of the exchange, participants reported high satisfaction with their exchange partners, positive evaluations of the interactional framework, and increased self-confidence, involvement, and cross-cultural awareness. Institutional differences emerged in specific areas, such as perceived language level, satisfaction, and cultural learning, but these did not substantially alter the overall pattern of findings. Correlation analyses revealed strong and significant relationships among key variables, indicating that linguistic development, learner engagement, self-confidence, and intercultural knowledge were closely interconnected and mutually reinforcing.

The findings suggest that virtual language exchanges supported by clear guidelines and a structured pedagogical design can enhance undergraduate learners' language skills and cultural growth. The study contributes to existing research by demonstrating the consistency of these outcomes across cohorts and institutional contexts, and by highlighting the dynamic links between affective, linguistic, and cultural dimensions. These results support the integration of virtual language exchanges as a sustainable and effective component of internationalization at home in higher education since they offer students opportunities for authentic interaction and sensitivity to cultural diversity without physical mobility. Therefore, they can promote multilingualism and intercultural understanding, the keystone of democratic societies.



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sciforum-170549: Whose Knowledge Counts? Rethinking Sustainability Education in Higher Education

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Sustainability education has become a key priority in UK higher education, shaped by policy frameworks such as Education for Sustainable Development (ESD) and the United Nations Sustainable Development Goals (SDGs) (UNESCO, 2017; United Nations, 2015). Universities are expected to address climate change, biodiversity loss, and social inequality through teaching and research, often framing sustainability in terms of skills, competencies, and measurable outcomes (Advance HE, 2021; QAA, 2021). While this signals institutional commitment, I argue that dominant pedagogical approaches frequently rely on universal and Eurocentric assumptions, marginalising Indigenous and place-based knowledges.

Drawing on decolonial theory and Indigenous scholarship, this conceptual research will critique how ESD and SDG discourses shape sustainability pedagogy in the UK. Decolonial scholars highlight how education systems privilege certain knowledge systems while silencing others (de Sousa Santos, 2015; Mignolo, 2011). In sustainability education, global narratives can frame environmental crises as technical problems detached from colonial histories and unequal responsibility (Andreotti, 2014). Indigenous perspectives instead emphasise relational, place-based understandings of sustainability grounded in responsibilities to land and more-than-human relations (Ajaps, 2023; Whyte et al., 2016).

I will identify three tensions: between global policy universality and local epistemic plurality; between institutional inclusion and epistemic justice; and between policy compliance and meaningful educational responsibility. I propose a decolonial reframing centred on relationality, reflexivity, and place-responsiveness. Rather than adding Indigenous content, sustainability education should become a space for critical dialogue about power, knowledge, and contested futures, challenging assumptions about whose knowledge counts and what futures universities help sustain.



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Session 3. Curriculum and Instruction

sciforum-176231: 'Igniting the Spark' in English through a Phonics-based Approach and Interactive Whiteboards in a Young Learners' Primary Classroom

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Early foreign language literacy development requires systematic decoding instruction while sustaining learner engagement. Although phonics-based approaches effectively promote grapheme–phoneme correspondence and early word recognition, their implementation in Portuguese primary English as a Foreign Language (EFL) classrooms remains inconsistent and often disconnected from meaningful literacy experiences. This study reports on a ten-week action-research intervention involving 80 second-grade learners (aged seven) in Portugal, integrating explicit phonics instruction with authentic storybook read-alouds and multimodal reinforcement through interactive whiteboards. Data were collected through student questionnaires, classroom artefacts, field notes, and a semi-structured interview with the Head Teacher. Findings indicate measurable gains in decoding accuracy, reading comprehension, and written production, alongside heightened learner engagement. Notably, struggling readers demonstrated accelerated progress when phonics instruction followed contextualised narrative exposure.

Milestones in first (L1) and second (L2) language acquisition have long attracted scholarly attention. However, recent research (e.g., Mourão & Lourenço, 2015; Lucas, Rei & Albuquerque, 2021; Yum et al., 2021) has not consistently translated into classroom practice, particularly in Teaching English to Young Learners (TEYL) in Portuguese primary schools. Prior studies highlight a lack of uniformity in syllabus design and implementation, as well as the need for sustained professional development opportunities for teachers.

This study sought to bring together the “best of both worlds” by aligning research-informed practice with classroom-based evidence. Its purpose was to examine the effectiveness of combining read-aloud storybooks and their video adaptations with interactive whiteboard activities, anchored in a systematic phonics approach to support early reading and writing in English. The findings suggest that integrating engaging narrative contexts with explicit phonics instruction offers an effective strategy for nurturing foundational English literacy skills among young learners.



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sciforum-177590: Conceptual Reconstruction and Implementation Pathways of Educational Happiness in Cross-Cultural Perspective: A Comparative Analysis of China and Latvia

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Happiness has become the core mission of 21st-century holistic education, yet its conceptualization is deeply bounded by cultural contexts. A critical gap in active education research remains: severely insufficient cross-cultural exploration between Eastern European and East Asian education systems. This paper fills this gap through a critical theoretical comparison of the cultural and philosophical foundations underpinning educational happiness concepts in China and Latvia.

Integrating Confucian/Taoist traditions with Nordic-European Enlightenment thoughts, and drawing on positive psychology frameworks (PERMA, Self-Determination Theory), this study develops a five-dimensional cross-cultural conceptual framework of educational happiness: harmonious relationships, purposeful engagement, moral-ethical development, psychological balance, and cultural foundation with identity.

Findings show that while peer relationships, teacher-student interactions, and meaningful learning are cross-cultural common pillars of happiness, fundamental conceptual divergences exist. In China's educational context, happiness is rooted in collectivist ethics, often framed as resilience amid systemic academic pressure. In Latvia's setting, happiness is built on individual autonomy, community belonging, and nature harmony, treated as an inherent component of school experience.

This paper proposes a culture-responsive happiness education model to guide curriculum design and teaching practice, stressing that interventions must integrate local cultural values, educational system features, and students' subjective needs. It offers a theoretical framework for global active education discourse, insights for context-specific happiness interventions in Central-Eastern European and East Asian secondary schools, and aligns closely with the conference's S3 (Curriculum and Teaching) and S6 (Teacher Education) themes.



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sciforum-176239: Pedagogical Re-engineering of Literacy and Numeracy Programs through Deweyan Constructivism Framework

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Early childhood literacy and numeracy are foundational competencies that significantly influence children's long-term academic development. This study examined the status of literacy and numeracy programs in kindergarten education and their relationship to learners' academic performance as a basis for re-engineering early childhood instruction through a Deweyan constructivist framework. The study was conducted in five selected public elementary schools in the City of Naga, Cebu during the School Year 2025–2026. It aimed to evaluate the instructional strategies utilized in literacy and numeracy teaching and determine how these practices contribute to the academic development of kindergarten learners. A descriptive–correlational research design was employed to determine the relationship between the instructional strategies implemented by teachers and the academic performance of learners. The respondents included forty (40) kindergarten teachers and two hundred (200) kindergarten learners selected through simple random sampling. Data were gathered through structured questionnaires and analyzed using descriptive statistics and chi-square analysis. Findings revealed a statistically significant relationship between the strategies utilized in literacy and numeracy instruction and the academic performance of kindergarten learners. Strategies such as capturing children's interest before reading, introducing vocabulary during read-aloud activities, sharing the see–show–say strategy with families, highlighting children's favorite books, and establishing consistent read-aloud routines contributed to improved literacy development. Similarly, numeracy strategies including hands-on learning experiences, the use of visual representations, differentiated instruction, encouraging learners to explain their ideas, and integrating storytelling into mathematical contexts supported the development of numeracy competencies. These findings emphasize the importance of learner-centered and experience-based pedagogical practices consistent with Deweyan constructivist principles. The study concludes that re-engineering early childhood literacy and numeracy programs through constructivist pedagogical approaches can enhance instructional effectiveness and strengthen foundational learning outcomes. It is therefore recommended that schools implement targeted teacher upskilling initiatives to reinforce constructivist instructional practices in early childhood education.



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sciforum-170681: Developmental and Contextual Predictors, and Behavioral Patterns of Off-Task Behavior in UAE Early Childhood English Classrooms

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This study investigates the developmental and contextual predictors and behavioral patterns of off-task behavior among kindergarten students in public-school English classrooms in the United Arab Emirates, while also examining teachers' perspectives on these behaviors within early childhood learning contexts. Adopting a mixed-methods design, data were collected over an eight-week period through teacher interviews, surveys, anecdotal records, and systematic time-sampling observations involving 78 KG1 and 82 KG2 students, alongside 7KG English teachers. Findings revealed consistent behavioral patterns, with off-task behavior most frequently manifested as talking, wandering, and daydreaming. These behaviors occurred more often during afternoon sessions, extended instructional periods, and activities that lacked movement, interaction, or hands-on engagement. The analysis identified both developmental and contextual predictors shaping these behaviors. Developmental factors included emerging attention span, self-regulation abilities, and age-related learning needs, while contextual influences involved classroom environment, instructional structure, lesson pacing, and emotional climate. Teachers' perspectives consistently framed off-task behavior as a natural and developmentally appropriate part of early childhood learning rather than intentional disruption. Many viewed these behaviors as indicators of fatigue, limited engagement, or unmet learning needs. In response, targeted strategies inspired by Montessori-informed practices, structured transitions, movement-based activities, and brief self-regulation routines were implemented to support children's focus and participation. These approaches showed promising effects in improving engagement and reducing the frequency of off-task behaviors. Overall, the findings highlight the importance of understanding off-task behavior through a developmental and contextual lens and underscore the value of responsive, child-centered pedagogical practices in supporting engagement, attention, and wellbeing in early childhood English classrooms.



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sciforum-141339: Gamified Mobile Learning to Strengthen Malaria Diagnostic Competence: A Case Study from Sierra Leone

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The ongoing global challenge posed by malaria underscores the urgent need for innovative, scalable, and context-appropriate educational tools, particularly in low-resource settings with limited access to laboratory training. In response, we developed a mobile-based digital learning solution—the *e-Parasitology Game Collection*[®] (<https://play.google.com/store/apps/details?id=com.DMUHLS.ParasitologyGameCollection>)—to support the acquisition of essential diagnostic skills in clinical parasitology. Designed specifically for use in Sierra Leone, the app combines three serious mini-games tailored to build user competence in malaria prevention, symptom recognition, and laboratory diagnosis. Available free of charge on the Google Play Store, the app provides interactive, self-directed training through a simulated public health environment. Users engage in activities such as identifying symptoms and examining virtual blood smears to distinguish between key *Plasmodium* species affecting humans. This educational tool was field-tested with a cohort of 54 public health students from the University of Makeni (UniMak), including undergraduate and postgraduate participants who had received prior instruction in malaria. Initial results show high levels of engagement and perceived educational value: 90.2% of students agreed the virtual smears were useful for learning diagnosis, while 88.7% considered the skills acquired relevant for their future careers. Notably, over 86% reported improved understanding of species-level identification, a key competency in malaria case management. This initiative is part of a broader effort to build sustainable health capacity in Sierra Leone through gamified and open-access resources that complement conventional teaching methods. The project also demonstrates the potential of digital tools to democratise access to essential diagnostic training, foster independent learning, and support the development of critical health workforce skills in malaria-endemic regions.



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sciforum-161129: Rewiring Education: Student-Led Curriculum Programs for a More Sustainable and Just World

Michael Brand * and Melina Tisopulos

University of California, Berkeley, USA

Digital infrastructure underpins contemporary economic and social life, yet it remains invisible. This is a problem for the digital infrastructure industries: data center and subsea cable companies are deeply concerned about the next generation of their workforce. This is also a public problem: as sectors increasingly depend on digital infrastructure and services, a basic literacy of these infrastructures is needed to ensure continuity of service, sustainability, and resilience.

A critical challenge in this discipline is the growing workforce and training divide between industry operators and academic institutions. Digital infrastructure designers and operators primarily gain expertise through hands-on experience in real-world projects, often independent of formal educational programs. While this practical approach is invaluable, it has created a substantial gap in formal education on digital infrastructure.

In this presentation, we will describe our course, “Building A Sustainable Internet,” which we designed, proposed, implemented, and are teaching at the University of California, Berkeley. This is a unique class, developed and taught by students for students, that dives into the hidden environmental costs of internet infrastructures. In it, we tackle the problem of how to solve sustainability while also balancing pressing issues of social equity, geopolitics, and security. The course introduces students to new technologies and policies that could make the internet more sustainable, equitable, and resilient for everyone. So far we've taught the course for three semester to almost 500 students from 60 different majors. In the presentation, we describe the course, as well as our process of drawing from science and technology studies to make sustainable digital infrastructure accessible for a broad range of students across disciplines.



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sciforum-170171: Belonging by Design: Neurodivergent-Affirming Curriculum Development in Online Social Work Education

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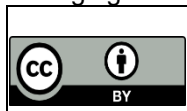
This session examines human services curriculum development through a **belonging-centered, neurodiversity-affirming** lens, using an online social work curriculum as a practical and transferable template. **Neurodiversity recognizes natural variation in cognitive functioning, including differences in attention, sensory processing, communication, learning, and information processing, rather than framing these differences as deficits.** As online education continues to expand across human services disciplines, traditional course design models often fail to foster a sense of belonging for neurodivergent students and non-traditional learners, including working adults, caregivers, first-generation students, and learners returning to higher education after extended absences.

Grounded in social work values, Universal Design for Learning (UDL), adult learning theory, and anti-oppressive pedagogy, this poster explores how curriculum can be intentionally structured to support psychological safety, predictability, and meaningful engagement while emphasizing academic rigor. Participants will examine design strategies that move beyond accommodation-based approaches toward proactive, learner-centered course development. Topics include multimodal content delivery, scaffolded learning activities, flexible assessment pathways, clear and consistent course organization, and the intentional use of educational technology to reduce cognitive overload while supporting autonomy and self-regulation.

Drawing on real-world examples from personally developed social work courses, the session highlights how core professional values such as dignity and worth of the person, person-in-environment, and relational accountability can be operationalized through strategic curriculum design. Attention is given to the intersection of neurodiversity, disability, race, class, and access to technology.

Session Outcomes:

By the end of this session, participants will be able to (1) identify structural and instructional barriers that undermine belonging for neurodivergent and non-traditional learners; (2) apply UDL-informed strategies to design courses that promote belonging and engagement; and (3) adapt belonging-centered curriculum practices across human services and allied professional programs.



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sciforum-172752: Comparative Didactic analysis of the Teaching of Calculus Concepts in Textbooks Using the Modeling Eliciting Activity (MEA) Approach.

Yassine NAAMAOU

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Textbooks play a central role in mathematics education, structuring learning, guiding teachers, and influencing teaching practices (Remillard, 2005; Ball & Cohen, 1996).

This paper presents an analysis of secondary school textbooks using the theory of Modeling Eliciting Activities (MEA) and semiotic register theory (Duval, 1993). The MEA approach, created by Lesh et al. (1987), aims to develop open-ended, contextualized activities that encourage students to construct mathematical models applicable in various contexts.

The analysis of textbooks is conducted using the evaluation criteria proposed by Lesh and Doerr (2003), which examine authenticity and contextual relevance, openness and cognitive complexity, construction of mathematical models, transferability of models, communication and collaboration, and evaluation and feedback.

This study adopts a comparative qualitative approach focusing on textbooks from the following three countries (Morocco, Italy, and the Philippines):

Al Mofide en Maths, edition: DAR ATTAKAFA, 2018.

Manuale blu 2.0 di matematica, third edition, 2020.

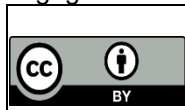
Matematica blu 2.0, third edition, 2020.

Basic Calculus Learner's Material, Department of Education, Republic of the Philippines. **First Edition, 2017.**

Precalculus Learner's Material, Department of Education, Republic of the Philippines, First Edition, 2016.

To analyze these textbooks, an evaluation grid based on the six criteria proposed by Lesh and Doerr (2003) was developed and used to identify the presence and quality of modeling activities. Additionally, another grid was used to analyze the types of frameworks and semiotic registers employed in these textbooks.

Preliminary results show that most analyzed textbooks emphasize procedural exercises and offer limited opportunities for authentic modeling consistent with the MEA framework. Moreover, the use of semiotic registers is mainly restricted to symbolic representations, with limited coordination between graphical, tabular, and verbal registers, which may constrain students' understanding and engagement in mathematical modeling processes.



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sciforum-178164: Designed for Understanding: Learning Progressions for Global Citizenship

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“Students can find facts on the internet; we should focus on teaching skills.” This observation is common among educators today, but it is also naïve and dangerous. If students lack a framework of accurate and well-connected facts for comparison, it is hard to evaluate new facts for accuracy or relevance. The key word in that sentence is *framework*. A new observation or internet “fact” might obviously support or contradict another fact in memory, but the real test is how it fits into a larger body of accepted knowledge. This seemingly abstract discussion has gained new urgency as the internet makes all kinds of “facts” easier to access. In this session, a short presentation and handouts will review 21st-century research on the neural processes of perceiving, processing, and remembering *spatial* information – the specific category of facts that matter when analyzing any issue that has a geographic component, from agriculture, biodiversity, climate change, and disease to sustainability, tariffs, terrorism, and voting. Session participants then examine some ongoing efforts to develop internet-based presentations, readings, and age-appropriate student activities that engage students, target the brain networks that process spatial information, and help build a scaffold for further inquiry. The centerpiece of this scaffold is a set of interactive maps, which allow users to turn individual layers of information on or off. This website allows easy comparison of memorable maps that are carefully curated to provide background about latitude, resources, population density, cultural diversity, and several other ideas that are causally important around the world. The goal is to build a framework of fundamental geographic facts that can help students (and citizens) interpret information from other internet sites, especially those that promise to provide “a satellite image, ground-level view, and/or census information about any place on earth.”



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sciforum-178667: Educational Time and Knowledge: Between Chronos and Kairós

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Contemporary societies are increasingly shaped by accelerated temporal dynamics that reorganise experience, knowledge, and action across multiple domains of life. Globalisation and technological development have normalised immediacy, continuous availability, and real-time responsiveness, privileging speed and optimisation. These dynamics coexist uneasily with forms of understanding that depend on duration, interruption, and experiential depth. The growing integration of artificial intelligence makes this tension particularly visible, as technologically mediated forms of knowledge provision reshape assumptions about time, efficiency, and agency. Within this broader context, education emerges as a critical site for questioning whether and how accelerated temporal regimes can meaningfully support the formative aims of human life. This conceptual paper offers a philosophical examination of these issues by engaging the classical distinction between *Chronos* time—quantitative, sequential, and instrumental—and *Kairós* time—qualitative, opportune, and meaning-laden. This philosophical framework illuminates an epistemological tension between automated forms of knowledge production and embodied human knowing. While artificial intelligence systems can generate responses that appear procedural or explanatory, their epistemic operation remains oriented toward the production of articulated outputs within accelerated temporal frameworks. Embodied knowing, by contrast, unfolds within lived and relational time, where understanding emerges through experience, judgment, and formative engagement. From this perspective, the growing integration of AI as an epistemic and pedagogical mediator risks reconfiguring educational processes around responsiveness and optimisation, at the expense of temporal depth. In response, the paper argues for a curriculum-informed pedagogical approach attentive to *Kairós*, foregrounding dispositions such as imagination, creativity, empathy, reflexivity, relationality, and care. They are understood as constitutive dimensions of educational subjectivity and knowing. By situating educational challenges within a philosophy of time and knowledge, the paper offers a conceptual framework for examining how educational practices negotiate questions of technology, temporality, and human formation.



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sciforum-172463: Empowering Critical Thinkers: The Role of Critical Pedagogy in Shaping Students' Analytical Skills in Moroccan Classrooms

Rachid Bendraou

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Language learning, in some educational systems, is evolving to be more than just the learning of vocabulary and grammar but also a platform to foster critical thinking and social awareness. In Morocco, EFL learning at the middle school level is more focused on the acquisition of language skills, while critical thinking about social issues represented in literary works is not a priority. This study aims to assess the impact of critical pedagogy on the critical thinking skills of third-year middle school students in Casablanca, using a novel by Anna Sewell, "Black Beauty," as a tool to foster critical thinking about social issues.

In the quasi-experimental classroom intervention, 25 students were included in the dialogic and problem-based learning activities aimed at developing critical thinking, reflection, and critical dialogue in the classroom. The analytical and interpretive skills of the students were assessed using pre- and post-tests. The data were analyzed statistically to compare the test results. The study revealed that the intervention significantly improved the critical thinking skills of the students. The average score of the students was 10.04 (SD = 3.09) in the pre-test, which improved to 12.88 (SD = 1.42) in the post-test. This improvement was statistically significant ($p < 0.05$). However, more than the quantity, the quality of the critical thinking skills of the students was observed in analyzing and evaluating literary events and social issues raised in the text. The students were observed to possess the ability to scrutinize the actions of the characters, evaluate the injustices in the society, and provide rational explanations of the issues raised in the text in association with the themes of the literature.

Based on the study, it was revealed that the integration of critical pedagogy and problem-based learning in the teaching of EFL literature could improve the higher-order thinking skills of the students. This study provides useful guidance for teachers in developing critical thinking skills in their students in the context of the Moroccan middle school setting.



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sciforum-162075: Explorative Study on Psychology Techniques to Enhance Adaptive Learning in Sustainability Practitioners: Lessons from Portugal

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Sustainability studies and sustainability practices can challenge the learning capacities of any practitioner. For example, marine conservation requires balancing production, biodiversity, and climate resilience—a task demanding not only technical skill but also deep ecological empathy and adaptive cognition. Practitioners confront not only emotionally taxing challenges in practice, but are also overloaded with a meta-level knowledge of the world's ecosystems. This requires formal psychological scaffolding training as a learning intervention, such as embodied grounding techniques. An explorative study suggests that individuals who are more actively incorporating psychological techniques can alleviate their sensory attunement or ecological-centric behaviours. This work captures a qualitative analysis derived from reflective journaling of a sustainability practitioner using autoethnography methodology. The research indicates a new narrative analysis framing understanding of the role of psychology models or theory to address practitioners cognition and behaviors. The assessment provide insights about the changes in perceptions of sustainability agency, empathy toward environmental ecosystems, social organisms, and the framing of management trade-offs. This work contributes to original findings to sustainability related pedagogy. An evidence-based research highlights the possible transformation of personal development and mental health well-being of sustainability practitioners. Considering the challenges of environmental education, there is a perceived gap in the education regulation or policies which directly implicates the important role of psychology techniques to support successful environmental-centric behaviors.



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sciforum-178699: Exploring Experienced Teachers' Awareness of Culturally Relevant Pedagogy Through a Personable Culturally Situated Mathematical Modeling Task

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This study examines how experienced teachers' engagement in the *Family Pizza Sharing Challenge* (culturally situated mathematical modeling task) supports development of culturally relevant pedagogy (CRP) awareness. Grounded in CRP and equity-oriented teacher noticing, the analysis focuses on how teachers activate personal and cultural resources, critique task contexts, and connect mathematical reasoning with ethical considerations of fairness and representation. Thirty-five elementary teachers completed the task and produced written artifacts and reflections, which were analyzed using ethnographic thematic content analysis. We examined how teachers redesigned a familiar 'Family Pizza Sharing' problem to make students' cultural and community knowledge consequential to the mathematics while sustaining cognitive demand and rigor. Data included original and revised task artifacts, teacher annotations. Analytically, we iterated open coding with a framework for culturally relevant design (e.g., purposeful contexts, opportunities for student authority/voice, language supports, and attention to power/identity), corroborated through artifact tracing and peer debriefing. Findings show that the activity surfaced cultural assumptions, prompted redesigns for inclusivity, and supported shifts from equal to equitable interpretations of fairness demonstrating growth in CRP awareness and illustrate how task design serves as a productive context for equity-focused teacher learning. We argue that task redesign functioned as a lever for teacher learning about equity: when the task changed, so did teachers' noticing, talk, and enactment. The use of culturally situated mathematical modeling task artifact-anchored PD may make teachers' equity work more observable and improvable.



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sciforum-177493: Framework for a Smart Breeding 4.0 Curriculum: Insights from Sub-Saharan African Nations (Nigeria) and Global Implications

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The Alliance for a Green Revolution in Africa (AGRA) exemplifies the failure of top-down, technology-centric agricultural models that disregard local contexts, yielding limited improvements in smallholder livelihoods across Sub-Saharan Africa (SSA). Concurrently, Smart Breeding 4.0—integrating biotechnology, big data, and artificial intelligence—offers unprecedented opportunities for precision crop improvement. However, successful adoption in SSA requires educational systems producing graduates with both technical proficiency and critical awareness of ethical and socio-economic dimensions.

This paper addresses this gap by proposing a comprehensive Smart Breeding 4.0 curriculum framework, developed through systematic literature analysis and stakeholder consultation with five leading global agricultural universities, aligned with Nigerian CCMAS standards and UN SDGs. The framework comprises four interconnected modules: (1) Foundational Theory, integrating genetics, genomics, and data science while critically evaluating historical models like AGRA; (2) Technology Integration, providing hands-on training in high-throughput phenotyping, IoT, remote sensing, machine learning, and genomic selection; (3) Practical Innovation, emphasizing experiential learning through prototyping digital solutions like the Smart-Bean GSI system, multi-modal data analytics, and field experimentation; and (4) Ethics and Policy, addressing data governance, AI ethics, intellectual property, and impact assessment.

To operationalize this framework, we propose the Russia-Africa Smart Breeding 4.0 Knowledge Exchange Program—a dual-track initiative comprising an online knowledge platform and on-ground Living Labs across SSA, facilitating two-way technology transfer between Russian technical expertise and African agro-ecological knowledge. This paradigm shift positions African universities as generators rather than importers of agricultural technology, training graduates who ask not only "how" but "who defines the breeding objective?" and "who benefits?"—ensuring Smart Breeding 4.0 serves as a tool of empowerment, resilience, and equity for SSA's farming communities.



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sciforum-170477: From Co-Curricular Engagement to Sustainable Curriculum Design: Rethinking EFL Instruction in Higher Education

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EFL instruction in higher education calls for curriculum designs that draw on co-curricular engagement to support sustainability and student development. So, tertiary institutions are expected to correspond with it. Nonetheless, the pedagogical possibilities of co-curricular engagement are not fully utilized in the formal curricula in English as a Foreign Language (EFL) programs. This paper investigates how the principles based on co-curricular involvement can guide sustainable curriculum development and teaching in higher education EFL settings. The proposed study is based on the transformative learning and sustainability-oriented education frameworks. It follows a mixed-method design, incorporating curriculum and syllabus analysis, classroom observations, surveys among undergraduate students, and semi-structured interviews with EFL teachers. The results reveal that the curriculum designs based on co-curricular principles increase motivation, communicative competence, and critical awareness of the learners because they place the art of language within meaningful learning and social contexts. Educators and learners noted a change in the nature of instruction to inquiry-based and participatory teaching and learning, respectively. However, strict assessment systems and insufficient professional support remain as barriers to systematic integration. The study states that incorporating co-curricular involvement into the EFL curricula enhances sustainability and instructional relevance without undermining linguistic rigor, which has practical implications for curriculum designers, educators, and policymakers.



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sciforum-173204: From Policy to Practice: Systemic Constraints Undermining Construction Learnership Implementation and Effectiveness in South Africa

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Purpose: The persistent shortage of skilled labour and unemployment have made learnership programmes a vital policy instrument for workforce development and socio-economic inclusion. Despite an extensive legislative and institutional framework supporting their implementation in South Africa, concerns persist about the limited effectiveness of these programmes in meeting industry skills demands. This study investigates the systemic constraints that undermine the implementation and effectiveness of construction learnership programmes in South Africa, with particular focus on the gap between policy intent and actual practice.

Design/Methodology/Approach: A descriptive research approach was employed, utilising a structured questionnaire administered to key stakeholders within the construction skills development ecosystem, including employers, training providers, and industry practitioners.

Findings: Data were analysed using descriptive statistics and exploratory factor analysis (EFA) to identify underlying dimensions of systemic constraints affecting learnership performance. Descriptive analysis revealed that limited collaboration among stakeholders, limited access to information, and limited government support are the top-ranked barriers. The EFA results identified five primary constraint clusters, which are systemic and interrelated rather than isolated, contributing to persistent learnership underperformance.

Originality/Value: Collectively, these challenges undermine the capacity of construction learnerships to provide sustainable skills development and meaningful employment pathways. This study contributes to the construction education and training discourse by providing empirical evidence of multilevel constraints affecting learnership effectiveness in a developing country context. Practically, the findings highlight the need for strengthened inter-institutional collaboration, enhanced industry incentives, curriculum alignment with evolving construction practices, and robust quality assurance mechanisms. Addressing these systemic barriers is essential to translate learnership policy ambitions into effective practice and to support the development of a resilient and sustainable construction workforce in South Africa and similar economies.



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sciforum-145610: Integrating Problem-Posing and Problem-Solving within Mathematics Teaching

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The mathematical problem posing and problem solving are mutually dependent, mutually reinforcing, and develop in tandem. Over the past two decades, research on problem posing has become increasingly prevalent and in-depth among educational researchers, while research on problem solving has gradually declined. It is well known that many educational researchers have published numerous papers related to mathematical problem posing in various mathematics education research journals. Many conferences in mathematics education have also dedicated specialised discussion topics to problem posing. Educational researchers pay close attention to the solvability of problems posed by participants, employing appropriate analytical frameworks to evaluate the solvability and thereby examine participants' problem-posing ability. However, there is a lack of research on the solutions to the problems posed by participants. Drawing upon the author's experience as a secondary school mathematics teacher, this poster presents a case study of a lesson integrating mathematical problem posing and problem solving by using a problem on set as an exemplar. In the lesson, the author and students first posed new mathematical problems based on a sample problem, then attempted to solve these newly generated problems. Research indicates that posing new problems is typically straightforward, as participants can employ a variety of problem-posing strategies. However, solving these problems can be quite challenging, often requiring mathematical knowledge and mathematical tools extending beyond the scope of secondary school mathematics, and there are very few available problem-solving strategies. Integrating problem-posing and problem-solving within mathematics teaching can foster the synergistic development of both teachers' and students' abilities in problem posing and problem solving.



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sciforum-176912: Mapping the Intellectual Landscape of Multiple Representations in Physics Education: A Systematic Review and Bibliometric Analysis

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This study aims to map the intellectual landscape of research on multiple representations in physics education by integrating a systematic literature review and bibliometric analysis. This study analyzed Scopus-indexed journal articles that explicitly discussed multiple representations in physics learning, using selection procedures in accordance with the PRISMA 2020 guidelines. Bibliometric analysis was conducted using the Biblioshiny package and VOSviewer to identify publication trends, key actors, patterns of scientific collaboration, and the thematic structure of the research. The results show that publication output has grown significantly since 2016 and entered a phase of rapid expansion, though conceptual maturity has not yet been reached. Indonesia led in publication volume (86 articles), while the Netherlands and Germany demonstrated the highest citation impact (MeanTC: 125.5 and 32.8, respectively), revealing a notable gap between productivity and scientific influence across countries. At the institutional and author levels, contributions remain concentrated within specific groups, reflecting a fragmented research community. Keyword co-occurrence analysis identified multiple representations as the central conceptual node, strongly linked to conceptual understanding, students, physics education, and educational computing, with a discernible thematic shift from classical pedagogical studies toward digital learning ecosystems integrating augmented reality, simulation-based learning, and high-order thinking skills. Thematic evolution analysis revealed three research phases: a conceptual phase (2005–2017), an integrative phase (2018–2020), and an innovation-oriented phase (2021–2025) emphasizing research and development and representational fluency. Future research directions include AI-based adaptive learning, AR/VR-integrated multirepresentational environments, and the development of R&D-based MR learning ecosystems aligned with 21st-century competencies. These findings offer a comprehensive and data-driven overview of the global dynamics of multiple representations research and serve as a strategic conceptual basis for formulating a more targeted future research agenda in physics education.



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sciforum-178762: Motivating Undergraduates to Synthesize Information Using a Kinesthetic Sticky Note Activity for Reading Research Articles and Writing

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English lecturers often face challenges in motivating less-engaged undergraduates to actively use higher-order cognitive skills such as synthesizing information. This study explored the influence of a kinesthetic note-taking activity on 24 Social Science students' engagement in practicing synthesizing in a Sri Lankan university English language classroom. The students worked in pairs to read three research articles related to their proposed study, and made notes on four topics: aim of the article, methods, results and gaps on sticky notes, which were displayed on boards around the classroom. In this study, a qualitative approach informed by the Grounded Theory was employed for data collection and analysis. Data were collected using semi-structured interviews with eight students and the first author's observational notes. The iterative data collection and analysis were based on the GT strategies such as convenient sampling, theoretical sampling, saturation, initial coding, memo writing, constant comparison, focused coding and theoretical coding. Findings indicated that the students found the activity useful for note organization, synthesis, distinguishing ideas, and increased motivation. The physical movement involved in the activity supported the process of synthesizing. Comparison of the notes on the boards helped the students identify similarities and differences across the studies. The students also reported increased motivation in reading research and engagement with making syntheses. This study suggests the effectiveness of kinesthetic activities in helping students identify similarities and difference in research notes. English lecturers can use kinesthetic activities to help students develop synthesizing more engagingly in English language classrooms.



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sciforum-172250: Pharmacology Curriculum Transformation from a Disciple-based to a Systems-based Model in an Osteopathic Medical School

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Background:

The University of Pikeville transformed its pre-clinical curriculum from a traditional, discipline-based model to an integrated, system-based, two-pass hybrid design. Prior to reform, pharmacology was delivered as two stand-alone second-year courses primarily through didactic lectures. Curriculum redesign reduced pharmacology contact hours and redistributed content across organ systems.

Objective:

This study evaluates whether pharmacology contact hours can be reduced within an integrated systems-based curriculum while maintaining national licensing examination performance and strengthening clinical application.

Methods:

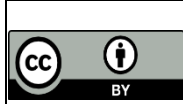
Pharmacology content was systematically mapped across the revised curriculum to eliminate redundancies and clarify disciplinary roles. Faculty developed explicit guidelines: pharmacology focused on mechanisms of action, adverse effects, drug interactions, and core clinical uses, while internal medicine emphasized diagnosis, guidelines, and drugs of choice. Previously underrepresented topics (e.g., immunopharmacology; pharmacotherapy in pregnancy and lactation) were incorporated. A longitudinal case-based course reinforced pharmacologic principles across both pre-clinical years, and a second-year Therapeutics of Infectious Diseases series was introduced to strengthen antimicrobial application in clinical contexts. Student outcomes were assessed using NBOME Level 1 pharmacology performance reports, comparing cohorts before and after curricular transformation.

Results:

Following curricular reform, pharmacology contact hours were successfully reduced from 124 to 90 hours (27% reduction) without deterioration in national benchmark performance. Pre-transformation pharmacology scores were comparable to national means (national mean 549.07, SD 155.21 vs. school mean 502.25, SD 140.76). Post-transformation performance remained at national average levels, indicating preservation of pharmacology competency despite a 27% reduction in instructional time.

Conclusions:

Strategic content mapping and longitudinal integration allow for meaningful reduction in pharmacology contact hours while maintaining national examination performance. Embedding pharmacology within a two-pass, hybrid systems curriculum promotes efficiency and strengthens clinical application. Continued longitudinal assessment will further evaluate retention and clinical impact.



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sciforum-173226: Promoting Sharks and Ray Literacy through an Interactive Outreach Experience

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An environmental education intervention was implemented during the European Researchers' Night in a coastal region with an important fisheries sector to improve public understanding of sharks and rays through hands-on activities. The instructional sequence combined games, biological samples (including egg cases), and guided discussions. Participants (N=51; mean age = 9.93 ± 5.97 ; 54.90% female), who were mainly primary school students (78.43%), completed pre- and post-questionnaires to assess prior knowledge and learning outcomes. The questionnaire included 4 demographic and 10 questions combining drawings (eggs and adults), Likert-scale, and open-ended responses addressing elasmobranch biology, ecology, and threats. Data were analysed using descriptive statistics and pre-post comparisons to identify changes in knowledge, perceptions, and attitudes. Initial drawings showed that most participants could accurately depict adult sharks and rays, but representations of eggs were often inaccurate, consistent with limited prior exposure. After the intervention, drawings of egg cases became notably more precise. Most respondents identified sharks and rays as fish, but fewer recognized them as vertebrates, particularly rays. Species knowledge was scarce and strongly biased towards well-known shark species, whereas awareness of ray diversity was limited even after the intervention. Perceived threats to sharks and rays were already high at pre-test, especially pollution, habitat destruction, and overfishing, and generally values increased after post-intervention. Participants justified protection mainly in terms of biodiversity and ecosystem roles. Pro-environmental intentions shifted from a general focus on pollution toward more specific actions such as avoiding overfishing and habitat destruction. Attitudes toward citizen science showed substantial gains, with strong post-test increases in willingness to report sightings, search for egg cases, disseminate conservation information, and enrolment in educational projects like The.Shark-Ray.Map. Overall, results indicate that short, interactive outreach activities integrating real biological samples and participatory science can effectively enhance marine literacy, and foster engagement with conservation actions among younger audiences.



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sciforum-139560: Strengthening Professional Preparedness through Interdisciplinary CBRN Education at the University of Alcalá, Spain

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Chemical, biological, radiological, and nuclear (CBRN) threats are increasingly relevant in contexts shaped by industrial activity, environmental emergencies, accidental releases, and intentional incidents. These challenges require interdisciplinary training that prepares future professionals to recognise hazards, understand response principles, and work across health, environmental, and forensic settings. To address this need, the University of Alcalá launched in 2025 a summer course entitled *Responder y prevenir ataques con agentes químicos, biológicos, radiológicos y nucleares (NRBQ)*.

A descriptive educational innovation study was conducted to characterise the implementation and participant appraisal of the course. The programme was delivered through lectures, case-based learning, and applied sessions focused on major CBRN scenarios and response principles. Evaluation was based on data routinely generated during the course, including enrolment and attendance records and an anonymous end-of-course satisfaction questionnaire completed by participants. The questionnaire explored perceptions of course organisation, content relevance, teaching methodology, interdisciplinary value, and overall usefulness using structured rating items, together with open-ended comments. Quantitative data were analysed descriptively, and qualitative comments were reviewed to identify recurrent themes related to strengths, limitations, and suggestions for improvement.

The course attracted participants from diverse academic backgrounds linked to health and environmental sciences, supporting an interdisciplinary learning environment. Overall participant appraisal was favourable, with students highlighting the relevance of the topic, the novelty of CBRN content within their previous training, and the value of combining conceptual foundations with applied examples. Participants particularly appreciated the practical orientation of the course and its usefulness for understanding real-world emergency contexts. Suggestions for improvement mainly focused on increasing hands-on activities and expanding the duration of some sessions.

This summer course represents a feasible and well-received initiative for introducing CBRN preparedness into higher education. The findings support the value of short, interdisciplinary training formats and provide a basis for future editions incorporating stronger learning-outcome assessment strategies.



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sciforum-172781: Student Engagement Profiles in a Collaborative-Competitive Learning Environment: Evidence from an Industrial Statistics Course

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Innovative instructional strategies are increasingly needed to enhance student engagement in quantitative engineering courses. This study examines a collaborative-competitive learning design implemented in Industrial Statistics course for Undergraduate Student of Industrial Engineering, Telkom University. Students collaborate within groups at each meeting by working on questions in groups and in some sessions, students competing across groups. Students may respond differently to such instructional designs. To evaluate how students respond to this instructional innovation, a data-driven using cluster analysis was employed. Data were collected from 200 undergraduate students through a structured questionnaire after implementing the learning design innovation. Instruments measured collaboration quality, attitude towards work group, sense of belonging, perceived learning outcomes, and competitive orientation. Following data screening, descriptive analysis, reliability testing and analyzed using K-means clustering. Based on silhouette evaluation and interpretability considerations, a three-cluster solution was retained. The findings reveal three distinct engagement profiles: (1) highly engaged students demonstrating strong collaboration, belonging, and competitive motivation; (2) moderately engaged students showing balanced but less intense responses; and (3) a small segment of disengaged students with consistently lower scores across dimensions. These findings indicate that collaborative–competitive learning generates differentiated engagement patterns rather than uniform effects. The proposed data-driven framework offers practical implications for designing adaptive and inclusive learning environments in engineering education.



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sciforum-157933: Task-Based Language Teaching and EFL Oral Skills: A Pre-Post Study at Djelfa University

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Effective English communication is crucial in the EFL context globally, yet many learners struggle with fluency, accuracy, and confidence in speaking. Task-Based Language Teaching (TBLT) is one of the most promising learning methods for promoting oral proficiency; yet, its efficacy may vary across different educational contexts. This paper examines how TBLT can be used to improve oral communication among first-year EFL students at Djelfa University. Using a one-group experiment design, 33 students were evaluated using pre- and post-tests to characterize six oral communication criteria, including fluency, pronunciation, grammar, vocabulary, interaction, and comprehension. Qualitative data collection in the form of classroom observations was used to supplement the quantitative data to offer a better insight into the student engagement and the use of the language. Although the sample size included is small, and there is a lack of a control group, the results showed that the statistical significance of the improvement in all criteria, which is statistically significant, and fluency and interactive competence achieved the most significant improvement. The findings show that meaningful, communicative tasks can improve accuracy and fluency and can also contribute to motivating the learners as well as helping them build confidence and autonomy in speaking English. This paper forms part of the increasing body of research promoting the incorporation of TBLT in EFL learning and especially in the first few years of university education. It also suggests that in the development of curriculum, the task-based approaches should be embraced to promote efficient, useful, and practical use of language.



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sciforum-164880: Technopreneurial Intention among Ordinary Level Students in Uva Province, Sri Lanka

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In many developing economies, school systems are increasingly expected to develop not only academic achievement but also career readiness and innovation capacity. Sri Lanka's ongoing education reforms position **Grades 10 to 11** as a critical stage for career readiness and introduce entrepreneurship related learning within the revised senior secondary pathway. However, **Uva Province** has limited digital exposure and records the lowest computer literacy rate among all provinces (**26.5%**), which may constrain students' readiness for technology based entrepreneurship. This study measures the current level of **technopreneurial intention** among Ordinary Level students in Uva Province and examines how **technopreneurial related activities**, **technopreneurial self-efficacy**, and **technopreneurial motivation** influence technopreneurial intention, to provide evidence that can guide curriculum and co-curricular reform in resource constrained school contexts. A province wide questionnaire survey covering all ten education zones of Uva Province was conducted with **4,105** students, and the proposed relationships were tested using **structural equation modeling**. The results indicate that all three factors have **significant positive effects** on technopreneurial intention. Technopreneurial motivation shows the **strongest influence**, followed by technopreneurial related activities, while technopreneurial self-efficacy shows the **weakest effect**. These findings suggest that education reform efforts aimed at building future ready learners should prioritize motivational drivers, expand hands on technology and innovation activities, and strengthen students' confidence to perform technopreneurial tasks. By providing baseline evidence aligned with the government's direction to integrate technology and entrepreneurship in schooling, this study offers practical direction for strengthening school to innovation pathways and supporting future education reform initiatives in Sri Lanka.



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sciforum-178676: The Conditional Efficacy of Embedded Reflective Learning Journals in Promoting Critical Thinking in Higher Education

Reid McLain * and Ty Choi

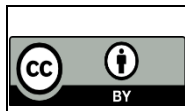
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Introduction: Reflective learning is frequently cited as a core competency in higher education, yet it is often indirectly embedded within curricula rather than explicitly taught or assessed. This study examines whether structured weekly learning journals, when incorporated into formal assessment as an integral component of learning, can serve as a direct and active pedagogical tool for stimulating critical thinking, personal growth, and meaningful knowledge construction.

Methods: A mixed-methods study was conducted across 134 students enrolled in six university courses. Students submitted weekly learning journals via a Learning Management System, assessed on depth of reflection, logical development, and personal growth rather than rigid academic structure. Students selected their four strongest journal entries for formal evaluation, preserving individual agency within the assessment framework. Using MaxQDA, we conducted a qualitative textual analysis of 124 final reflections detailing the students' journaling experiences.

Results: Qualitative analysis identified three recurring themes: objective organisation of thoughts and consolidation of weekly learning; expanded curiosity and intrinsic motivation; and strengthened critical thinking through written self-examination. However, these benefits were conditional. Key challenges included time constraints, emotional frustration with unfamiliar critical thinking demands, and anxiety over grading. Courses assigning higher grade weights and mandating minimum length requirements yielded deeper and more authentic reflections, subsequently preventing superficial responses that could be submitted without the guidelines.

Conclusions: Reflective learning journals are an effective but conditionally realised tool with their benefits emerging only when journaling is accompanied by assessment and guidelines rather than as an optional task. Students typically require several weeks before recognising the value of structured self-questioning, indicating that the inclusion of the tasks as a regular part of the class design is as important as implementing journals. When designed with clear expectations, meaningful grade weighting, and structured rubrics, reflective journals build metacognitive awareness and move students toward genuine knowledge construction.



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sciforum-172368: The Effect of Policy Practices on Mathematical Achievement of Students: A country-Fixed Hierarchical Model on OECD Countries

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Introduction:

From school-choice expansion, class-size reduction, teacher specialization, to school-climate indices, pedagogical innovations, and performance feedback, measures pioneered by OECD countries are well documented for their merits, given their separate lines of research. As not every country has the luxury of implementing everything, this study aims to help policymakers in less-privileged education systems make informed decisions about which measures to prioritize by measuring outcomes across legislative perspectives.

Method:

To control for country heterogeneity, a country-fixed hierarchical model was employed to estimate the production output of various OECD-adopted instructional practices on PISA 2022's featured math test scores of students. To achieve a balanced dataset while complying with the 20% missingness threshold for data imputation, the final model comprised data from 179,168 students across 6,810 schools in 23 OECD education systems, using 13 measurement proxies (school type and size, class size, school and classroom climate, teacher training, ability grouping, reasoning-fostering and thinking-encouraging pedagogy, teacher support, student feedback, student gender and SES).

Result:

Nine variables had a positive impact on math scores of students, and they were: student SES (22.78), class size (7.94), classroom climate (6.48), school size (6.15), teacher support (5.77), reasoning-fostering pedagogy (5.33), no ability grouping (3.39), math teacher training (2.77), and private enrollment (1.59). Four variables were negative predictors of student math scores: negative school climate (-18.02), thinking-encouraging pedagogy (-8.35), female (-6.05), and student feedback (-1.59).

Conclusion:

Compared to pedagogical approaches whose effects are contradictory, students in large non-ability-grouping math classes with supportive teachers under a positive classroom and school climate appear to have an edge over their counterparts. As students' math performance grows with their SES and private enrollment, privatizing school choices may be a worthy policy to help disadvantaged students excel.



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sciforum-169714: The Influence of Basic Psychological Needs Satisfaction on Primary School Pupils' Intentions to Continue Learning Calligraphy: The Mediating Role of Learning Motivation

Anlin Jianchun Hong

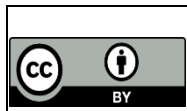
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Improving the effectiveness of primary-school calligraphy education is urgent in today's context of cultural globalisation and the renewed emphasis on calligraphy aesthetic education in China. Yet calligraphy is often marginalised as an elective; teachers' backgrounds are diverse; pupils' motivation is frequently low; and meaningful outcomes require long-term engagement. Sustaining upper-primary pupils' intention to continue learning calligraphy is therefore a key challenge.

Drawing on Self-Determination Theory, this study tested whether satisfaction of basic psychological needs (autonomy, competence, relatedness) predicts intention to continue learning calligraphy through different motivational regulations. The current study surveyed 531 Grade 4–6 pupils from four primary schools in Guangzhou, China, using the Basic Psychological Needs in Calligraphy Class Scale, the Calligraphy Learning Motivation Scale, and a self-developed Intention to Continue Learning Calligraphy Scale. Descriptive statistics, correlation analyses, and structural equation modeling were conducted.

Autonomy and competence satisfaction significantly and positively predicted continuation intention, whereas relatedness satisfaction showed no independent effect. Autonomy satisfaction increased intrinsic motivation and identified regulation and decreased external regulation and amotivation; competence satisfaction positively predicted identified regulation. Mediation analyses indicated that need satisfaction mainly strengthened continuation intention by enhancing identified regulation and by reducing external regulation and amotivation.

These findings clarify SDT internalisation pathways in a distinctive Chinese calligraphy education context and inform need-supportive practices to sustain pupils' long-term engagement.



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sciforum-178031: The Natural Approach: A Traditional Teaching Method for Achieving Quantum Literacy Proficiency

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The highly specialized field of quantum technologies has established a foundation and a source of inspiration for integrating innovative educational practices. In this realm, we heightened the Natural Approach, as defined by Krashen and Terrell as a synonym conform to the naturalistic principles of second language acquisition. The emphasis of treating quantum mechanics as a naturalistic framework concerns our disposition to view it as a vehicle for communicating meanings acquired through the hierarchical structure complexity of containing inputs, transformations and associations of the targeted solution by stages. The assumption of a linguistic hierarchy consists of lexicon symbols considered of primary importance in the construction and interpretation of achieving quantum physics (QP) literacy readiness for progressing towards more specialized areas covering the full breath of QP knowledge. The principal tenets of Krashen and Terrell Natural Approach theory are aligned to a linguistic system claiming acquisition/learning in the natural way and the capacity to correct ourselves when we communicate QP knowledge. We construct on the linguistic system hypotheses a set of general design principles and a syllabus approach aimed at fitting the needs and interest of students while pursuing communicative goals at the end of a course to the required proficiency level.



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sciforum-173129: The Significance of Experiential Knowledge in Clinical Education: A Case Report of Final Year Class of Physiotherapy Students' Experience of being Taught by a Person with a Lived Experience of Spinal Cord Injury

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Background: Teaching models, philosophies and techniques continuously evolve and get adopted. One of those models is the role of patients or people with lived experience of a condition as teachers in clinical education. The main import of the model is to utilize the patients' or the individual's experiential knowledge to enhance the learning journey of the students. **Aim:** The aim of this article is to report a final year class of physiotherapy students' experience of being taught by a person with a lived experience of spinal cord injury (SCI). **Method:** A middle-aged individual with about 20 year experience of living with SCI was requested to teach the students, spinal cord injury, including its causes, care and any other thing on the condition the individual deemed fit. During a period of 2 hours, the individual taught the students the causes of SCI, its symptoms and complications, burden (psychological and social including relationships, and family), resilience, coping strategies, support groups, expectations, job opportunities, return to work and treatments. The students were then asked to share their experience with the teaching, and the data obtained was analyzed using thematic analysis. **Result:** The class expressed that, the teaching provided them with experiential knowledge, enlightenment and awareness, and emotional connectedness with patients and influenced their perspectives on patients and the need for their care to be holistic. **Conclusion:** The significance of individuals with lived experience of a condition serving as teachers in clinical education cannot be emphasized. This is because, among other things, they can provide the students with experiential knowledge that can enhance their ability to learn how to make effective clinical decisions.



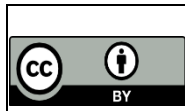
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sciforum-172724: Use of Albert Bandura's Sources of Self-Efficacy to Facilitate Students' Acquisition of Clinical Skills and Creativity in Physiotherapy: A Case Report

Favour Samuel David, Fauziyya Abdulkadir Sani, Salim Salisu Dayyib, Sulaiman Sani Musa, Hafsat Balaraba Abdullahi, Aisha Salisu Inuwa, Lukman Ayatullah Opeyemi, Abdulrasaq Usman Suleiman, Chukwuka Madubuike Franklin, Idris Usman Abba, Faith Olanrewaju Taiwo, Peace Anoze Osansan and Auwal Abdullahi *

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Background: Physiotherapy education requires students to acquire both and theoretical and practical knowledge that will enable manage their patients and/ or clients effectively. The aim of this article is to report a case of patient with impairment in motor function following stroke that was managed by a group of students using constraint induced movement therapy (CIMT). **Method:** At first, the students were taught by the teacher on how to administer CIMT to patients with stroke using Albert Bandura's sources of self-efficacy. They were then asked to identify a patient, design and administer it under the supervision of the teacher. **Results:** After the intervention, motor function (performance), amount and quality of use of the limb improved by 0.41, 0.35 and 0.39 points respectively at two weeks. At four weeks, motor function (performance), amount and quality of use of the limb improved by 1.35, 0.98 and 1.0 points respectively. In addition, motor function (time) decreased by 2.1 seconds points at two weeks, and 3.07 seconds at four weeks. Upper limb self-efficacy, it improved by 2.2 points at two weeks, and 3.8 points at four weeks. In addition, the group of the students stated that, '*This way helped us to learn easily, and we are now confident in managing such cases at any time.*' **Conclusions:** Use of Bandura's of sources of self-efficacy may enhance to students' learning.



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Session 4. Special and Inclusive Education

sciforum-167672: "GENIUS UNLOCKED: How AI-Powered Dialogue Can Transform Disabled Students from 'Problems' to 'Problem-Solvers'"

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Contemporary special education research emphasizes artificial intelligence as a tool for automating pedagogical administration and identifying student deficits more efficiently. This paper presents an alternative theoretical framework: Genius Recognition Through AI-Enabled Dialogue (GRAID), which reconceptualizes the role of artificial intelligence in special education. Drawing upon epistemic justice theory, neurodiversity studies, and phenomenological philosophy, this paper argues that current AI implementations, despite beneficial intentions, perpetuate systematic epistemic injustice by automating the diagnostic gaze that renders disabled students' ways of knowing invisible. GRAID proposes a theoretical inversion: rather than using AI to identify deficits, AI should liberate educators from compliance bureaucracy, creating temporal and cognitive space for genuine dialogue with students about their actual thinking processes. This framework articulates four interconnected theoretical dimensions: first, the concept of diagnostic epistemic closure and its displacement through sustained dialogue; second, neurodiversity reconceived not as disorder but as cognitive architecture constituting measurable forms of genius—systemic thinking, spatial reasoning, and rapid ideation; third, phenomenological dialogue as a practice of recognition distinct from conventional pedagogical interaction; and fourth, transformative identity formation that repositions disabled students from subjects of deficit discourse to intellectual agents. The paper further develops original conceptual innovations including the Genius-Deficit Paradox, the Epistemic Paradox of Diagnosis, and a relational ontology of disability. This theoretical framework offers philosophical foundations for educational justice without requiring empirical validation, contributing new conceptual architecture for understanding intelligence, recognition, and technology's proper role in transforming special education.



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sciforum-173126: An Exploration of Special Needs Assistants' Role and Experiences of Supporting the Care Needs and Independence of Children in Nurture Groups in Mainstream Primary Schools in Ireland.

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Introduction. Nurture Groups (NGs) are an evidence-based intervention for children with emotional and behavioural difficulties (Hughes and Schlosser, 2014, Jones et al., 2025). The NG intervention originated in the UK and are typically run by a Teacher and Teaching Assistant (Boxall and Lucas, 2010). In Ireland, the number of NGs in schools are increasing, with Teachers and Special Needs Assistants (SNA) often implementing these. In Irish policy, the SNA role is grounded in support for children's care needs and independence (Circular 0030/2014). Given the contrast in roles of the SNA and TA, this research explored how SNAs are supporting children's care needs and independence within the NG setting in mainstream primary schools, and the enablers and barriers to this.

Methods. Case study methodology was employed with second generation activity theory employed as the guiding theoretical framework (Engeström, 2001). Three case studies were conducted. Data collections methods included semi-structured interviews with SNAs and Teachers, structured observations and Likert scale statements. Children participated in an adapted personal construct psychology activity titled 'Drawing the Ideal SNA'. Reflexive Thematic Analysis (Braun and Clarke, 2021) was employed to analyse qualitative data. Descriptive statistics were used to analyse data gathered from observations and responses to Likert statements.

Results. Key findings include themes relating to the relational approach used by SNAs to provide emotional support and build independence, the qualities and qualifications necessary for the SNA role in the NG, the emotional journey SNAs experience, partnership working, and the influences of the wider school community.

Conclusion. Implications of the study's findings reveal a key need for official policy on NGs in Ireland which defines the SNA role in these. Increased SNA training and supervision should be provided. At the school level, a whole school approach to Nurture is recommended prior to establishing a NG.



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sciforum-178177: Are We on the Right PATH? An Exploration of Planning Alternative Tomorrows with Hope in Transition Planning with Autistic Students.

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Background: As autism identification continues to rise both in Ireland and around the world, there is increasing recognition of the need for inclusive and individualised educational planning. In particular, the transition between or within educational settings can pose significant challenges for autistic students. Planning Alternative Tomorrows with Hope (PATH) is a person-centred tool that may support students during these transitions. Grounded in the principles of the neurodiversity movement, PATH promotes a collaborative, strengths-based approach that is responsive to the individual needs of autistic students.

Aims: This study aims to explore the experiences of autistic students, their parent, teacher and National Educational Psychological Service (NEPS) psychologist in using the PATH process to support transition planning.

Case Selection: Two cases were selected to facilitate literal replication. Each case comprised of a NEPS psychologist, a teacher, a parent and an autistic post-primary school student.

Methods: An explanatory two-case study design was employed, guided by Yin's (2018) methodology. Five propositions were developed using Activity Theory (Engeström, 1999) as a conceptual framework. Data were collected through semi-structured interviews and a questionnaire. Reflexive thematic analysis (RTA) was used to identify key themes (Braun & Clarke, 2021).

Results: RTA identified key themes relating to participants' perceived effectiveness of the PATH process. The themes generated highlighted the importance of the facilitator's role and skills, the student's voice being central to the process and the impact of teamwork or tensions on collaboration in the process. Pattern matching was subsequently conducted to compare empirical findings with the case propositions. Both primary and secondary contradictions were identified, revealing significant areas of focus for policy and practice.

Conclusions: The findings extend the limited empirical literature on the use of PATH within educational contexts. Results are discussed in relation to implications for school practice, educational psychology practice, future research and policy development.



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sciforum-173443: Demystifying the Relationship between Burnout, Enjoyment and Buoyancy and their Impacts on Academic Achievement

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In recent years, increasing attention has been given to the role of emotional and psychological factors in shaping students' academic outcomes. Among these factors, academic burnout, enjoyment, and academic buoyancy have emerged as key constructs influencing engagement and performance. Grounded in positive psychology and Control-Value Theory (CVT), this study adopts a quantitative research design. Data from 640 students were collected using validated self-report instruments measuring academic burnout, learning enjoyment, and academic buoyancy, while academic achievement was represented by students' course grades. Statistical analyses, including descriptive and correlation, were conducted to explore the profiles and relationships. In addition, a structural equation model was constructed to investigate the inner and deeper correlations among these variables.

The findings reveal that academic burnout is negatively associated with academic achievement, whereas enjoyment and academic buoyancy are positively related to performance. Academic buoyancy appears to mitigate the adverse effects of burnout. These results highlight the importance of emotional well-being and resilience in academic success. This study provides an integrated perspective on both negative and positive emotional factors in education and offers pedagogical implications. Reducing burnout, fostering enjoyment in learning, and strengthening students' capacity to cope with everyday academic setbacks may contribute to improved academic outcomes and overall well-being.



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sciforum-160246: Design and Pilot Implementation of the Active Music Programme (MAP) in a Special Education Centre for Adolescents and Adults with Autism Spectrum Disorder (ASD)

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The Active Musical Program (MAP) is an interdisciplinary initiative designed to promote inclusion, facilitate communication, and enhance the emotional well-being of individuals, ultimately aiming to improve their overall quality of life through participatory musical practice. This manuscript presents the comprehensive design and strategic planning for the forthcoming implementation of MAP within a special education center that serves adolescents and adults diagnosed with Autism Spectrum Disorder (ASD). The theoretical foundation of MAP is grounded in active music education methodologies, guided improvisation techniques, and interactive sound experiences, which collectively serve as effective tools for fostering socio-emotional and cognitive development. The planned pilot phase, set to commence in the upcoming academic year, consists of structured weekly sessions centered on clearly defined objectives. These objectives include promoting joint attention, supporting emotional regulation, enhancing motor coordination, and reinforcing non-verbal communication skills. The program's interdisciplinary framework involves close collaboration among music professionals, special education instructors, and social inclusion experts, ensuring a holistic approach to intervention. Evaluation of the program will employ qualitative methods, focusing primarily on participatory observation and detailed analysis of participant experiences and outcomes. This approach will provide valuable insights into the program's efficacy and areas for refinement. Through this work, we aim to share the conceptual and methodological underpinnings of MAP and to stimulate discussion regarding its potential to serve as an innovative and effective tool within the fields of inclusive education and artistic intervention for individuals with ASD. Ultimately, MAP aspires to contribute meaningfully to the advancement of inclusive practices and the empowerment of neurodiverse populations.



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sciforum-167710: Effects of Parent Training Facilitated by Elementary School Teachers for Parents of Children with Developmental Disabilities: Changes in Parenting Attitudes, Behavioral Problems, and Quality of Life

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Objective: This study aimed to evaluate the effectiveness of a parent training (PT) program led by a team of elementary school teachers for parents of children with developmental disabilities. The study focused on improving the children's Quality of Life (QOL) and behavioral problems, as well as enhancing the parents' nurturing attitudes.

Methods: In this single-arm pre-post study (without a control group), the participants were 32 parents of children enrolled in special education classes in a local community. The intervention followed a blended learning model, consisting of four face-to-face sessions, on-demand videos, and online training. Pre- and post-intervention assessments were conducted using the SDQ, KINDL, and PNPS. The final analysis was limited to 23 participants who attended all sessions.

Results: Regarding behavioral problems, the SDQ "Total Difficulties Score" showed significant improvement. In terms of QOL, significant enhancements were observed in the "Self-esteem" and "Family" subscales of the KINDL. For parenting attitudes, the "Involvement/Monitoring" factor of the PNPS improved. Additionally, the program received high ratings for social validity.

Conclusion: The findings suggest that a PT model delivered by local school teachers can be an effective support system. However, this study is limited by its small sample size and the absence of a control group. Future research should include larger samples and longitudinal follow-up sessions to evaluate the long-term maintenance of these effects.



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sciforum-154272: Mediation, Identity, and Territory: Challenges for the Construction of the LGBTIQ+ Narrative in the Socio-Educational Context of the Andean Pacific.

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Public policy frameworks in the Andean Pacific region (Peru, Ecuador, Colombia, and Chile) view reading mediation as a fundamental process essential to fostering citizenship, strengthening social cohesion, and advancing democratic inclusion. Building on this foundation, reading is established as a pivotal transformative factor for historically excluded communities, such as LGBTIQ+ individuals, who face significant obstacles to accessing cultural resources and identity visibility due to pervasive systematic discrimination and violence in educational settings. Consequently, there is a critical knowledge gap regarding how reading mediation is applied in practice and its effective impact on promoting LGBTIQ+ identity within the region's socio-educational context.

This research aims to trace, analyze, and synthesize reading mediation practices, related bibliography, and research on reading and LGBTIQ+ identity from 2005 to 2025.

We employed a systematic literature review (SLR) following rigorous PRISMA guidelines, utilizing an exhaustive search strategy across multiple academic databases and regional repositories. The study is expected to identify and characterize the typology of existing Cultural Mediation Models and their principles of application. The results will provide the conceptual framework and empirical basis for designing inclusive cultural public policies and culturally responsive library practices, offering a direct and timely contribution to education and society studies in the Andean region.



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sciforum-178084: A Practical Study on Participatory Digital Fabrication for Inclusive Wayfinding and STEM Learning

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Introduction: This paper presents a practical study on how participatory digital fabrication can support inclusive education by enabling students to co-design both school spaces and learning tools. Grounded in Universal Design for Learning, creative learning, and co-design approaches, the project explored how everyday school needs can become meaningful opportunities for participation, accessibility, and STEM learning. In particular, the study focused on transforming communication barriers within a comprehensive school into shared design challenges connected to the common good.

Methods: The intervention involved 30 students and 3 teachers in a school-based iterative process structured around four phases: empathize, think, make, and improve. Students mapped accessibility and orientation needs in common areas, then designed and fabricated tactile, high-contrast signage through CAD modelling and 3D printing. In parallel, they developed five angle-learning kits to support geometry learning through peer tutoring activities with younger pupils. Data were collected through inclusive rubrics, student self-assessment, focus groups, and formative feedback tools.

Results: Preliminary findings suggest that participatory fabrication strengthened students' sense of agency, collaboration, and social responsibility. The project produced nine tactile restroom signs, including one accessible sign, and five manipulable geometry kits. Qualitative evidence indicates positive effects on awareness of inclusive design, school orientation, accessibility, and engagement in STEM learning. The process also supported conceptual understanding through hands-on exploration and encouraged students to see school spaces as shared environments that can be improved collectively.

Conclusions: Participatory digital fabrication can act as a bridge between inclusive design, technology-enhanced education, and STEM pedagogy. Even small-scale interventions may help schools become more accessible, collaborative, and educationally meaningful spaces, while offering replicable practices for broader school communities.



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sciforum-143991: AI-based Teaching: Connecting Inclusion to Education.

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In GCC, specifically KSA, students with language disorders/delays are barred at schools that claim to be inclusive. This practice has produced a wide gap in education sector, as the option left for students are either homeschooling or unschooling. Lack of awareness, limited knowledge and training, and reluctance in using modified AI tools in practice, hinder the success of students. The main objective of this qualitative study is to explore the importance of AI-based teaching methods for children with special needs; mainly language disorders. The study describes how special needs educators, therapists, and parents perceive the integration of AI-based tools, such as Speech blubs, SymboTalk, Articulation station etc. into intervention for children with in school settings or at home, relative to their experiences with traditional tabletop therapies like pointing and imitating sounds. Data are generated from in-depth interviews with parents, special educators, therapists and student observations, then thematically analyzed through the lens of motor learning theory. The analysis reveals that various strategies and programs are available to make these children more adept to expressive and receptive language. Proper training of educators in AAC (augmentative and alternative communication) can bring drastic changes to allow coping with challenges in educating students with special needs. AAC has brought a revolution in speech development and special education needs. Moreover, implementing strategies like DTTC (Dynamic tactile and temporal cues) help students achieve their milestone. The call of time is to create an environment welcoming to all, irrespective of any disability. Introducing AI assisted proprioceptive activities, such as VR obstacle courses, sensory inputs like AI powered sensory calming stations in a classroom setting will enhance the cognitive ability of children with language impairments. Rigorous practice, actual cue and timely correction empowered by AI can lead to improvement of language disorders.



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sciforum-176402: An Exploration of Parent's and Teachers' Experiences of Shared Decision Making and Goal Setting for Students Attending Special Schools and Classes for Students with Moderate to Severe/Profound Levels of Intellectual Disability, in Ireland.

Aisling Dempsey

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Irish and international policy emphasises parent–teacher collaboration and shared decision-making as central to inclusive education for students with special educational needs (Department of Education, 2024). However, research suggests that such collaborative decision-making is unevenly enacted, with parental influence often constrained by power dynamics and professional dominance (Morris et al., 2022). Moreover, students with more significant needs, have been identified as marginalised in educational policy and practice, often positioned within contexts of reduced academic expectations, and whose parents have been described in research as having limited opportunities to engage as equal partners in educational planning and decision-making (Banks et al., 2016; Colley, 2018; Stroggilos & Xanthacou, 2006; Rendoth et al., 2024).

This study explored parents' and teachers' experiences of shared decision-making and educational goal setting for students with moderate to severe/profound levels of intellectual disabilities and identified factors shaping these collaborative practices.

Participants comprised parent–teacher dyads recruited from special schools and classes across Ireland.

A qualitative phenomenological design, informed by a social constructivist epistemology and underpinned by Bronfenbrenner's Bioecological Model of Human Development (Bronfenbrenner & Morris, 2007), was adopted. Semi-structured interviews were conducted with parents and teachers separately. Data were analysed using Reflexive Thematic Analysis (Braun & Clarke, 2019).

Shared decision-making was variable and context dependent. While endorsed in principle, practices often reflected consultative or teacher-led approaches. Parents prioritised wellbeing and functional goals, while academic goals were typically positioned within teachers' professional remit. Goal alignment was frequently partial or assumed. The Individual Education Plan served as the primary formal mechanism for shared decision-making, though its enactment varied. Trust, power dynamics, and educational stage shaped experiences.

Conclusions: Shared decision-making and goal setting emerged as negotiated, relational processes embedded within organisational and systemic contexts. Greater clarity, consistency, and relational support are needed to strengthen these collaborative practices in special education contexts.



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sciforum-153595: Applying Universal Design for Learning in Reading Comprehension Instruction: Practical Insights for EFL Teachers

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Reading comprehension remains one of the most complex areas of language use (Snow, 2021) in English as a Foreign Language (EFL) classrooms, especially in contexts characterized by distinct learner profiles and varying levels of linguistic proficiency. Universal Design for Learning (UDL), an inclusive educational framework rooted in cognitive neuroscience, presents a promising approach to confront these challenges by promoting flexibility in teaching and assessment and presents evidence-based interventions to address the needs of struggling learners. This paper aims to impart EFL teachers with practical strategies that can aid them in integrating UDL principles into reading comprehension instruction. Drawing on existing research and practical classroom insights, this paper reports on a systematic review of literature that examined the effectiveness of integrating UDL principles in reading comprehension instruction. The review, guided by the research question “How does the application of UDL principles enhance reading comprehension outcomes for diverse EFL learners?”, examined studies conducted between 2013 and 2023 following PRISMA guidelines. This paper underlines how the three core UDL principles—multiple means of representation, multiple means of action and expression, and multiple means of engagement—can be utilized to make reading instruction more attainable, engaging, and inclusive. Practical examples encompass the use of multimodal texts, differentiated comprehension activities, collaborative reading tasks, and technology-enhanced scaffolds to support distinct learners. The paper also discusses common difficulties that teachers may face, such as scarce resources and training needs, and presents recommendations for gradual implementation in resource-restrained contexts. Drawing on these findings, the paper presents evidence-informed strategies for teachers seeking to design inclusive reading lessons. By linking research findings to practical classroom applications, this study contributes to the growing body of evidence supporting UDL as a research-grounded approach to inclusive EFL instruction.



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sciforum-167407: ArInLi Erasmus+ Project: Open, Accessibility-First AI Literacy for Inclusive Secondary Education

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Introduction:

Artificial Intelligence Literacy (AI-L) has rapidly become an emerging educational priority in secondary schooling, demanding conceptual understanding, ethical awareness, and accessible pedagogical guidance. However, students with disabilities and those at risk of digital exclusion face disproportionate barriers in engaging meaningfully with AI-enhanced learning environments. ArInLi—an Erasmus+ KA210 collaboration among four European schools from Spain, Türkiye, Italy and Germany, addresses these challenges by developing two open outputs: a public website and a freely available e-book designed to integrate foundational knowledge of AI with ethically grounded, classroom-ready resources through an accessibility-first approach.

Methods.

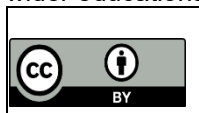
Using a design-based, practice-oriented methodology, ArInLi iteratively develops and curates instructional sequences and teacher guidance. The e-book offers structured chapters on core concepts (AI, Machine Learning, Deep Learning), AI in education and data ethics, followed by catalogues of AI tools for teaching and learning. The website disseminates these materials and incorporates a four-session “AI Copilot” classroom guide, alongside curated accessibility-focused toolsets (e.g., screen readers, text-to-speech, captioning, simplified text) with practical recommendations for students with disabilities and learners experiencing digital vulnerability.

Results.

Project outputs include: an openly licensed e-book consolidating conceptual, ethical, and pedagogical elements, a dynamic online repository with tutorials and teacher-ready sequences and curated accessibility supports that normalize the use of assistive technologies in everyday learning. As of 14 January 2026, the website has accumulated 55,852 visits from 30 countries, reflecting substantial international interest and supporting early adoption across partner contexts.

Conclusions.

ArInLi demonstrates a replicable and scalable model for inclusive AI-L in secondary education by coupling conceptual depth and ethics with accessible, classroom-ready resources. The framework lowers participation barriers for learners with disabilities and those at risk of digital exclusion. Future iterations will expand language coverage, refine teacher guidance and extend dissemination across wider educational networks.

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sciforum-168448: Between Barriers and Possibilities: The Medical Experience in Communication with Non-Verbal Autistic Children

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Introduction: Autism Spectrum Disorder (ASD) involves deficits in communication and social interaction. In non-verbal children, the absence of speech hinders the expression of symptoms and emotions, making diagnosis and treatment adherence challenging. Thus, physician-patient communication relies on family mediation and alternative strategies. **Objectives:** To analyze the perceptions of child neurologists and psychiatrists regarding challenges and strategies in communicating with non-verbal autistic children, highlighting structural barriers and therapeutic bonding.

Methods: A qualitative study was conducted through semi-structured interviews with three physicians (two child neurologists and one psychiatry resident) who treat non-verbal autistic patients. The script addressed clinical routines, communication challenges, strategies, formal training, and institutional barriers. **Results:** Participants reported daily contact with non-verbal patients, citing agitated behavior, low frustration tolerance, and a lack of standardized protocols as primary obstacles. Neurologists emphasized parental mediation and clinical observation, while the psychiatrist noted that emergency environments and limited time hinder bonding. Strategies included using the Picture Exchange Communication System (PECS), clear communication, and toys to calm the environment. All participants identified a lack of formal training and the need for adapted clinical spaces. Despite barriers, empathy, patience, and parental presence were deemed essential for humanized care. **Final Considerations:** Communication with non-verbal autistic children is restricted by limited resources and insufficient training. However, parental mediation and an empathetic clinical approach can strengthen the physician-family bond.



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sciforum-170075: Bridging the Policy-Practice Gap: An Action Research on Digital Inclusion for Multilingual Learners

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The systemic exclusion of migrant children in education persists, driven by monolingual policies and a critical implementation gap between inclusive rhetoric and classroom reality. My fieldwork in Buryatia, Russia, highlighted how institutional designs invalidate multilingual identities.

This action-research study investigated whether gamified virtual learning environments (VLEs) can serve as a micro-level tool to foster inclusive, multilingual peer interaction, thereby addressing symptoms of broader systemic failure.

The study was conducted in a language studio with a diverse group of migrant and local children. I designed and facilitated a series of collaborative tasks within a gamified virtual world, collecting data through participant observation, feedback surveys, and analysis of in-world communication.

Preliminary findings indicate a significant increase in engagement and cross-linguistic collaboration. The VLE lowered affective filters, allowing learners to use their full linguistic repertoires strategically. It created a "third space" where multilingualism was an asset for problem-solving rather than a barrier.

While not a systemic solution, such digital tools demonstrate that inclusive practice is possible. However, their scalability depends on macro-level policy changes: mandated teacher training in digital pedagogies, curricular flexibility, and official recognition of multilingualism. This research underscores the need to bridge innovative classroom practice with evidence-based policy reform to dismantle barriers to inclusive education.



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sciforum-178736: Challenges of Educational Inclusion in English Language Teaching: Pedagogical Reflections from Teaching Experience with a Visually Impaired Student

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Inclusive education at the high school level presents several challenges for teachers, particularly in subjects such as English, where many instructional resources rely heavily on visual materials and digital platforms. In this context, the present study aims to reflect on the pedagogical challenges that arise in teaching practice when supporting the learning process of a student with visual impairment in an English class at the upper secondary level.

The study adopts a qualitative approach based on pedagogical reflection and the analysis of teaching practice. Data were collected through observation records, classroom interaction experiences, and the process of adapting activities during the academic support provided to the student. The analysis focuses on the strategies implemented by the teacher to foster the student's active participation, as well as on the adjustments made to teaching and assessment practices.

The findings indicate that teaching in inclusive contexts involves a continuous process of pedagogical adaptation, instructional creativity, and flexibility in the use of educational resources. The results also highlight the importance of creating learning environments that promote equitable participation among students, as well as the role of teacher reflection in transforming educational practices.

It is concluded that inclusive education does not only involve the adaptation of materials, but also requires a transformation of pedagogical practices in order to respond effectively to the diversity present in the classroom.



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sciforum-141884: Cognitive Factors Associated with Mathematical Achievement in Tunisian Children With and Without Dyscalculia

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Dyscalculia is a specific cognitive disorder affecting the understanding of quantities and numerical symbols. It may significantly impede mathematical learning, even in children with otherwise preserved intellectual development. This study aims to identify the cognitive factors correlated with mathematical achievement in Tunisian children, with and without dyscalculia. The sample consisted of 100 children aged 8 to 16, equally divided into a dyscalculia group and a typically developing control group. Executive functions were assessed across four domains: inhibition (Stroop Test), planning (Tower of London), and cognitive flexibility (Trail Making Test). Working memory was evaluated using the Digit Span (verbal) and Corsi Block-Tapping Test (visuospatial). Non-verbal reasoning was measured through Raven's Progressive Matrices. School performance in mathematics was based on the most recent term grade. Pearson correlation was used to explore associations between cognitive variables and mathematics scores. Group comparisons were made using independent-samples t-tests. A two-way ANOVA examined the effects of age and socioeconomic status on executive functioning. In children with dyscalculia, strong correlations were found between mathematics scores and both verbal working memory and inhibition. Moderate correlations emerged with non-verbal reasoning and planning, while the link with visuospatial memory was weaker but still significant. Among children without dyscalculia, mathematical performance was moderately related to planning, and weakly to verbal memory and non-verbal reasoning. No significant correlations were found with inhibition or visuospatial memory. Significant group differences were observed in verbal working memory and planning. A moderate difference was also noted in non-verbal reasoning, while other cognitive measures did not differ substantially. The ANOVA revealed a significant effect of age on executive functioning, with no effect of socioeconomic status. These results underscore the central role of verbal working memory and planning in mathematical achievement and call for targeted pedagogical strategies supporting these key cognitive functions in children with dyscalculia.



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sciforum-165295: Effects of the Cognitive Load–Managed Handwriting Program (CLM-Handwriting) on Handwriting Legibility among Students with Learning Disabilities

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Introduction: Handwriting is a basic academic skill and students with learning disabilities often struggle with handwriting legibility due to limitations of working memory and cognitive processing. This study developed and investigated the effectiveness of Cognitive Load–Managed Handwriting Program (CLM–Handwriting) to develop handwriting legibility among LD students. CLM–Handwriting is grounded in the principles of the Cognitive Load Theory (CLT). It is especially designed to target the cognitive needs of LD students.

Methodology: A quasi–experimental design was employed, where a sample of 40 LD students was divided into two groups. The experimental group ($n = 20$) received CLM–Handwriting intervention for a period of 10 weeks (30 sessions), while the control group ($n = 20$) received traditional classroom instructions. Handwriting Legibility and Motor Control Scale (HLMCS) ($ICC = 0.83$; $\alpha = 0.80$) was used to collect pre–test and post–test data.

Data Analysis: Data was analyzed using descriptive and inferential statistical tests. Data Analysis revealed that baseline performance of both groups was similar ($p = 0.97$). The control group didn't show significant improvement at the post–test ($p = 0.79$) while the experimental group demonstrated a significant improvement in score ($t(19) = -4.33$, $p .001$, $d = 0.97$). Post–test between group analysis also confirmed that the experimental group performed significantly better than the control group ($t(38) = -2.97$, $p .001$, $d = 0.94$). Analysis of covariance further confirmed that the improvement in the scores of the experimental group was significant even after controlling the pre–test score ($F(1,37) = 19.4$, $p .001$).

Conclusion: The data analysis overall confirms the effectiveness of CLM–Handwriting on handwriting legibility among the LD students. Findings of the study suggest the application of cognitive load aware strategies in special and inclusive classrooms.



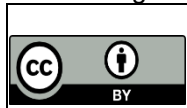
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sciforum-177672: Embodied Socio-Affective Learning in Adults with Intellectual Disabilities: An Educational Intervention Based on Consent Practices and Personal Boundaries

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The development of socio-affective competencies represents a key dimension of inclusive education, particularly in educational work with young adults with intellectual disabilities and mild autism spectrum conditions, who may experience difficulties in interpreting interpersonal boundaries, consent and socially shared norms (Schaafsma et al., 2015; McDaniels & Fleming, 2016). Research on social and emotional learning highlights the importance of fostering relational awareness and social competencies as fundamental components of educational processes (Durlak et al., 2011). Studies on embodied cognition further suggest that experiential and body-based learning environments may support the understanding of relational concepts that are often difficult to grasp through purely verbal instruction (Wilson, 2002; Shapiro & Stolz, 2019). This contribution presents a practice-based educational intervention aimed at promoting awareness of personal space, consent and the distinction between public and private behaviours through an embodied socio-affective learning approach. The intervention takes the form of an experiential workshop involving young adults with intellectual disabilities and engaging participants in movement-based activities and guided interaction designed to explore relational boundaries and socially shared behavioural norms. The study adopts a small-scale qualitative exploratory design based on a structured observation protocol. Data are collected through systematic observation grids and narrative field notes compiled by external non-participant observers. A thematic analysis is conducted to identify patterns related to awareness of personal space, understanding of consent and recognition of socially shared behavioural norms. Preliminary observations suggest that embodied and situational learning environments may facilitate the understanding of relational concepts such as consent and privacy through concrete relational experiences. Positioned at the intersection of educational foundations and special education, the study highlights the pedagogical potential of embodied socio-affective learning for fostering relational awareness and social competence in inclusive educational contexts.



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sciforum-170716: Emotional Experiences and Support Stability among Teaching Assistants in Inclusive Education

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In the context of the continuous advancement of inclusive education, how to provide stable support for students with diverse learning needs has become an important issue. And teaching assistants play a crucial role in providing behavioral support, promoting learning participation, and offering emotional support. However, teaching assistants often occupy marginalised professional position, facing role ambiguity and limited professional support while being expected to provide relational care and supportive connections (Sinnema et al., 2025). Current research mainly focuses on inclusive teaching strategies or students' learning outcomes, while there is relatively limited attention paid to the emotional experiences of educational support personnel who are mainly teaching assistants and their impact on the stable implementation of inclusive education. Inspired by the theory of emotional labour, this study aims to explore the emotional experience of teaching assistants in inclusive educational contexts from their perspective as education support staff, and to examine how emotional needs, supports structures, and support continuity are related. This study adopts an exploratory qualitative research design. Collecting data through semi-structured interviews, approximately 10 - 15 teaching assistants working in special education setting will be recruited. A brief reflective journal will be incorporated to enhance the triangulation of data. The data will be analysed using a reflexive thematic analysis. It is anticipated that the study will reveal ongoing emotional pressure experiences by teaching assistants when supporting diverse student behaviours, tensions between emotional demands and professional role expectations, and the impact of limited institutional support on cumulative emotional load. The study is expected to further highlight link between support structures and service continuity, and suggest that support staff emotional sustainability may influence the stability of inclusive education implementation. This study strengthens understanding of support staff roles and offers insights for school-level support system development in inclusive education.



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sciforum-176477: Evidence-Based Policy: A Case Study of Stakeholder Involvement in Inclusive Education

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This presentation reports on the way that key participants in inclusive education provide real-world perspectives to support systematic, long-term policy change. It uses a recent example of a States of Jersey/*National Association of Special Education* (nasen) project (UK), which sought to evaluate current provision in that island location. Its aim was to use insider knowledge to help develop a 5-Year Plan to enhance inclusion in Jersey's schools and other education settings. Using surveys, face-to-face interviews and focus groups, the project team gathered quantitative and qualitative data which illustrated a diverse range of views concerning the effectiveness of current provision, as well as the challenges and barriers encountered by learners with special educational needs (SEN). The project's final report made 50 recommendations across 23 areas of policy and provision. All were accepted by the States of Jersey Parliament, including the adoption of a 5-Year Plan, mapped in the project's final report. Work on the latter is currently proceeding, including consultations with parents and charities and the inauguration of a set of baseline measures. The presentation provides insights into the data-gathering methodology used, indicative data extracts and a most importantly, a commentary on the ways which the project outputs have subsequently been helping to stimulate further island-wide initiatives.



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sciforum-171030: Extended Curriculum Programmes as a Catalyst for Building Equity and Resilience in Higher Education

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Many learners are unable to access higher education (HE) annually due to not meeting the minimum entry requirements for mainstream programmes. This persistent challenge reflects deep inequities in the education system and calls for transformative approaches that move beyond academic remediation. The Extended Curriculum Programme (ECP) has emerged as a strategic intervention aimed at widening participation, promoting inclusivity, and fostering academic success among students, particularly those from historically disadvantaged backgrounds. This paper explores how inclusive teaching practices, curriculum responsiveness, and student-centred pedagogies within the ECP help level the academic playing field in South African HE while nurturing social and economic resilience among graduates. Drawing on theoretical insights and reflective experience as an educator, it highlights the transformative role of ECPs in providing access and sustained academic support to underprepared students who might otherwise be excluded from mainstream academic pathways. Through contextualised pedagogy, mentorship, and holistic support systems that extend beyond academic assistance to include social integration and confidence building, ECPs cultivate graduates who are academically capable, socially conscious, and economically resilient. The paper underscores the importance of embedding Education for Sustainable Development (ESD) principles within ECP curricula and advocates for innovative pedagogical approaches, such as Universal Design for Learning (UDL) and participatory methods, to foster sustainability competencies and enhance engagement. Ultimately, it argues that true sustainability in South African HE must prioritise human development and inclusive teaching practices that transform structural inequalities into opportunities for collective growth and empowerment. Strengthening inclusivity within ECPs can bridge systemic gaps, advance institutional transformation, and support the broader goals of equitable and sustainable higher education.



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sciforum-178735: From Neuroaffirming Intentions to Proceduralised Practice: Policy Enactment and Practice Drift in Autism Education

Jennie N Burton * and Hayley Morrison

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Introduction: Autism is one of the most commonly identified neurodevelopmental conditions in childhood, contributing to sustained growth in demand for specialised educational supports. Although inclusive education policy increasingly promotes neuroaffirming, individualised approaches, the organisational conditions required to realise these commitments remain uneven, shaping how autism-informed programmes are interpreted and taken up in practice (Pellicano & Houting, 2022).

Methods: This study examined how autistic students and autism-specific programming were represented in provincial policy and interpreted alongside educators' responses to piloted and refined qualitative vignette tasks (Braun et al., 2017). Guided by an ecological framework and Critical Discourse Analysis, datasets were compared to identify similarities, differences, and omissions, examining where policy expectations aligned with or diverged from educators' professional reasoning and highlighting gaps between policy intentions and classroom practice (Bowen, 2009).

Results: Provincial policy describes autism-informed programming as relational, flexible, and responsive to student needs. Educators' vignette responses indicated that in practice this work is shaped by organisational conditions, including time pressures, documentation requirements, staffing arrangements, and competing classroom responsibilities. As a result, relational supports may be organised through procedural routines that align with existing administrative and accountability structures. This highlights how organisational systems shape the forms autism-informed support can take in everyday classrooms.

Conclusions: These findings suggest that challenges in sustaining neuroaffirming practice are not primarily a matter of individual educator implementation but reflect how school systems organise time, documentation, and support structures for inclusive education. Strengthening autism-informed programming may therefore require greater attention to the organisational and relational conditions that enable educators to sustain responsive supports in everyday classrooms.



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sciforum-164509: From Resistance to Resilience: Digital Immigrant Teachers' Adaptation to Technology in Special Educational Needs (Sen) Education

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This qualitative study investigates the experiences of digital immigrant teachers—those who adopted technology later in life—in teaching students with Special Educational Needs (SEN) using digital tools. The significance lies in understanding how these educators navigate the complex demands of inclusive digital education, especially as technology becomes integral to modern pedagogy. Grounded in a phenomenological framework, the research involved semi-structured interviews with 12 teachers from Kuala Lumpur and Selangor, Malaysia, each with over five years of SEN teaching experience. Thematic analysis revealed five major themes: adaptation to technology, perceived impact on student learning, barriers to integration, coping strategies, and emotional responses. Findings indicate that while initial encounters with digital tools were marked by resistance and low digital fluency, many teachers gradually transitioned into more confident and innovative users through peer mentorship, self-directed learning, and targeted professional development. Participants noted that assistive technologies, such as text-to-speech software and adaptive apps, enhanced accessibility and engagement for SEN students. However, challenges including inadequate training, time constraints, and classroom management complexities persisted. The study concludes that digital immigrant teachers, despite their initial struggles, can become effective facilitators of inclusive digital education when supported by context-sensitive training and collaborative school cultures. Their emotional resilience and pedagogical expertise are valuable assets that, when combined with digital competence, can significantly improve SEN learning outcomes. This research highlights the need for tailored professional development and intergenerational mentorship to bridge the digital divide and promote equity in special education settings.



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sciforum-165038: Improving Communication Skills of Children with Autism Spectrum Disorder and Engage Them: Puppets vs Social Robots

Ayşe Tuna

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Learning and social participation of children with autism spectrum disorder can be greatly impacted by the ongoing difficulties that they often face in social communication, joint attention, and sustained engagement. To address these difficulties, in recent years, play-based and technology-assisted interventions have become popular. In this study, the use of puppets and social robots as mediating tools for enhancing communication skills and engagement in children with autism spectrum disorder is examined. This study consolidates findings from empirical research, focusing on outcomes related to social initiation, verbal and nonverbal communication, joint attention, emotional expression, and engagement during intervention sessions.

The results of this study show that puppet-based interventions provide a versatile, affordable, and emotionally expressive medium that fosters symbolic play, imagination, and reciprocal interaction. On the other hand, social robot-based interventions are predictable and consistent and grab the attention of children with autism spectrum disorder. This study contributes to the existing literature by offering a comparative perspective and provides practical implications for educators, therapists, and researchers seeking evidence-informed approaches to supporting communication development in children with autism spectrum disorder. However, this study also identifies methodological shortcomings in a number of studies, including a lack of long-term outcome measures, inconsistent intervention designs, and small sample sizes.



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sciforum-169044: Inclusive Music Pedagogies in Practice: Multisensory and Learner-Centred Approaches

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¹ Department of STEM Education, Mary Immaculate College, Limerick, Ireland

² Independent Researcher

In many parts of the world, mainstream schools accommodate learners with diverse abilities. Over recent decades, inclusive pedagogies have been widely discussed in education, acknowledging that all learners differ, and that successful inclusive educational settings should provide multiple opportunities for learning. This requires teaching, learning, and assessment approaches that offer multiple entry points for participation and learning. Within music education, significant research has theorised inclusive music classrooms and programmes (Jellison, 2015; McCord et al, 2025). However, there remains limited research-based guidance on how inclusive pedagogy can be enacted in practice within music education. This presentation shares findings from two research studies exploring learners' experiences of inclusive pedagogy in music education, undertaken in higher and primary education contexts, in Ireland and Cyprus. A case study methodology was employed in both studies. An integrated framework combining theories of inclusive pedagogy and Universal Design for Learning (UDL) (Varvarigou, 2025) was used to map inclusive music pedagogy in practice. Findings from both studies revealed that key practices promoting inclusive pedagogy included repetition of structure and materials to establish a sense of routine and to promote musical development; imitation-based activities that gradually led to interaction; and multisensory learning. These experiences extended beyond the visual, auditory, and tactile modalities traditionally emphasised in education to include olfactory, vestibular (sense of balance and movement), and proprioceptive (sense of body in space) dimensions of musical learning. The presentation concludes with recommendations for inclusive practice across diverse learning contexts and across the lifecourse, advocating for hands-on, person-centred and participant-led approaches within flexible structures. Furthermore, it highlights the role of educational leadership in promoting co-creation and recognising learners as experts in their own learning.



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sciforum-176189: Inclusive Pedagogy: Rethinking Variation and Equity in Early Childhood Education

Erin FITZGERALD

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Inclusive education has traditionally focused on providing support for learners identified with specific needs, often through specialized programs or separate systems of support. While these approaches were developed to improve access to education, emerging research in inclusive pedagogy challenges this model by reframing learner diversity as a normal and expected feature of classrooms rather than a deviation from a perceived norm. Drawing on the work of Florian and colleagues, as well as contemporary findings from learning sciences research, this presentation explores how the concept of variability in human development disrupts traditional bell-curve assumptions about ability and achievement. Instead of designing education for an “average learner,” inclusive pedagogy encourages educators to expand the capacity of everyday classrooms so that all children can participate meaningfully in shared learning experiences.

This session examines the implications of these ideas for early childhood and teacher education programs, particularly within increasingly multicultural and multilingual contexts. It highlights how traditional special education structures may inadvertently reproduce inequities by separating learners rather than strengthening inclusive classroom practices. Through discussion of research insights and practical examples, the presentation invites educators to reconsider how curriculum design, teaching strategies, and classroom environments can better reflect the natural diversity of learners. Participants will gain practical insights into how inclusive pedagogy can inform teacher preparation and contribute to more equitable learning environments for all children.



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sciforum-137908: Investigating Early Childhood Teachers' Perceptions and Readiness in Implementing Inclusive Pedagogy in the UAE

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Inclusive education is a key priority in early childhood education (ECE), ensuring equitable learning opportunities for students of determination (SOD). In the UAE, policies such as “School for All” promote inclusive practices, yet teachers face challenges in implementation due to workload pressures, gaps in practical training, and limited classroom support. This study examines ECE teachers’ perceptions, attitudes, self-efficacy, intentions, and concerns regarding inclusive pedagogy. Using a mixed-methods approach, data were collected through surveys and interviews with 17 homeroom teachers from Pre-K to Grade 2. Findings show that teachers generally hold positive attitudes and demonstrate high self-efficacy towards inclusion, but report significant concerns, particularly about managing severe disabilities and adapting curricula to diverse needs. Correlational analyses revealed that higher levels of concern are associated with lower self-efficacy and less favorable attitudes, while intentions to implement inclusive practices remain moderately positive and show a surprising positive relationship with concerns, reflecting teachers’ commitment despite challenges. Interviews highlighted challenges, including a disconnect between theoretical training and practical classroom realities, parental resistance influenced by cultural stigma, and insufficient professional development and support. Despite these barriers, most teachers demonstrate a willingness to collaborate and adapt when provided with adequate resources and guidance. The study emphasizes the need for targeted professional development, stronger administrative and specialist support, enhanced parental engagement, and improved home-school collaboration to better support inclusive pedagogy in early childhood settings.



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sciforum-178519: Investigating Magic-Based Interventions as Mediating Tools for Improving Communication Skills and Social Interactions Among Students with Autism Spectrum Disorder (ASD) in Inclusive Classrooms: A Systematic Narrative Review

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Communication deficits among students with autism spectrum disorder (ASD) can limit meaningful participation in inclusive classrooms. In many social situations, students with ASD have difficulty understanding the nuances of social cues which may cause many communication problems when socially interacting with their peers not on the spectrum. It is essential for students with ASD in inclusive classrooms to have good communication skills. Magic-based interventions have been explored as an alternative to traditional methods of social skills development. Since social skills are embedded within the performance of magic tricks, they may be used as a tool to develop and improve communication skills in an authentic context.

Using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, a systematic narrative review was conducted to examine the use of magic-based interventions as mediating tools for improving communication skills and social interactions among students with ASD in inclusive classrooms. Specifically, this review investigates if learning and performing magic tricks can positively improve communication skills and social engagement among students with ASD.

The results of this review show that magic-based interventions may be a fun and practical alternative to traditional methods of learning the social rules of communication; thereby increasing the social engagement of students with ASD. Magic-based interventions may also provide a shared emotional experience that enhances reciprocal communication skills needed to have a conversation naturally.

In conclusion, magic-based interventions may be considered a viable option to promote and strengthen social communication skills among students with ASD that foster meaningful peer relationships and increase social acceptance by their peers not on the spectrum. Conceptually, magic-based interventions create structured opportunities for social interactions and have embedded possibilities for social practice within inclusive settings.



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sciforum-165566: Language Development in Arabic-Speaking Children with Cochlear Implants: Evidence from a Saudi Context

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This research investigated the early language development of children who are cochlear recipients in this population, with the objective of identifying language acquisition profiles and determining how they were affected by chronological age, duration of use (its initiation time and total period in months), and the effects of the timing of the intervention. Design: A descriptive cross-sectional. A structured questionnaire was applied to parents and speech-language pathologists in Medina, Saudi Arabia. The sample comprised 78 children born within the ages of 1–5 who were using cochlear implants. The questionnaire included 28 language skills, which ranged from basic auditory-receptive abilities to syntactic knowledge.

The results revealed a clear rank-ordering of language development. The item pool and receptive skills demonstrated the highest achievement rates, with the recognition of personal items at 93.59% and various interactional skills exceeding 90%. Higher-order expressive and syntactic skills, in contrast, were significantly impaired. The lowest attainment rates were found for generating three- to four-word utterances (55.89%) and for comprehending complex question forms, such as "why," "who," and "how many" (57.69%), indicating an ongoing delay in acquiring more complex language structures.

The instrument had excellent reliability (Cronbach's $\alpha = .949$). Trends toward significance indicated that a younger age at cochlear implantation and an earlier onset of language intervention were related to higher linguistic profiles, while a greater amount of device experience correlated with better overall language performance. Together, the results show that Arabic-speaking children with cochlear implants develop basic language skills more easily than complex syntax. The findings highlight the need for early implantation, continuous intervention, and culturally and linguistically appropriate interventions to achieve higher-level language development.



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sciforum-168207: Mental Health Interventions in General Education Environments

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The increasing recognition of mental health's role in academic success has prompted a growing focus on integrating mental health supports within general education classrooms. This study focused on the various strategies and interventions designed to address students' mental health needs within the mainstream educational setting. The findings highlight the importance of creating an inclusive environment that fosters emotional well-being and resilience among all students. Key approaches discussed include the implementation of social-emotional learning curricula, training for educators on recognizing and responding to mental health issues, and the integration of mental health professionals within schools. The study also addressed the benefits of promoting a positive school climate and building strong support networks involving parents, teachers, and community resources. The specific focus of this study was on major depression disorder, general anxiety, and self-injurious behavior. By embedding mental health supports into general education, schools can enhance student engagement, reduce behavioral issues, and contribute to overall academic success, demonstrating a holistic approach to education that prioritizes both emotional and academic development. However, many existing training programs for school staff lack comprehensive mental health guidance, leaving teachers uncertain about how to help students. Furthermore, lower-grade schools often lack the necessary resources for individualized support, highlighting the need for effective, sustainable mental health programs in classroom settings. Therefore, this study identifies tools and programs that have shown to be effective through long-term research for a variety of grade levels.



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sciforum-169837: Profiles of Overexcitabilities in Students With High Abilities, High Achievement, and Non-Identified Peers

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Dabrowski's Theory of Positive Disintegration proposes overexcitabilities (OEs) as heightened forms of responsiveness frequently associated with students with high abilities. However, OEs are often misinterpreted as behavioral or emotional difficulties, and their discriminant value for talent identification remains unclear. This study examined whether profiles across the five OE dimensions (psychomotor, sensual, intellectual, imaginational, and emotional) differentiate students formally identified as highly able, high-achievers, and non-identified peers.

A quantitative, comparative, cross-sectional design was employed with 157 Spanish students aged 8–13 years (59 highly able, 57 high-achievers, 41 non-identified). Participants completed the Spanish adaptation of the Overexcitabilities Questionnaire–II (OEQ-II), which demonstrated adequate to excellent internal consistency ($\alpha = .73-.84$). Group differences were analyzed using MANOVA and follow-up ANOVAs with Bonferroni adjustments. A multinomial logistic regression examined the predictive value of OE dimensions for group membership.

Results revealed a significant multivariate effect of group on OE profiles, Pillai's $V = .359$, $F(10, 302) = 6.62$, $p = .001$, partial $\eta^2 = .18$. Univariate analyses showed significant differences across all five dimensions ($\eta^2 = .09-.23$). Both highly able and high-achieving students scored higher than non-identified peers in emotional, sensual, and imaginational OEs. Intellectual OE most clearly distinguished the highly able group, which scored significantly higher than both comparison groups and emerged as the only significant predictor of formal identification in the regression model (Nagelkerke $R^2 = .38$). Post hoc power analyses indicated high sensitivity ($1-\beta = .99$).

Findings suggest that intensity-related characteristics are common among high-performing students, but intellectual OE uniquely characterizes highly able learners. Incorporating multidimensional OE profiles alongside cognitive and academic indicators may improve early identification and provide a more comprehensive basis for educational support and enrichment.



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sciforum-168575: Promoting Inclusive and Intercultural Education through the Next Generation EU Framework: A Comparative Analysis of National Recovery and Resilience Plans

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The Next Generation EU (NGEU) 2021–2026 initiative offers a strategic opportunity to advance inclusive and intercultural education across Europe. This study explores how reforms and investments outlined in the National Recovery and Resilience Plans (NRRPs) of selected EU member states foster inclusive educational practices and the development of intercultural and social competences within education and training systems.

A comparative and compilative analysis was conducted, examining NRRPs from Northern-Central Europe, Eastern Europe, and Mediterranean Europe. Official policy documents, governmental reports, and EU strategic frameworks were analyzed to identify objectives, implementation strategies, resource allocation, and monitoring mechanisms aimed at enhancing intercultural and inclusive education.

The analysis highlights both convergences and divergences in approaches to inclusive and intercultural education. Northern-Central European countries emphasize structured curricula and teacher professional development, while Mediterranean and Eastern European countries prioritize infrastructure, digital tools, and policy measures to promote participation. Variations in governance, resources, and strategic focus influence the effectiveness and reach of interventions, demonstrating the role of context in policy implementation.

NRRPs function as pivotal instruments for promoting inclusive and intercultural education. Their regional impact depends on governance structures, resource distribution, and policy priorities. The findings offer insights for future European educational policies, stressing the importance of targeted investments, capacity building, and harmonized evaluation frameworks to ensure sustainable and effective intercultural education practices.



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sciforum-165513: RISE to Transform: Collaborative Systems Leadership for Inclusive Education in Ireland

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This paper presents a strategic framework for building leadership capacity in inclusive education through a systems theory lens, drawing on the collaborative RISE (Realising Inclusive Special Education) strategy led by a post primary management body and a university involved in teacher education in Ireland. Designed to bridge policy, practice, and research, the RISE strategy adopts a whole-system approach that mobilises the expertise of educators, leaders, researchers, and stakeholders across Ireland's post-primary schools.

Grounded in ecological systems theory, systems leadership, and social learning theory, the strategy promotes values-driven leadership, inclusive practice, and collaborative knowledge engagement. It supports meaningful participation by students and families and facilitates context-sensitive school support aligned with national policy frameworks.

RISE employs Design-Based Implementation Research (DBIR), an iterative methodology involving co-design and evaluation with practitioners and system leaders. Data from 220 post-primary schools across 16 districts, alongside 10 cross-sectoral partner schools, informs ongoing development. Mixed-method evaluations-including surveys and interviews-have demonstrated enhanced strategic planning, increased collaboration, and improved professional learning alignment.

Key outcomes include:

Strengthened communities of practice that foster teacher leadership. Evidence-informed decision-making supporting policy and resource allocation. Clarified professional learning needs and reduced duplication. A sustainable model for inclusive school improvement.

This paper argues that inclusive education transformation requires systemic investment and adaptive leadership. By leveraging existing expertise and fostering collaborative learning environments, RISE unleashes schools' untapped potential to improve themselves and optimise existing expertise in the system. Communities of practice stimulate momentum through contextually relevant learning. Sustainable leadership originates within schools but requires ongoing support to thrive. Continued stakeholder collaboration between supports agile, research- and practice-informed responses to evolving policy and practice contexts. Framing inclusive school improvement through an ecological lens acknowledges complex interdependencies and enhances understanding of systemic effectiveness.

The framework offers a replicable model for international contexts seeking to build leadership capacity for inclusion.



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sciforum-172571: Strategies for Supporting Learners with Autism in Sub-Saharan African Mainstream Classrooms: Systematic Review

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Introduction: In the African setting, inclusive education is now a priority to enable access and participation on an equal basis to all learners, including those with autism spectrum disorder (ASD). The successful inclusion of learners with autism within mainstream classes across Sub-Saharan Africa is still highly contentious, although policies support this movement as part of global initiatives, namely the Sustainable Development Goals and the Salamanca Statement. Many teachers are unaware of ASD.

Methods: A systematic review was conducted to identify evidence-based approaches for supporting pupils with autism in typical Sub-Saharan African classrooms. PubMed, ERIC, Scopus and Web of Science were selected as the databases to search literature from 2010 to 2025. And last, empirical studies on teacher-facilitated interventions, instructional or support mechanisms for students with ASD in inclusive settings within Africa were an essential part of the inclusion criteria. Studies conducted outside Africa or with results that do not pertain to classrooms were excluded. The study adhered to the PRISMA guidelines.

Findings: Research studies indicate that many teachers in Africa lack understanding of ASD, and their training for behavioural support does not teach any strategies for supporting the learning of these learners. In addition, many barriers impede inclusion initiatives, such as overcrowded classrooms. Some low-cost ways to support students with ASD are to use the following strategies: Visual supports, creating structured routines for students' daily activities, creating an individualised instructional plan, and using peers to support other students who have ASD, along with providing positive behaviour support. The academic, social and emotional inclusion of students with ASD depends on the collaborative efforts of parents, teachers and the community.

Conclusion: The systematic review identifies substantial teacher preparation, expertise, and resource gaps when working with students with autism and evidence-based strategies to implement



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sciforum-167044: Supporting Inclusive Early Numeracy through Tablet-Based Digital Activities: A Quasi-Experimental Study on Counting by Tens in First Grade

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Understanding counting by tens up to 100 is a core component of early numeracy and place-value development in first-grade primary education. This study investigated the effect of tablet-based digital activities on students' understanding of increasing and decreasing by ten, with particular attention to Special and Inclusive Education. A quasi-experimental design with a control group was implemented. The sample consisted of 82 first-grade students from public primary schools, including students with disabilities and learning difficulties, who formed an integral part of the research sample. The experimental group ($n = 41$) participated in a four-week instructional intervention using specially designed tablet-based digital activities, while the control group ($n = 41$) followed conventional instruction based on the standard curriculum.

A researcher-developed assessment tool was administered as both a pre-test and a post-test, allowing direct comparison of students' performance before and after the intervention. The assessment measured students' ability to count forward and backward by tens up to 100 and to recognize numerical patterns related to base-ten structure. The digital activities emphasized visual representations, interactive number lines, immediate feedback, and differentiated task progression, supporting diverse learning needs within the classroom.

The results showed that the experimental group achieved significantly greater improvements in post-test scores compared to the control group. Notably, students with disabilities and learning difficulties demonstrated clear progress in accuracy and conceptual understanding, indicating that the tablet-based intervention functioned as an effective supportive tool within an inclusive instructional context.

The findings suggest that well-designed tablet-based digital activities can enhance early numeracy skills and contribute positively to Special and Inclusive Education practices in first-grade classrooms, supporting meaningful learning outcomes for students with diverse educational needs.



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sciforum-173195: Teaching Multidimensional Poverty for Inclusive Classrooms: Evidence from Marginalized Regions of India

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Introduction:

Multidimensional Poverty (MDP) extends beyond income to encompass deprivations in education, health, living standards, social inclusion, and empowerment. Despite its significance for equitable development, MDP remains inadequately addressed in higher and teacher education, particularly within inclusive classroom contexts [1]. This study focuses on marginalized districts of West Bengal, such as Jhargram (2023–2024), where over 60% of households in communities like the Sabar earn below ₹3,000 per month, reflecting persistent socio-economic and educational challenges. The study also examines digital inclusion, specifically government-supported smartphone access, as a tool to reduce educational barriers and enhance learning outcomes [2,3].

Methods:

A mixed-method approach was employed, combining secondary analysis of Higher Secondary (HS) examination results (2018–2025) with a primary survey of 500 households. The study assessed the impact of mobile-based learning, cost-effectiveness compared to private tuition, and time-use patterns. Various online platforms, including NDLI, SWAYAM, and NPTEL, were used, alongside experimental demonstrations and supporting materials shared through WhatsApp, Telegram, or direct guidance from class teachers. Curriculum mapping identified gaps in higher and teacher education, informing strategies using MPI-based data, localized case studies, participatory activities, and digital tools.

Results and Discussion:

Findings show a notable improvement in educational outcomes, with Higher Secondary (HS) pass rates projected to increase from 83.75% in 2018 to 90.79% in 2025. Among households earning ≤ ₹36,000 annually, 54% reported that mobile learning significantly benefited their children. Mobile access (~₹2,400/year) was more cost-effective than private tuition (~₹6,000/year) and reduced travel time, allowing students to devote more time to studying or income-generating activities (~₹350/day) and improving nutritional stability. Contextualized, experiential, and data-driven pedagogies enhanced understanding of MDP, critical thinking, and policy awareness, while digital tools improved access for geographically marginalized learners and fostered equity-oriented teaching competencies.

Conclusions:

Integrating MDP into experiential and digitally supported pedagogy enhances inclusive education in marginalized regions. Mobile-based learning improves academic outcomes, reduces costs, and optimizes time for study and income-generating activities. Contextualized, data-driven approaches strengthen critical thinking, policy awareness, and equity-oriented teaching competencies, while digital tools expand access and engagement for geographically and socio-economically disadvantaged learners.

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sciforum-177932: Technology Utilization and Teaching Effectiveness among Secondary Schools Teachers in Southwest, Nigeria.

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This study examined the relationship between technology utilization and teaching effectiveness among secondary school teachers in Southwest Nigeria. The study adopted a descriptive survey research design in order to obtain information from a large population and describe the existing relationship between the variables under investigation. A sample of 1,600 teachers was selected through a multistage sampling procedure from different public secondary schools across the region to ensure adequate representation. Data for the study were collected using a self-designed instrument titled Technology Utilization and Teaching Effectiveness Questionnaire (TUTEQ). The instrument was carefully structured to measure teachers' level of technology use as well as their instructional effectiveness in the classroom. To ensure the consistency of the instrument, its reliability was determined using the test-retest method, which yielded a reliability coefficient of 0.86, indicating that the instrument was reliable for the study. The hypotheses formulated for the research were tested using the Pearson Product Moment Correlation (PPMC) at the 0.05 level of significance. The findings revealed a significant relationship between technology utilization and teaching effectiveness among secondary school teachers in Southwest Nigeria. The results also showed that teachers' digital competence and the availability of technological facilities significantly correlate with teaching effectiveness. The study concluded that effective utilization of technology enhances teachers' instructional effectiveness and improves educational outcomes in secondary schools. It was therefore recommended that the government should provide adequate technological infrastructure and continuous professional training for teachers to support effective integration of technology in teaching and learning.



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sciforum-169697: The Chair to Chairperson Role of AI in Teaching and Learning: A Comprehensive Theoretical Academic Article.

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Artificial Intelligence (AI) is transforming contemporary education by redefining the roles of teachers, learners, and institutions. This theoretical article conceptualizes the evolving position of AI in teaching and learning through the metaphor of **“from chair to chairperson,”** signifying AI's progression from a peripheral instructional aid to a central orchestrator of pedagogical, assessment, and governance processes. Anchored in constructivist theory, connectivism, activity theory, and the diffusion of innovation framework, the paper critically examines how AI reshapes curriculum design, instructional strategies, learning personalization, and academic decision-making.

The article proposes conceptual models that illustrate AI's role in mediating interactions among teachers, learners, content, and institutional systems. It highlights how AI-supported analytics and adaptive systems enhance teacher agency by enabling data-informed instructional planning, while simultaneously fostering learner autonomy through personalized, self-regulated learning pathways. In assessment, AI is positioned as a transformative force enabling formative, continuous, and competency-based evaluation practices beyond traditional examination-centric models.

At the institutional level, the study explores AI's emerging leadership functions in academic governance, including resource optimization, quality assurance, and strategic planning. While recognizing AI's potential to improve efficiency and equity, the paper critically addresses ethical and practical challenges such as algorithmic bias, data privacy, digital divides, and the need for professional readiness among educators and administrators.

The article concludes by outlining future trajectories of AI as an academic “chairperson,” emphasizing hyper-personalized learning ecosystems, emotionally responsive AI systems, and semi-autonomous digital classrooms. It offers strategic recommendations for responsible AI integration, advocating a human-centered, ethically grounded approach that positions educators as co-leaders rather than passive recipients of AI-driven change. This work contributes to theoretical discourse by reframing AI not merely as technology, but as an evolving leadership actor within educational ecosystems.



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sciforum-173286: The Transformative Impact of the Universal Design for Learning Approach within the Organizational Level of School - InclusivEduHub as a Collaboration Model between Special Schools and Mainstream Schools

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InclusivEdu Hub is a pilot project developed in Bucharest, Romania that aims to offer and validate a new model of School for All based on the culture of inclusion in the context of a partnership developed between mainstream and special schools.

The transformative element of this experimental study is the Universal Design for Learning approach that was introduced into the classroom work for 132 children from the inclusive school and another 130 students from the special school. The screening based on the ICF functional profile brings to the attention of the teacher the child's strengths in relation to his/her developmental needs, the evolution being understood also through the prism of the social factors that can facilitate or hinder development and educational performance.

The screening also highlighted numerous emotional difficulties that the children in the experimental group were facing (24%), but also the challenge of identifying a significant number (36%) of high-functioning students whose abilities exceeded the school requirements. Enriching the curriculum with a creative collaborative learning program, TactileImages educational plans, peer mediation and outdoor activities increased the quality of the educational act within the pilot project. or at the class level, the intervention could be oriented individually, in small groups.

This proposed model is a reaction to the Romanian educational system rigidly focused on the acquisition of knowledge that can no longer see its beneficiaries, the children and their complex needs.



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sciforum-165208: Training Effectiveness of Individual Education Plan for Children with Neurodiverse Conditions in the Community School of Kathmandu Metropolitan City

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This paper poses some research questions against which it studies the execution and efficacy of Individualized Education Programs (IEPs) in neuro-inclusive schools in Kathmandu Metropolitan area with reference to different individual needs, such as autism, ADHD, cerebral palsy and deaf-blindness. The research is informed by the neurodiversity paradigm and shaped through the Piaget, Bruner, and Vygotsky's cognitive developmental theories, and the study is applied under ethnographic approaches and qualitative case studies in four neuro-inclusive schools. The results indicate different degrees of knowledge and use of IEPs in institutions. While certain schools evolve hybrid forms of Korean and Nepali structure, others face challenges such as ineffective instruction of teachers, absence of resources, and poor maintenance of parental interest. According to teachers, IEPs provide a wonderful background in helping them achieve their learning outcomes but the constraints are usually confined to space limits, teacher shortages as well as the intricacy of addressing various learners needs on the same platform (classroom). Notwithstanding these difficulties, there exists evidence of better self-regulation and developing socially skills especially in students with mild cases of autism with the adaptive, activity-based IEPs playing a role. To improve inclusive education processes, the study reinforces the importance of lifelong professional learning, cross-culturally sensitive parent collaborations, and culturally contextual education-related resources. It finds that the flexible, developmentally-based and child-centered approach, rooted in the developmental theories, is critical to the sound implementation of the IEP in the neurodiverse ecology of learning settings.



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Session 5. STEM Education

sciforum-156794: Open Science and Citizen Engagement: LIASTRA's Contribution to the Democratization of Knowledge

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Introduction:

Open Science plays a key role in transforming education into a collaborative, inclusive, and globally connected endeavor. The International Astronomy League (LIASTRA Ltda) exemplifies how astronomy-based citizen science can democratize access to knowledge and foster scientific literacy. This study investigates how LIASTRA's international programs, combining open data, digital tools, and community participation, contribute to educational innovation and engagement in STEM learning.

Methods:

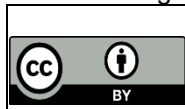
A mixed-methods design was applied, including (1) a bibliometric review of 150 Scopus-indexed publications (2015–2025) on open and citizen science in education, and (2) qualitative case studies of LIASTRA's initiatives: the Asteroid Search Campaigns, Astronomy Olympiads, Scientific Workshops, Teacher Training Programs, and the Open Sky Virtual Observatory. Data from interviews with 34 educators, students, and institutional partners were analyzed using content analysis and descriptive statistics.

Results:

The findings reveal that open science practices integrated into astronomy education significantly increase STEM engagement and public participation. Over 65% of participants reported higher motivation to pursue science-related careers. Educators identified improvements in inquiry-based teaching, data analysis skills, and collaborative learning.

Conclusion:

LIASTRA's educational model demonstrates that open data and citizen participation can effectively bridge research and education, promoting inclusivity, digital literacy, and global collaboration. Astronomy thus becomes not only a science of exploration but a pathway for democratizing knowledge, empowering teachers, and inspiring the next generation of global citizens.



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sciforum-178727: Children's Participation: A STEAM Education

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Children's participation constitutes a fundamental right recognized by the Convention on the Rights of the Child, which establishes in Article 12 the child's right to express their views freely on matters that concern them. However, the realization of this right in educational settings remains a challenge, requiring pedagogical practices that promote children's effective agency in decisions related to their learning process. From this perspective, the study draws theoretically on the participation model proposed by Lundy (2007, 2012), which operationalises this right through four interrelated dimensions: space, voice, audience, and influence. In parallel, documents such as the Manual for Schools on Children's Rights – Child Participation, published by UNICEF (2022), are incorporated, reinforcing the importance of promoting more democratic, inclusive, and participatory educational environments. Within this framework, the present study aims to analyse how implementing a STEAM Education can promote and value children's participation in the learning process. The study was carried out with a group of 40 children in nursery and preschool educational settings in northern Portugal. Methodologically, a qualitative Education was used, drawing on data collection techniques and instruments such as participant observation, pedagogical records, children's work, and records of dialogue moments. Data were analysed using descriptive and reflective analysis. The results highlight the potential of the STEAM Education to foster investigative and collaborative learning environments that encourage freedom of expression and the sharing of ideas, centred on the child. The analysed data indicate that participation tends to intensify when children engage in organized, intentionally structured investigative contexts in which their suggestions and initiatives are incorporated. In sum, the STEAM Education can constitute a privileged context for promoting participatory educational practices by mobilizing meaningful challenges that foster problem-solving and interdisciplinary integration, thereby supporting the valuing of children's voices and initiative in the learning process.



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sciforum-169560: Piagetian Learning Centres and Foundational Numeracy Development in Grade 2 Classrooms in the UAE

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Interactive learning centres grounded in Piagetian constructivism are increasingly positioned as a pedagogical approach that merges purposeful play with structured mathematical learning. However, robust evidence of their impact in Gulf-region primary contexts remains limited. This study examined the effectiveness of Piagetian learning centres in strengthening Grade 2 students' foundational mathematics skills in a government school in the United Arab Emirates. A comparative mixed-methods design was employed across eight Grade-2 classes, where 94 students participated in Piagetian constructivist mathematics learning-centre activities, while 91 students received conventional teacher-led instruction. Students completed pre- and post-assessments targeting key basic mathematics competencies, including verbal counting, one-to-one counting, counting a subset, subitising, numeral comparison, set comparison, number order, numeral identification, set-to-numerals, story problems, and number combinations. To contextualise learning outcomes, qualitative evidence was triangulated through classroom observations, teacher interviews, and a perception survey completed by 7 teachers. Results indicated statistically significant gains favouring the learning-centre approach across most assessed skill domains, alongside teacher-reported increases in student engagement, motivation, and hands-on mathematical reasoning. Implementation constraints were also identified, notably limited classroom space, resource availability, and time demands. These findings suggest that Piagetian learning centres can serve as a scalable, learner-centred approach to improving early mathematical proficiency in UAE classrooms, provided that systemic supports are developed to strengthen feasibility and sustainability.



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sciforum-171235: Functional Approaches for Applying Work-Based Learning into Physics Education in Senior Secondary Schools of Kano State

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This study examined the functional approaches for applying work-based learning into Physics education in senior secondary schools in Kano State. A descriptive survey research design was adopted, and data were collected using a structured questionnaire administered to 400 secondary school students across SS I–SS III. Data were analyzed using frequency counts and percentages. The findings revealed that current Physics teaching practices are moderately engaging, with 75% of students indicating that Physics lessons are interesting, while 65% perceived Physics as more difficult than other science subjects. Although 70% reported that their teachers connect lessons to real-life applications, only 60% indicated regular exposure to practical or vocationally related experiments, and self-study habits remained low, with only 60% engaging in independent study. Results further showed that work-based learning significantly enhances students' understanding, motivation, and interest in Physics. A total of 72.5% of respondents agreed that work-based learning helps them understand real-world applications of Physics, 72.5% reported increased interest through school workshops and projects, 65% acknowledged that industrial visits and internships improved their understanding, while 75% affirmed that hands-on experience improved their motivation to study Physics. Additionally, 65% confirmed that their schools organize career-related programs linked to Physics. The study also identified key functional approaches for effective integration of work-based learning into Physics education. A large majority supported school–industry collaboration (75%), inclusion of industrial field trips (70%), use of project-based learning (75%), integration of simulations and technological tools (70%), and provision of additional teacher training on work-based learning methods (72.5%). The study concludes that although traditional teaching methods still dominate Physics instruction, the adoption of structured work-based learning strategies can significantly improve students' understanding, motivation, and career relevance of the subject. It is therefore recommended that stakeholders should prioritize functional approaches like industry collaboration, practical-based instruction, and continuous teacher training.



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sciforum-178538: How Do Students' Cognitive Profiles and Attribute Structures Vary Across Mathematical Domains? A Cognitive Diagnostic Modeling Analysis

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This study aims to evaluate students' cognitive attribute mastery across several mathematics domains using the Cognitive Diagnostic Model (CDM) approach. The study involved 219 eighth-grade students who were assessed in five mathematics domains: basic statistics, sequences and series, relations and functions, linear equations and gradients, and systems of linear equations and inequalities. The analysis was conducted to identify patterns of students' skill mastery and to determine the most appropriate diagnostic model for each domain. The results indicate that each mathematics domain exhibits different cognitive structures. In the domains of basic statistics and sequences–series, attribute mastery tends to be more flexible and partially compensatory, although in basic statistics there is evidence that conceptual understanding of statistical concepts functions as a prerequisite for calculating measures of central tendency and dispersion. In contrast, in the domains of relations and functions, linear equations and gradients, and systems of linear equations and inequalities, the pattern of attribute mastery appears more hierarchical and non-compensatory, where mastery of fundamental concepts becomes a foundation before students can perform procedural calculations and apply the concepts. These findings suggest that evaluating mathematical ability solely through total test scores is insufficient, as it does not capture the specific learning difficulties experienced by students. Therefore, the application of CDM provides more detailed diagnostic information regarding students' strengths and weaknesses at the attribute level, which can serve as a basis for designing more targeted and effective instructional strategies.



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sciforum-171714: Investigating Active Learning Approaches on Students' Self-Regulation and Academic Performance in Flipped Learning Environments

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Self-regulation in flipped learning is important because it is positively related to academic performance. Thus, flipped learning environments must be designed to incorporate active learning approaches that enhance self-regulation. For flipped learning to be successful, both online and physical learning components are important. This project aims to investigate active learning approaches (collaborative and online interactive learning) for flipped learning to improve self-regulation among polytechnic learners in applied science, and to determine the extent to which self-regulation in flipped learning environments can improve learners' academic performance. A mixed-methods, equivalent time-series design-based research approach was employed in this study, with the first two cycles focused on improving the intervention. In the final cycle, an evaluation of the intervention was conducted. Test scores were utilised to determine academic performance, while the Motivation Strategies for Learning Questionnaire was used to measure self-regulation. Results show that both self-regulation and academic performance improved. For both active learning approaches, dimensions such as metacognitive self-regulation, goal orientation, and task value improved significantly. Academic performance increased after the interventions, though Spearman's rank correlation analysis revealed only weak to moderate relationships between self-regulation and academic performance, suggesting the influence of other factors, such as motivation. The study contributed practical guidelines for educators, offering evidence-based strategies to enhance self-regulation in flipped learning environments. Unlike existing literature that emphasizes personal strategies (e.g., time management), this research highlighted the role of structured pedagogical approaches.



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sciforum-172990: Mathematics Anxiety in Primary School Students: A Systematic Review

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Introduction: In a social and educational context increasingly oriented towards promoting STEM skills, mathematical abilities represent key competencies of the 21st century and are essential for active and informed participation in contemporary society. Mathematics anxiety is a pervasive global issue, present across different cultural contexts and spanning from childhood to adulthood. It has significant repercussions on students' performance and attitudes toward the subject. Despite this, most research has focused on secondary and university students, leaving the primary school context relatively unexplored. Understanding mathematics anxiety in the early school years is crucial for developing effective preventive interventions and fostering a positive relationship with the subject.

Methods: The systematic review was conducted following the PRISMA 2020 guidelines. The databases Scopus, PubMed, and Google Scholar were consulted, considering publications from 2014 to 2024 in English, Italian, and Spanish. Meta-analyses, systematic reviews, and research articles on mathematics anxiety in primary school students were included. The search used the keywords “math anxiety” AND “primary school.” Articles were selected through screening, and data were extracted and presented in tables reporting authors, study type, sample characteristics, methods, and main results.

Results: A total of 43 studies met the inclusion criteria. Evidence shows a negative relationship between mathematics anxiety and performance even in the early school years, suggesting a bidirectional causal relationship between anxiety and achievement. The importance of teacher support also emerges, along with the need for interventions aimed both at enhancing mathematical skills and at managing students' emotional experiences.

Conclusions: Early detection of mathematics anxiety and targeted interventions are essential to prevent avoidance behaviours and underachievement. The findings highlight educational implications useful for teachers and researchers, suggesting strategies to support emotional regulation and mathematical engagement in students.



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sciforum-173232: Scientific Reasoning in Brazilian Children and Its Associations with Reading Fluency, Intelligence, and Theory of Mind

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Scientific reasoning is defined as the intentional pursuit of knowledge and the articulation of theory and evidence. Mastery of this skill entails the formulation of hypotheses, the design and execution of experiments, the evaluation of results, and the formulation of conclusions. These domains can be grouped into different components, as outlined in the Science-K Inventory (SKI): experimentation, data interpretation, and understanding the nature of science. The present study aimed to (a) analyze the psychometric properties and gather validity evidence for the Brazilian Portuguese version of the Science-K Inventory (SKI), and (b) investigate scientific reasoning in children aged 7–10 years and its association with intelligence, reading fluency and advanced theory of mind. Children from two public schools in the São Paulo metropolitan region participated ($N = 145$; 43% girls), aged 7–10 years (mean = 8.8; $SD = 1.1$). The instrument demonstrated adequate reliability indices ($\alpha = .79$; $\omega = .82$; split-half = .78). Correlations with reading fluency ($r = .39$; $p = .001$), intelligence ($r = .43$; $p = .001$), and theory of mind ($r = .21$; $p = .01$) were observed. Additionally, age ($F = 11$; $p = .001$) and grade level ($F = 14.4$; $p = .001$) had effects on the scores. A linear regression model demonstrated that reading fluency and intelligence, but not theory of mind, explained 23% of the variance in scientific reasoning ($R^2 = .23$). The Brazilian SKI represents the first validated instrument to assess scientific reasoning in the Brazilian children. Replicating established findings with an underrepresented population supports the parsimony of the scientific reasoning theoretical model. The availability of reliable measures of predictive learning skills may inform early intervention initiatives, strengthen evidence-based educational practices, and improve the science and technology curricula.



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sciforum-173212: Chorus: Amplifying Student Voice through Creative, Sustainable STEAM Engagement

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Chorus: Amplifying Student Voice through Creative, Sustainable STEAM Engagement explores how inclusive, interdisciplinary learning ecosystems can be designed around creativity, collaboration, and research-informed practice. The project examines how student voice can be meaningfully embedded within STEAM education by positioning learners not only as participants, but as co-creators of knowledge, resources, and learning experiences. Drawing on two national initiatives, *Harmonic* and *Chorus*, the session demonstrates how narrative, co-design, and principles of Universal Design for Learning can be translated into scalable, classroom-ready practice. Central to the model are partnerships across different tiers of education, where learners collaborate to design creative resources and skills-based videos that scaffold flexible, interdisciplinary STEAM workshops.

The co-designed outputs generated through these partnerships are subsequently adapted and shared with primary classrooms, culminating in a mixed-media STEAM anthology that communicates complex ideas through story, illustration, and creativity. This process foregrounds peer-to-peer learning and supports continuity across educational levels. The presentation reflects on how creative STEAM engagement can amplify student voice, foster collaborative learning cultures, and bridge research, practice, and policy. It offers insights for educators, researchers, and practitioners interested in participatory design, inclusive education, and SDG-focused STEAM learning, which integrates science, technology, engineering, arts, and mathematics to explore real-world challenges linked to the United Nations Sustainable Development Goals, supporting creative problem-solving, student voice, and social responsibility.



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sciforum-170213: Connecting the Curriculum: Investigating the Impact of Competency-Based Curriculum on Concept Integration Across Chemistry Modules and Students' Self-Efficacy

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Creative Exercises (CEs) require students to produce relevant and accurate statements from open-ended prompts. CEs can be used for formative and summative assessment because they are easy to grade. Besides enabling instructors to assess students' learning, they also reveal misconceptions and connections among concepts within a module and between related modules. CEs in organic chemistry are understudied, and due to the interconnected nature of organic chemistry concepts, CE is a suitable assessment tool for this area. In this study, CE was integrated as a formative assessment tool into two competency-based chemistry modules to explore how learners connect concepts.

A mixed-methods approach was used to analyze polytechnic students' CE scores and responses to determine if they make conceptual links and to identify common misconceptions. Additionally, the effect of CEs on students' self-efficacy was investigated using the self-efficacy for learning and performance scale from the Motivation Strategies for Learning Questionnaire. To understand their perception of CEs, qualitative items were included in the survey.

Results showed that students across two modules ($n = 54$ and $n = 58$) made relevant and accurate statements during CEs, with high scores ($M = 7.69$ and $M = 8.74$ out of 10). Content analysis of the CE statements revealed common misconceptions about the properties and functional groups of organic molecules. Based on the survey results, students found the CEs useful for foundational concepts ($M = 5.45$, $SD = 1.32$) but less useful for challenging concepts ($M = 4.10$, $SD = 1.25$). Their expectations for success, in terms of obtaining an excellent module grade, were lower ($M = 4.37$, $SD = 1.64$). Therefore, CEs can serve as meaningful learning activities and assessment tools to help instructors monitor students' learning and misconceptions. CEs also act as a self-assessment tool for students, especially in modules that require connecting concepts.



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sciforum-169666: Culinary Exploration Using the Entire Plant as an Experiential STEM Approach to Teaching Sustainability

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Introduction:

Experiential learning in STEM education strengthens students' ability to connect theoretical scientific concepts with real-world challenges. This module used whole vegetable plants to explore sustainability through applied scientific reasoning.

Methods:

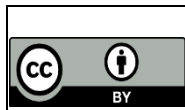
In a university-level food-science course, students were provided with whole plants (e.g., broccoli, cauliflower, corn, and Brussels sprouts) and developed recipes using all edible components to minimize waste. Structured prompts guided analysis of plant morphology, agricultural inputs such as fertilizers, pesticides, and herbicides, and the typical mass of waste produced during commercial trimming and household preparation. Students then developed and cooked one or more recipes that used as much of the plant as possible. Learning was assessed through recipe-development reasoning, recipe preparation, and peer/instructor feedback during tastings.

Results:

Students successfully developed and prepared dishes that incorporated plant components not traditionally used in household cooking and demonstrated creative strategies to reduce food waste. They clearly articulated common sources of waste in plant processing and explained how agricultural inputs influence environmental outcomes. Class presentations showed increased confidence in using scientific reasoning to make resource-efficient culinary decisions, even without prior culinary training. During in-class tastings, students engaged in evidence-based discussion about ingredient functionality, preparation choices, and the overall feasibility of their dishes.

Conclusions:

This module illustrates that culinary exploration using nearly the entire plant can effectively support experiential STEM learning in sustainability. The activity enabled students to apply scientific reasoning, evaluate real-world sources of food waste, and make resource-efficient decisions during recipe development. This experiential module offers a scalable approach that can be adapted to different resource contexts for integrating sustainability concepts into secondary through university-level STEM curricula.



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sciforum-173289: Cultivating the Future Agricultural Workforce through Interdisciplinary Innovation

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As agricultural science and technology undergo a rapid, interdisciplinary transformation, the industry faces a critical challenge: an aging workforce that often maintains traditional perspectives. To meet the growing demands of a global society, it is essential to prepare a new generation of producers capable of navigating swift shifts in agricultural practices. Modern advancements increasingly rely on a fusion of agricultural, chemical, environmental, industrial, and mechanical engineering—disciplines deeply rooted in chemistry, physics, and mathematics. However, the interconnectivity of these fields is frequently under-communicated to aspiring students.

A cohort-based undergraduate research program provided students with rich STEM learning experiences on topics such as mass and energy balances, heat and mass transfer phenomena, and environmental sciences and engineering related to wastewater treatment and environmental remediation. The generation of scientific data and inquiry in groups have offered diverse perspectives and allowed students to work across scales. The problem-solving approach is strengthened by the participation and teamwork of interdisciplinary teams in more realistic research. By designing a dynamic, cohort-based summer undergraduate research experience, these programs provided enriching activities that occur along the active learning continuum.

This presentation examines the challenges and opportunities in developing a workforce capable of managing sustainable agricultural landscapes. We highlight three research and education programs funded by USDA-NIFA that provided high school, community college, and undergraduate students with hands-on opportunities to explore the diverse scientific and management disciplines shaping the industry. The focus will be on the learning experiences of STEM topics by the participants and the implications of educational activities on student learning experiences. The presentation will showcase student perceptions before and after participation, demonstrating how experiential learning can successfully shift viewpoints toward a more technological and sustainable future. These ongoing efforts provide vital insights into the educational frameworks necessary to complete the transition to a modern agricultural workforce.



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sciforum-178435: Declared Religious Beliefs and Attitudes toward Science among the Public in Chile

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A traditional view of the scientific culture and the general public's attitude toward science is that they depend largely on the level of scientific literacy of a given population. However, more recent studies on scientific culture question this perspective and highlighted the importance of social context and factors like family environment, cultural frame, and educational experiences in shaping disposition towards science. Especially important among these factors is trust, both in science as an institution and in the relevant actors involved in the production of scientific knowledge: From scientists, to universities, to politicians, down to the science teacher who represents children's first and frequently formative contact with science. Within this framework, religious beliefs or lack thereof can be considered a relevant dimension of the sociocultural context that shapes the public's view of science and its role in society. From the perspective of teaching and learning, exploring the impact of this factor can help understand what barriers and opportunities exist to the penetration of scientific knowledge within the wider society.

In this study, we used a quantitative, exploratory, ex post facto analytical methodology of data from the third version of the Chilean government's Survey of the Social Perception of Science and Technology (EPSCT). We aimed to analyze the relationship between the degree of declared religious belief and its association with indicators related to interest in science, trust in scientific knowledge, and perception of the benefits of science and technology, among others. Our results show differentiated patterns between groups with different declared levels of religious beliefs in their attitudes towards science and technology. This highlights the relevance of cultural dimensions in the relationship between the individual and science, and how a better understanding of these sociocultural relationships can contribute to more inclusive educational strategies.



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sciforum-149961: Do → Reflect → Explain → Connect: A Culturally Responsive Framework for STEM Learning

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Traditional STEM instruction often begins with theory, followed by practice. While effective in some contexts, this sequence can feel abstract and disengaging for many learners—especially in Indigenous settings where knowledge is rooted in experience, reflection, and community.

This session introduces a new four-step framework for STEM teaching: **Do** → **Reflect** → **Explain** → **Connect**. Beginning with hands-on exploration (“Do”), students experience phenomena directly, building curiosity and confidence. Through guided discussion, questioning, and storytelling (“Reflect”), they make sense of patterns in their own words. Educators then layer in scientific principles and vocabulary (“Explain”), grounding learning in disciplinary knowledge. Finally, students extend their understanding to real-world applications and cultural knowledge (“Connect”), seeing STEM as relevant to both their lives and communities.

Participants will explore this model through practical classroom examples drawn from a First Nations school context, such as engineering shelters inspired by traditional designs.

By the end of the session, participants will:

Understand how “Do → Reflect → Explain → Connect” balances experiential learning, scientific rigor, and cultural relevance. Recognize the alignment between this framework and Indigenous pedagogies. Take away practical strategies for adapting the model to their own STEM classrooms.

This session offers a fresh, culturally responsive approach to STEM education that honors Indigenous ways of knowing while strengthening student engagement and achievement.



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sciforum-172618: Educational Escape Rooms in Mathematics Didactics within Undergraduate and Master's Education Degrees: A Systematic Review of Motivational, Cognitive, and Methodological Impacts.

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Educational Escape Rooms (EERs) have emerged as an innovative game-based learning strategy within Mathematics Didactics courses in undergraduate and master's degrees in Education. This systematic review synthesizes empirical evidence on the pedagogical impact, methodological characteristics, and research quality of studies examining EER implementations in higher education contexts between 2016 and 2026. A total of 21 peer-reviewed studies were analyzed following structured selection criteria. The review focused on three core dimensions: (1) motivational and affective outcomes, (2) development of mathematical reasoning and didactic competencies, and (3) methodological rigor and research design quality.

Findings consistently indicate that EERs significantly enhance student motivation, engagement, and satisfaction in teacher education programs related to mathematics. Positive emotional activation, increased immersion, and perceived enjoyment were recurrently reported across quantitative and mixed-methods studies. From a cognitive perspective, EERs demonstrated potential to strengthen logical-mathematical reasoning, problem-solving skills, collaborative learning, and the ability to design innovative teaching strategies for mathematics classrooms. In both undergraduate and postgraduate teacher education, escape rooms were associated with improved conceptual understanding and greater awareness of active methodologies applicable to school contexts.

However, methodological analysis revealed variability in research design quality. While most studies employed quasi-experimental or descriptive approaches, fewer incorporated control groups or longitudinal measurements. Risk of bias and limited sample sizes were common limitations. Despite this, overall methodological quality ranged from moderate to high when assessed through standardized appraisal frameworks.

The evidence suggests that Educational Escape Rooms constitute a promising active-learning methodology in Mathematics Didactics within teacher education programs. Nevertheless, further rigorous experimental research is needed to consolidate causal evidence and determine long-term impacts on professional teaching competence.



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sciforum-172535: Effects of Guided Discovery Approach on Senior Secondary Two Students' Performance in Volumetric Analysis in Gombe, Gombe State

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This study examined the effects of the guided discovery approach on Senior Secondary Two students' performance in volumetric analysis. A quasi-experimental design with non-randomized pre-test and post-test groups was adopted. The sample consisted of 98 students selected from two secondary schools using simple random sampling. Data were collected using the Volumetric Analysis Performance Test (VAPT), a researcher-developed instrument designed to assess students' understanding of acid–base titration. The test comprised six structured essay questions totaling 25 marks, measuring students' procedural skills, conceptual understanding, and quantitative problem-solving ability in volumetric analysis. The instrument was validated by two experts in chemistry education to ensure alignment with curriculum objectives, while reliability testing using the Kuder–Richardson Formula 20 yielded a coefficient of 0.85. Mean and standard deviation were used to answer the research questions, and Analysis of Covariance (ANCOVA) was employed to test the hypotheses at a 0.05 level of significance. The results revealed a significant difference in the performance of students taught using the guided discovery approach compared to those taught using conventional methods, $F(1,95) = 162.407$, $p < 0.05$. No significant difference was observed between male and female students exposed to guided discovery, $F(1,47) = 0.135$, $p > 0.05$. The study highlights the significant role of guided discovery in enhancing students' understanding of volumetric analysis. It provides significant evidence that structured, student-centered instruction improves learning outcomes in complex chemistry topics. The findings have significant implications for science education, particularly in contexts where learners struggle with abstract concepts and practical applications, and offer guidance for teachers, curriculum planners, and policymakers seeking to strengthen chemistry teaching and promote effective learning for all students.



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sciforum-176830: Enhancing Creative Thinking through Coding: Evidence from an Experimental Study in Primary and Secondary Education

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Introduction: Coding is increasingly recognized as an effective pedagogical approach for developing computational thinking, problem-solving, and creativity, which are considered essential 21st-century skills within STEM education. Recent studies suggest that coding activities can foster divergent thinking by engaging students in structured yet flexible processes of exploration, design, and solution generation. This study investigates the impact of coding-based educational interventions on the development of creative thinking in primary and secondary school contexts.

Methods: The research adopted a quasi-experimental design involving experimental and control classes in primary and secondary schools. Experimental groups participated in structured coding activities integrated into school projects, while control groups followed regular curricular activities. Creativity was assessed through the Divergent Association Task (DAT), administered before and after the intervention to measure verbal divergent thinking. The sample included 138 primary school students and 148 secondary school students. Pre- and post-test mean scores were compared to identify changes in creative performance.

Results: In primary school, experimental classes showed a greater increase in creativity scores (+3.27%) compared with control classes (+1.51%). In secondary school, both groups improved, with a slightly higher increase in experimental classes (+2.62%) than in control classes (+2.54%). Individual-level analysis showed that a higher percentage of students in experimental groups improved their performance, particularly in primary education.

Conclusions: The findings suggest that coding can contribute to the development of creative thinking, especially in primary school, when embedded in intentional pedagogical designs. The results highlight the relevance of coding as a technology-enhanced educational strategy within STEM learning and suggest that age, instructional design, and teacher mediation may influence its educational effectiveness.



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sciforum-146258: Evaluating Factors Affecting the Effectiveness of Physics Teaching and Learning in Senior Secondary Schools: Evidence from Papua New Guinea within a Global STEM Education Context

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Across many developing and under-resourced education systems worldwide, persistent underachievement in secondary school Physics remains a critical barrier to strengthening STEM capacity and fostering participation in the global knowledge economy. While Physics is central to developing scientific literacy, analytical thinking, and innovation, students in many contexts continue to perform below expectations due to interconnected systemic and classroom-level challenges.

This study investigates the factors influencing the effectiveness of Physics teaching and learning among Grade 11 and 12 students in Papua New Guinea, offering insights that resonate with similar educational contexts internationally. Conducted in six diverse secondary schools across Madang, East Sepik, and West Sepik Provinces, the research employs a mixed-methods approach, including questionnaires, semi-structured interviews, and classroom observations. Participants comprised six Physics teachers and sixty senior secondary students.

Findings reveal a complex interplay of challenges consistent with global trends in STEM education in developing contexts. These include limited access to clear and contextually relevant curriculum materials, gaps in teachers' pedagogical content knowledge, inadequate laboratory infrastructure, low student motivation, and persistent gender disparities in participation and achievement. Additionally, structural inequities—such as geographic isolation, financial constraints, and limited institutional support—further exacerbate disparities, particularly in rural and remote schools.

Beyond identifying constraints, this study contributes to the international discourse on improving STEM education by proposing context-responsive and scalable strategies. These include strengthening teacher professional development, contextualizing curriculum design, enhancing equitable resource distribution, and implementing targeted interventions to address gender imbalance and student engagement. The study underscores the importance of aligning national reforms with localized realities while drawing on global best practices.

The significance of this research extends beyond Papua New Guinea. Its findings offer transferable lessons for other low- and middle-income countries striving to improve Physics education and broader STEM outcomes. By addressing these persistent challenges, education systems can better prepare students with the competencies required for participation in an increasingly technology-driven and interconnected world.

Ultimately, improving Physics education is not only a national imperative but also a global priority. This study provides evidence-based insights to inform policy, practice, and future research aimed at advancing equitable and effective STEM education worldwide.



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sciforum-173072: Exploring Topology in Secondary Education through Game-Based Learning

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Introduction

Topology is rarely included in secondary mathematics curricula, yet it offers strong potential to foster abstract reasoning and spatial thinking. Its visual and conceptual nature makes it particularly suitable for exploratory learning. This study presents an educational proposal that introduces basic topological ideas in Secondary Education through practical and game-based experiences. By using interactive digital environments, students are encouraged to discover properties of shapes and spaces in an intuitive and meaningful way.

Methods

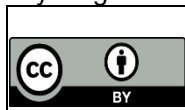
The study began with a review of research on the introduction of advanced mathematical topics at non-university levels, with special attention to topology. A second review examined the educational value of digital games in mathematics teaching. Based on these findings, a set of learning situations was designed around interactive geometry and topology games available on the platform Geometry Games. The proposal integrates principles of game-based learning and inquiry-based learning: students explore virtual environments, formulate conjectures, test ideas, and discuss their conclusions. Activities were structured to connect topological concepts with everyday contexts and real-world applications.

Results

The implementation suggests that interactive digital games can make abstract concepts more accessible and engaging. Students showed increased motivation and were able to identify topological properties such as continuity and transformation through guided exploration. The activities also supported the development of logical reasoning, spatial awareness, and problem-solving skills.

Conclusions

Introducing topology through structured game-based experiences is both feasible and pedagogically valuable in Secondary Education. While careful guidance is needed to ensure conceptual clarity, this approach opens new possibilities for bringing advanced mathematics closer to younger learners in a meaningful and motivating way.



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sciforum-172992: Fostering Scientific Literacy through an Educational Study: Students' Initial Perceptions of Science Communication on Social Media

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Introduction

Achieving Scientific Literacy (SL) requires STEM education to move beyond the mere acquisition of conceptual knowledge and to foster critical thinking and informed decision-making (Ah-Namand & Osman, 2018; EC, 2015). Nowadays, science content is widespread in both formal and informal environments, including Science Education (SE) and Science Communication (SC) on social media (WHO, 2020). However, there is still a lack of integration between SE and SC in research and school practice (Everhart, 2009; Lewenstein & Baram-Tsabari, 2022). This study aims to address this gap by combining SE and SC in an educational research study designed to foster students' SL. The objective is to utilise the benefits of SC, particularly its increased engagement and edutainment function.

Methods

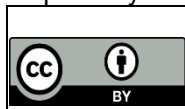
The research adopted a phenomenological approach to investigate the experiences and meanings constructed by the involved students and teachers (Mortari, 2007). Data were collected through various qualitative methods and analysed using content analysis (White & Marsh, 2006) and the crystallisation technique (Ellingson, 2009).

Results

The presentation will briefly describe an educational project conducted in six schools with 11 and 14-year-old students, and focus on findings related to students' prior knowledge of SC on social media. Specifically, the analysis of classroom discussions shows that students associate SC with planning and content creation and, above all, with communication skills and audience engagement. The activity has two purposes: educating students about the opportunities and risks of social media and gathering data on their existing beliefs.

Conclusions

Given the growing popularity of social media among young people (Karahan & Roehrig, 2015) and their perceptions of SC on social media, this study emphasises the importance of linking SE and SC in educational settings. Such integration can improve students' ability to consciously and responsibly access scientific information online, promoting the development of SL.



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sciforum-178722: Four Years of STEAM Learning in Elementary School – Understanding the Design and Implementation of an Educational Program

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STEAM education is an interdisciplinary approach that integrates science, technology, engineering, arts and mathematics in order to develop long-life soft skills, addressing learning in a way that mirrors real life. After STEM, that focuses on technical skills, this new approach brought the arts into the equation, shifting the focus to critical thinking, understanding the world and finding creative solutions.

Perhaps the most relevant discipline for understanding the methods used is architecture, the field that brings together artistic and technical elements in a natural way, as part of the profession. A topic of interest for understanding STEAM education for children and adolescents is how this discipline could be taught to elementary school pupils, as it requires considerable effort to establish a specific methodology.

This article aims primarily to present the methodology developed by De-a Arhitectura Association in two manuals: "Playing architecture – mini" for the first and second grade and "Playing architecture in my town" for the third and fourth grade. Second and perhaps more importantly is the whole process analysis, with exercises, experiments, the connections with other disciplines of the curriculum and conclusions the authors reached after four years of working with 25 children from the same classroom, tracking their progress and skill development.

As a conclusion, the STEAM approach is suitable for all age groups, and the tangible results are evident not only in terms of hard skills but especially in terms of soft skills, namely problem-solving, communication, emotional intelligence, collaboration and creativity.



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sciforum-173097: From Teaching Model to Success Model: Active Learning in a Core Engineering Course

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Gateway engineering courses pose a substantial challenge for first-year students and are often characterized by high failure rates and considerable cognitive load. Although the literature highlights the benefits of active learning in STEM courses, most studies have focused primarily on achievement outcomes and have less frequently examined process-oriented indicators such as ongoing performance and examination behavior. This study examined the impact of active learning in a core physics course in engineering on academic achievement, ongoing performance, failure rates, and examination patterns, and assessed the unique contribution of the instructional model to predicting the final course grade within a high-stakes gateway context.

A comparative quasi-experimental design was conducted between two independent groups (N = 105): a traditional instruction group (n = 61) and an active learning group (n = 44), which included in-class problem solving, structured scaffolding, simulations, preparatory tasks, and continuous digital communication designed to support conceptual understanding and sustained engagement. Both groups followed the same syllabus and completed identical assignments and examinations. Data included final grade, mean assignment grades, assignment submission rate, course failure, and attendance at the second examination session. Analyses comprised Mann–Whitney tests, chi-square tests, Z-tests for independent proportions, and hierarchical regression models.

Significant differences were found in final grades, mean assignment grades, and submission rates in favor of the active learning group. Lower failure rates and lower attendance at the second examination session were also observed. Hierarchical regression indicated a significant and unique contribution of the instructional intervention to the prediction of final grades beyond assignment performance. The findings suggest that active learning in cognitively demanding core engineering courses is associated with improved achievement, reduced failure, and altered examination behavior, offering an integrative empirical perspective for evaluating structural pedagogical reform in STEM higher education contexts.



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sciforum-158660: Impact of Educational Software Utilization on Students' Learning Performance: A Comparative Study at Uzbek Universities

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The integration of digital technologies in the sphere of higher education has increasingly been associated with enhanced learning outcomes and access to academic resources. This paper aims to explore the relationship between the utilization of educational software tools and academic performance among university students in Uzbekistan. The structured questionnaire was used to obtain data on students' approaches to learning, their levels of engagement in digital technologies, and their perceptions of academic performance in different fields. The results show that students who use software tools to learn tend to have deeper levels of understanding of their academic materials, efficiency in their coursework, and independence in their learning processes compared to their counterparts. This is also supported by statistical data showing a significant positive correlation between the use of technology-rich learning environments and academic performance. Additionally, the utilization of digital technologies is also associated with the development of cognitive skills, technical skills, and problem-solving skills that are increasingly essential in professional career readiness in the modern workforce. This underscores the critical importance of integrating digital competencies and software-based learning strategies in the curriculum in the sphere of higher education to promote innovative learning environments that are fully congruent with the demands of the knowledge economy.



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sciforum-172466: Infrared Thermography in Science Education: A Project-Based Approach to Enhancing Learning and Motivation

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Infrared thermography detects infrared radiation with thermal cameras, allowing the visualization of temperature distribution and the analysis of physical and chemical phenomena inaccessible to direct observation. This work highlights its didactic potential in science education, reducing the abstraction of phenomena, increasing student learning and motivation.

In 2025, a project with 22 tenth-grade students from the Science Club of a public school in the interior of Portugal, active since 2006, explored infrared thermography. With a methodology based on projects and themes chosen by the students, the study articulated science, daily life, and community, integrating disciplines such as Physics, Chemistry, and Mathematics, favoring an interdisciplinary approach centered on experimentation. Each student developed activities and/or investigated distinct scientific principles, united in a collective work. The club, recognized nationally and internationally, has already received about 30 awards in the field of education.

The results obtained are presented in three dimensions: technical-professional applications, didactic applications based on the analysis of thermal images, and didactic applications aimed at determining physical constants. Phenomena such as thermal conduction and convection, absorption and emission of infrared radiation, exothermic and endothermic reactions, as well as the determination of the specific heat capacity of a metal and the specific enthalpy of fusion of water were explored. The students involved obtained high grades in the experimental component, higher than those of students who addressed the same content without the use of thermography. The applications developed were also presented by the students at scientific dissemination events, contributing to the promotion of science.

It is concluded that infrared thermography, by making visible phenomena associated with matter and energy, establishes itself as a pedagogical resource of high educational value. Its ease of use and progressively more accessible cost reinforce the relevance of its integration into pre-university science education



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sciforum-178340: Integral STEM lesson "Energy in Nature"

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The educational process in the STEM concept is aimed at implementing interdisciplinary learning models (cross-curricular connections), through which students are given the opportunity to discover the logical connection between different "pieces" of knowledge taught in multiple scholar disciplines. Cross-curricular connections are a way to achieve stable knowledge, refracted through the prism of different scientific fields

The present study focuses on the big idea of energy flow in the nature and integrates biology, physics and chemistry in various experiments, forming one integral unit. The energy from a biological point of view is studied through the series of experiment involving the fundamental processes like photosynthesis, metabolism, movement and action. To study the energy like physical phenomenon students have to conduct some experiments like construction of dynamo, wind turbine, water turbine, as well as to measure the photovoltaic effect and discuss about the alternative energy sources. The chemical part of the experiments is related to the hydrogen energy and how to use the hydrogen cell to move a car.

When the same lesson is presented from different perspectives, we enable students to be flexible, to make connections between subjects, and to work in a variety of circumstances. They understand concepts, phenomena, and events better when we provide them with different learning contexts and different perspectives through which to explore them.



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sciforum-173144: Integrating Physical Education within a STEAM Framework in Primary Education: Effects on Motor Competence, Academic Achievement, and Creative Problem-Solving

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STEAM education has been widely promoted to foster interdisciplinary learning, creativity, and problem-solving skills. However, the integration of Physical Education (PE) within STEAM frameworks remains underexplored, particularly in Primary Education. This study examines the impact of a STEAM-based intervention incorporating Physical Education on motor competence, academic achievement, and creative problem-solving among primary school students. A quasi-experimental design with pre- and post-test measures was implemented in two public primary schools. The sample comprised 124 students (aged 9–11 years). The experimental group participated in a 12-week interdisciplinary STEAM program integrating science, mathematics, engineering design, arts, and physically active learning tasks embedded in PE sessions. The control group followed the standard curriculum. Motor competence was assessed using standardized movement skill tests, academic achievement through mathematics and science performance tasks, and creativity through validated divergent thinking measures. Data were analyzed using mixed ANOVA and effect size calculations. Students in the experimental group demonstrated significant improvements in motor competence ($p .01$), mathematics and science achievement ($p .05$), and creative problem-solving ($p .01$) compared to the control group. Effect sizes ranged from moderate to large ($\eta^2 = .08-.21$). Integrating Physical Education within a STEAM framework in Primary Education enhances not only motor development but also academic and creative outcomes. These findings support interdisciplinary models that position physically active learning as a catalyst for holistic educational development.



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sciforum-173001: Integrating Research and Pedagogy: A Case Study on the Impact of Project-Based Learning on Student Publication Success in Agricultural Engineering

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This study demonstrates how project-based learning (PBL) can effectively strengthen research capability, analytical thinking, and scientific communication within the MSc course. Instead of relying solely on traditional lectures, the course was also included an authentic research project in which student investigated hot-air drying and computer vision-based non-destructive quality assessment of Biser dates. This real-world problem provided a meaningful context for applying theoretical knowledge in food engineering and digital analysis. Through a carefully guided PBL framework, students engaged in the complete research cycle. They designed experiments, conducted controlled drying trials, collected and interpreted data, applied thin-layer drying models, analyzed digital images for quality changes, and prepared a scientific manuscript. The iterative nature of the project encouraged continuous problem-solving, peer discussion, and critical evaluation of results. Students not only developed technical competence in non-destructive testing methods but also gained confidence in using data to support scientific conclusions. Sustainability concepts were embedded throughout the project, aligning with SDG 2 (Zero Hunger), SDG 9 (Industry, Innovation & Infrastructure), and SDG 12 (Responsible Consumption & Production). This helped students connect laboratory findings to broader postharvest and food security challenges. The experience fostered independence, research ownership, and publication readiness, ultimately leading to acceptance of the project output in the Scopus-indexed journal Heat Transfer. The findings suggest that integrating PBL into research-intensive postgraduate courses creates impactful learning while producing meaningful scientific contribution



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sciforum-178529: Is Self-Perceived Data Literacy Psychometrically Defensible? Evidence from Data Literacy Self-Perception Questionnaire Validation

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Data literacy has become an essential competency for navigating the demands of modern education and the data-driven society. However, the psychometric defensibility of self-perceived data literacy remains unclear, particularly among adolescents whose metacognitive accuracy is still developing. This study aimed to validate the Data Literacy Self-Perception Questionnaire (DLSPQ) and examine the structure of students' perceived data literacy across cognitive, technical, and attitudinal domains. Using a quantitative psychometric design, content validity was evaluated through Aiken's V, followed by item-level diagnostics, polychoric Exploratory Factor Analysis (EFA), reliability estimation, and Confirmatory Factor Analysis (CFA). A sample of 354 upper-secondary students completed the 53-item DLSPQ. Results showed high content validity, strong corrected item-total correlations, and excellent internal consistency ($\alpha = .88-.95$; $\omega = .90-.97$). EFA supported a six-factor solution consistent with the theoretical model, while CFA indicated good model fit, confirming the multidimensional structure of data literacy. Descriptive findings revealed strong operational spreadsheet skills and positive attitudes toward data, alongside weaker mastery of conceptual statistical reasoning and complex Excel functions. Gender comparisons indicated minor yet interpretable differences favoring males in technical domains and females in attitudinal dimensions. Overall, the DLSPQ demonstrates strong psychometric defensibility as an assessment tool for mapping students' perceived data literacy. Its validated structure holds practical value for curriculum development, diagnostic assessment, and the design of instructional interventions targeting data reasoning, spreadsheet competency, and student engagement with data. Future studies are encouraged to complement self-perception measures with performance-based assessments and longitudinal designs to better understand developmental trajectories of data literacy.



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sciforum-178356: Learning Scenarios as Boundary Objects: A Multi-Country Study on Integrating Data Science, STEAM, and Social-Justice in Teacher Education

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Drawing on the sociocultural framework of Communities of Practice, this study analyzes the co-design and implementation of ten learning scenarios within the DataScEd4CiEn project. The research investigates how transdisciplinary learning scenarios function as macro-level boundary objects that facilitate the reification of practice among researchers, teacher-educators, and in-service teachers from Cyprus, Germany, Greece, Ireland and Spain. Using a mixed-method approach, the study traces how micro-level boundary objects -such as social justice problems, datasets, design templates, and inquiry questions -support collaboration across professional boundaries and curriculum subject areas. The analysis follows the trajectory of scenario integration across four phases: emergence, exploration, immersion, and consolidation. During the emergence and exploration phases, the study examines how these boundary objects were employed by researchers and teachers educators acted as brokers supporting teachers in navigating the disciplinary "silo effect" and coordinating the co-designing of scenarios aimed at advancing data science education within STEAM for civic engagement. In the immersion phase, the focus shifted to classroom enactment, analyzing how in-service teachers and students use these boundary objects to connect complex social justice issues with curricular learning goals and to transition from descriptive to exploratory data practices while fostering civic engagement. Finally, the consolidation phase, informed by teachers' reflection sheets and focus group discussions, examines how these practices became integrated into the teachers' shared repertoire. The findings suggest that learning scenarios grounded in meaningful social justice contexts can function as generative mediating structures in in-service teacher education, supporting the integration of data science within STEAM while promoting collaborative inquiry and civic engagement.



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sciforum-173282: Learning Through Engagement: What Industry Volunteers Reveal About Effective STEM Outreach in University-Industry Partnerships

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This presentation reports on an industry–university partnership between a large-scale multinational company and an educational outreach STEM Maker Space. Industry representatives co-facilitated STEM outreach workshops with children aged between 6–12 years old and their teachers with STEM facilitators and experts in the field of STEM education from a college of education in Ireland. Drawing exclusively on post-activity reflections from the industry volunteers, this presentation examines motivations for participation, perceived learning and, facilitation challenges, and translate these into practical recommendations for strengthening university–industry collaborations in STEM education.

Volunteers' primary motivations were values-driven: inspiring the next generation; sharing a passion for science; giving back; and personal connections (e.g., being parents or STEM advocates). Volunteers reported substantial learning about how children learn: curiosity and questioning as entry points; the power of hands-on demonstrations; unexpectedly high prior knowledge among 8–12-year-olds; and the need to adapt explanations by age. Challenges clustered around age-appropriate communication, simplifying abstract concepts for younger learners, and managing learner engagement and the learning environment.

From an industry perspective, the partnership yielded clear benefits: employee engagement and morale, development of communication skills, strengthened community relationships, and early talent pipeline visibility. The presentation will explore best practices in STEM educational outreach involving industry volunteers and propose a model of engagement for University-Industry Partnerships in the delivery of STEM outreach to younger children at elementary level education. The findings demonstrated how thoughtfully structured university–industry collaborations can amplify STEM interest among children while delivering reciprocal value to industry volunteers and partners.



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sciforum-172259: Max Math Challenge: Enhancing Computational Fluency and Reducing Cognitive Load in Primary STEM Education

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Introduction

In STEM education, learners often face intricate problem-solving challenges that require significant mental effort. A continual obstacle to achievement is restricted mathematical fluency, which burdens working memory with fundamental computations and limits involvement in advanced reasoning. This research presents the Max Math Challenge, a digital gamified tool aimed at automating basic arithmetic abilities and minimizing cognitive strain, allowing students to concentrate on higher-level STEM concepts.

Methodology

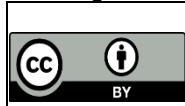
A 10-day pilot study was conducted using a single-group pre-post intervention design with 10 primary school students (all aged 8 years). Participants were recruited from a local educational setting based on their participation in standard curriculum arithmetic. The intervention consisted of daily 20-minute sessions focusing on core arithmetic tasks (addition, subtraction, and multiplication). The technology-enhanced learning (TEL) environment integrated adjustable difficulty algorithms, real-time feedback, and gamification components such as progress badges and level-unlocking. Performance was assessed by comparing baseline metrics to post-intervention results regarding Response Latency and Accuracy Rates.

Results

Initial results show significant improvements in computational fluency. Average response latency reduced by 60.7%, while accuracy improved by 22% during the intervention period. Qualitative observations also indicate a decrease in math anxiety, with learners expressing increased confidence and willingness to participate in engineering and technology-related tasks. The emergence of automaticity seems to liberate cognitive resources, facilitating a more fluid transition into intricate STEM problem-solving.

Conclusion

The Max Math Challenge emphasizes that digital transformation in education goes beyond merely digitizing material; it requires enhancing the cognitive framework of learning. By boosting basic fluency among young learners through a research-backed and flexible TEL method, the application promotes fair involvement in STEM pathways from an early age. These results highlight the promise of gamified micro-practice tools in boosting learner resilience and equipping students for the mental challenges of contemporary STEM education.



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sciforum-173237: Motivation, Achievement Emotions, and School Results in High School STEM Study

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This study investigates the complex transition from cognitive potential to academic achievement by examining the multidimensional constructs of motivation and affectivity in high school STEM education. As STEM disciplines demand high levels of abstract reasoning and persistent problem-solving, understanding the psychological determinants of success becomes imperative for optimizing pedagogical outcomes. Drawing on the control-value theory of achievement emotions, this research explores how motivational beliefs and emotional experiences synergistically influence the adoption of self-regulated learning strategies. Grounded in the control-value theory of achievement emotions, this study posits that students' subjective appraisals of control and value significantly shape their affective experiences in the classroom. The methodology involved a quantitative analysis of a sample of 150 high school students. Data collection utilized four psychometrically validated instruments adapted for the STEM context: the Motivated Strategies for Learning Questionnaire (MSLQ) to assess self-regulated learning; Goal Orientation (GO) scales to distinguish between mastery and performance approach; Implicit Theories of Intelligence (IMPL) to evaluate mindset prevalence; and the Achievement Emotions Questionnaire (AEQ) to measure discrete academic emotions. The analysis aims to demonstrate how a mastery goal orientation and a growth mindset function as positive predictors of activating emotions, such as enjoyment and hope, while concurrently mitigating deactivating states like boredom and anxiety. Furthermore, the study explores the role of self-regulated learning and motivation as critical mediators in the relationship between emotional states and academic achievement. The findings underscore the necessity for an integrated STEM instructional design that moves beyond technical content to support the development of emotional resilience and autonomous learning strategies, providing educators with targeted interventions to optimize student performance.



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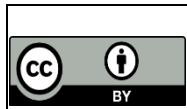
sciforum-178795: Pedagogical Innovations in Data Science and Statistics Teaching in Higher Education: A Systematic Review

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The growing prominence of data-driven decision-making across scientific, economic, and social domains has intensified the demand for graduates possessing strong competencies in statistics, data literacy, and data science. In response, higher education institutions are increasingly revising curricula and instructional practices to incorporate data science and statistical education across diverse academic disciplines. This study presents a systematic review of the scholarly literature examining pedagogical approaches for teaching data science and statistics in higher education. The review aims to synthesize existing research on instructional strategies, curriculum design, and the integration of computational tools that support the development of analytical and data-oriented competencies among university students. To ensure methodological rigor, a structured literature search was conducted using the Scopus database, focusing on peer-reviewed publications addressing statistics education, data science pedagogy, and data literacy within university-level contexts. The retrieved studies were screened and selected based on predefined inclusion and exclusion criteria, enabling the identification of relevant pedagogical patterns and emerging instructional practices. The analysis reveals several dominant approaches within the literature, including project-based learning, inquiry-oriented statistics education, the use of real-world datasets for applied data analysis, and the integration of programming environments that support computational thinking and data exploration. Furthermore, recent research highlights the growing role of digital tools and interactive technologies in facilitating data visualization, collaborative learning, and experiential engagement with complex datasets. Overall, the findings indicate a gradual pedagogical shift from traditional lecture-based instruction toward more applied, interdisciplinary, and technology-enhanced learning environments. This review contributes to a deeper understanding of evolving teaching practices in data science and statistics education and identifies key directions for future research in higher education pedagogy.



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sciforum-174373: Performance Evaluation of Generative AI Models in Chemistry Lesson Design Using Role-Based Prompting: Insights from Micro- and Nanoplastics

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Recent advances in generative artificial intelligence (GenAI) offer new possibilities for supporting teachers in instructional design; however, comparative empirical evidence on the performance of different models in discipline-specific lesson planning remains limited. This study evaluates five widely accessible GenAI models—ChatGPT (GPT-5.2), Claude (Sonnet 4.5), DeepSeek, Google Gemini 1.5, and Microsoft Copilot—in generating secondary-level chemistry lesson plans using role-assigned prompting (RAP). The instructional context was framed around the socio-scientific issue (SSI) of microplastic and nanoplastic impacts.

All models received the same role-assigned prompt (RAP) to act as experienced chemistry teachers and design curriculum-aligned lesson plans for 11th-grade students, which were then evaluated by five veteran chemistry teachers using an analytic rubric. The author-developed rubric, based on relevant theory, evaluated eight criteria, including learning outcome alignment, 5E model adherence, teacher–student role clarity, inquiry support, chemical accuracy, SSI integration, assessment quality, and language appropriateness.

Significant differences in model performance were observed. Claude produced the most comprehensive and pedagogically robust plans, with strong alignment to learning outcomes, effective SSI integration, and thorough assessments. ChatGPT offered structurally coherent plans aligned with the 5E model, but content depth was moderate. DeepSeek generated organized and practical plans, yet showed inconsistencies in 5E alignment and learning outcome coherence. Gemini and Microsoft Copilot performed weaker, with limited alignment to learning outcomes and more superficial chemistry content.

Overall, while all models generated broadly implementable lesson plans, their pedagogical quality varied significantly. The findings highlight the importance of model selection and prompt design in leveraging GenAI for chemistry education and suggest that RAP can be an effective strategy for enhancing instructional outputs.



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sciforum-178386: Proximal Factors in Extracurricular Science Programs: Insights from Teachers' Discourse

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Extracurricular science activities have been identified as educational contexts that can broaden students' opportunities to engage with scientific practices and develop interest in STEM disciplines. These initiatives may create learning environments that complement formal schooling by enabling participation in authentic scientific practices and fostering connections with science beyond the classroom. However, limited research has examined how teachers participating in these programs describe and structure these educational experiences from their professional perspective. This study analyzes teachers' discourse regarding their participation in an extracurricular science program identify the educational elements that structure these experiences.

The study forms part of the first phase of a doctoral research project and corresponds to an exploratory qualitative design. The data corpus consists of semi-structured interviews conducted with four teachers participating in an extracurricular science program. The analysis followed a sequential deductive–inductive approach. In the first phase, a deductive analysis was conducted based on the proximal level of the STEM orientation model proposed by Reinhold, Holzberger, and Seidel (2018). Subsequently, inductive coding was carried out following Saldaña's (2013) qualitative coding procedures to identify emerging patterns in teachers' discourse.

The analysis identified two main analytical dimensions comprising six categories and twenty-seven subcategories that describe key components of the educational environment generated in these extracurricular experiences. Among the elements most frequently emphasized by teachers are learning experiences outside the classroom, opportunities to engage with scientific practices, student recognition, the development of learning communities, and the public presentation of students' work.

The findings suggest that extracurricular science programs can create educational environments that extend learning opportunities beyond traditional classroom settings and support participation, recognition, and community-building around science. Within the framework of STEM orientation, these elements can be interpreted as proximal educational factors that may contribute to fostering students' interest and engagement with STEM pathways.

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sciforum-178172: Science Outside the Classroom: Connecting School and Scientific Communities to Improve Education

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Education as a strategic field is constantly called upon to reinvent itself, seeking dialogue with other actors and educational spaces; pedagogical innovation that considers digital transformation; collaborative and non-fragmented teaching based on real problems; and the responsible and interdisciplinary incorporation of technologies. In this context, methodologies aligned with these demands emerge, such as the STEM approach. It is from this approach that the research presented here is developed, with the objectives of: stimulating students' interest in science, enhancing new teaching methodologies, and contributing to the improvement of public basic education. The research is being developed in public basic education schools (early childhood education, elementary education, and high school). Considering Microscopy as a pedagogical tool and a means of articulating STEM disciplines, the project uses images produced at the microscopic level to mobilize students and teachers in the pursuit of innovative teaching, with the pedagogical and responsible use of technology. The methodology used is intervention research, in three stages: the capture, the digital processing, and the exhibition of the processed images. The first phase involves training students and teachers to use a pocket microscope attached to a cellphone or tablet; the use of a specific program for processing the captured images, carried out by the students; and the third stage involves the selection, discussion, and presentation of the processed images with the school community. As results, a greater interest of students in science and the pedagogical and responsible use of technologies can be observed, configuring a scenario of possibilities for the STEM approach in schools.



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sciforum-157551: Sociological Factors Explaining Math Anxiety in Spanish Primary School Students

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Mathematical anxiety is a psychological construct characterized by feelings of tension, apprehension, or fear that interfere with mathematical performance. It affects learners across all educational stages and has been shown to influence both motivation and academic achievement. This study examines whether sex and age account for differences in levels of mathematical anxiety among Spanish primary school students. A quantitative, correlational design was employed with a convenience sample of 185 students in Grades 3 to 6 of primary education (aged 9-12 years). Mathematical anxiety was assessed using the validated Abbreviated Math Anxiety Scale (AMAS), which is a standard instrument frequently used in the specialized literature. The findings indicate that, on average, students exhibit a moderate level of mathematical anxiety, with no significant differences between sexes. However, age showed a positive and statistically significant correlation with mathematical anxiety. Specifically, anxiety levels decreased until approximately age 10, after which they increased progressively with age. The relationship between age and mathematical anxiety was best captured by a quadratic model. These results suggest the need for targeted interventions to prevent and mitigate mathematical anxiety, with particular emphasis from the age of 10 onwards. Moreover, sex-related differences in the perception of mathematics may become more pronounced later, coinciding with the onset of adolescence.



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sciforum-177851: Step-by-Step: A Grounded Approach to Covariational Reasoning

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Introduction - The relevance of covariational reasoning in STEM education is well-acknowledged. Such a form of mathematical reasoning proves vital not only for a deep understanding of mathematical concepts but also for meaningful conceptualization of dynamic, contextualized situations. The potentialities of digital tools to appreciate simultaneous changes between quantities have been widely investigated. However, the use of digital simulations introduces a mediation and thus a fracture with the real-life context. In this project, we are exploring an approach to covariation grounded in the bodily experiences within the lived environment and aimed at developing a sense of world awareness.

Method – In our research group, we have designed a teaching experiment called “Step-by-step,” aimed at engaging students in conceptualizing and giving meaning to the relationship between the number of steps and the distance covered in a walk or a run. Starting from the bodily experience of a run, students measure the distance covered using different tools (tape measure, pedometer, and GPS) and elaborate conjectures and mathematical models connecting the quantities involved. In this presentation, we comment on preliminary findings from classroom experiments conducted by the mathematics and physics teachers of the group, in collaboration with physical education teachers, in their 9th- and 11th-grade classes.

Results – Adopting embodied cognition as theoretical background and a multimodal perspective on learning, we analyze students’ conceptualizations of the step-distance relationship. Students’ productions (verbal explanations, graphical representations, bodily experience) are generally co-timed and intermingled. Their analysis shows how an approach grounded in bodily experiences and the use of tools effectively supports their modelling of dynamic phenomena and their covariational reasoning.

Conclusion – The multimodal analysis presented suggests that bodily experiences within the lived environment support the development of mathematical models with a sense of mutual changes and world awareness. Hence, such a grounded approach is valuable for STEM education.



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sciforum-178220: Student-Designed Synthesis of Diarylamines as an Active Learning Strategy in Organic Chemistry

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In advanced Organic Chemistry courses, students often acquire knowledge of chemical reactivity mainly through the theoretical study of established synthetic transformations. While this approach provides a solid conceptual foundation, it may limit the development of key competencies such as scientific literature search, decision-making in synthetic design, and experimental planning.

This work presents a learning activity implemented within the framework of the Bachelor's Degree Final Project in Chemistry, involving four undergraduate students working individually. After introducing a synthetic methodology for the preparation of diarylamines, students were tasked with identifying a target compound of interest based on its properties, industrial relevance, or presence in the scientific literature.

Each student selected a compound and developed a synthetic proposal supported by bibliographic research, justifying the choice of starting materials, reaction conditions, and overall feasibility. The proposed strategies were subsequently implemented in the laboratory. Students were supported through periodic tutorials and evaluated using a rubric addressing literature search, synthetic reasoning, and experimental execution.

Learning outcomes were assessed through rubric-based evaluation and a post-activity student survey. All students developed viable synthetic proposals, and most successfully carried out the experimental work. Survey responses indicated increased confidence in literature consultation and synthetic planning.

Although limited by the small sample size, the results suggest that this active-learning approach fosters student engagement and strengthens the connection between theoretical knowledge and practical application in Organic Chemistry.



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sciforum-162028: Synthetic Cognition for STEM Education: A Novel Framework for Simulating STEM Learners and Discovering Misconceptions

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STEM education research has traditionally relied on classroom experiments, student surveys, and performance analytics to understand how learners reason through complex problems. However, these approaches require large student cohorts, raise ethical constraints, and offer limited control over cognitive variability. This study introduces a novel methodology that replaces traditional data collection with synthetic students created using large language model agents orchestrated through a Python based simulation pipeline. Five learning personas (novice, intermediate, competent, overconfident incorrect, and expert) were defined and used to generate 1,250 reasoning traces in response to a curated set of 50 mixed difficulty problems with five runs each.

Python automation enabled controlled persona behavior, prompt engineering, iterative sampling, and structured extraction of reasoning steps, misconceptions, confidence estimates, and final answers. Through systematic analysis of these traces, we developed the Universal STEM Misconception Taxonomy, which captures cross disciplinary cognitive errors such as incorrect rule generalization, symbolic-verbal disconnects, inverse reasoning, premature formula application, dimensional inconsistency, and flawed causal assumptions in physical systems. The synthetic students reproduced well documented STEM misconceptions and exhibited stable, persona specific error signatures that could be computationally analyzed at scale. The expert persona served as an internal benchmark for validity, enabling automated difficulty profiling and reasoning quality assessment.

This work demonstrates that synthetic learners combined with reproducible Python workflows offer an ethical, scalable, and cost effective paradigm for STEM education research. The methodology removes the need for human participant recruitment while enabling high fidelity modeling of diverse problem solving behaviors. The proposed framework supports new applications in STEM education, including curriculum diagnostics, automated distractor generation, pre testing of instructional materials, and the development of learning analytics. The pipeline is fully platform independent and can be extended to any STEM discipline, positioning synthetic cognition as a transformative approach for the next generation of STEM education research.



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sciforum-155646: Teaching English for Research Publication Purposes (ERPP) Based on Discipline-Specific Corpus and Artificial Intelligent Method: A Case Study of Ocean Engineering

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As the demand for publishing in English grows across STEM fields, researchers who use English as a second language face persistent writing challenges, including limited mastery of domain-specific terminology, a tendency toward literal translation, and sentence-length and error issues originating from compact rhetorical habits in their native language. Recent advances in artificial intelligence and data-driven methods offer new opportunities for language instruction and writing support. This study presents a comprehensive review of traditional corpus-building approaches and recent data-driven AI techniques, and then provides a focused case discussion in marine engineering conducted in collaboration with domain researchers. By comparing corpus resources, feature engineering strategies, and modeling approaches, we evaluate the transferability of data-driven instructional models for improving publication readiness among non-native engineering researchers. The discussion highlights evidence-based revision strategies, targeted pathways for disciplinary vocabulary acquisition, and practical ways to integrate automated feedback with expert human guidance to improve manuscript quality. Our review indicates that data-driven AI tools hold promise for supporting terminology acquisition, identifying common error patterns, and generating actionable revision suggestions, but their effectiveness depends on high-quality, domain-specific corpora and close collaboration with subject-matter experts. We conclude with recommendations for future research and pedagogical practice to scale evidence-based ERPP (English for Research Publication Purposes) support across STEM disciplines.



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sciforum-169796: Transforming Initial Wonder into Structured Understanding: Experiential Science Demonstrations to Foster STEM Pathways

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The transition from secondary education to STEM-related higher education is often hindered by students' perceptions of science as abstract, inaccessible, or disconnected from everyday experience. This contribution presents Beyond the Magic, an educational outreach project aimed at upper-secondary students, designed to promote early interest in scientific careers through short, live, and participatory science demonstrations conducted under controlled conditions and incorporating appropriate safety measures for educational settings. The project is structured around a series of carefully designed experimental demonstrations that initially provoke surprise and cognitive conflict. Students are actively involved in predicting outcomes, observing phenomena, and collaboratively constructing explanations guided by facilitators. The experiences address foundational concepts in chemistry and physics—such as reaction kinetics, gas behavior, surface tension, protein chemistry, and phase interactions—linking observable effects to underlying scientific principles. Classroom implementation revealed high levels of student engagement, with learners participating actively, posing spontaneous questions, and extending discussions beyond the planned content. These emergent inquiries suggest that the experiential format not only captures students' attention but also stimulates scientific curiosity and deeper conceptual exploration. From a pedagogical perspective, this work highlights the role of affective engagement and inquiry-based experimentation as key mechanisms for lowering barriers to STEM learning. By transforming initial wonder into structured understanding, the project supports the development of scientific reasoning and contributes to building positive STEM identities during a critical transition between secondary and higher education.



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sciforum-151149: Understanding the Gender Gap in STEAM from a Teaching Perspective

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Introduction:

This paper examines the perceptions of early childhood, primary, and secondary school teachers in Spain regarding the existence of a gender gap in subjects related to STEAM (Science, Technology, Engineering, Arts, and Mathematics) disciplines. The main objective is to identify how teachers interpret these inequalities and to what extent they consider them to influence students' academic performance.

Method:

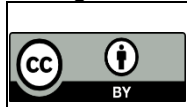
A descriptive study was conducted based on the collection and analysis of responses from teachers at different educational levels in Spain. The questionnaire addressed aspects related to the perception of gender stereotypes, student confidence and motivation in STEAM subjects, as well as the differential expectations and attitudes between girls and boys.

Results:

The results show that most teachers recognize the existence of perceptible gender differences from the early stages of education. These perceptions suggest that girls tend to show less confidence and motivation in subjects related to technology and engineering, while boys are perceived as more inclined to participate in them. This situation could be influencing future university and professional studies, contributing to the persistence of inequality in these traditionally masculinized STEAM fields.

Conclusions:

The study concludes by highlighting the need to delve deeper into the factors that create and sustain this gap, such as role models, implicit messages in the classroom, and the influence of the social and family environment. It also underscores the importance of designing and implementing pedagogical strategies that promote equal opportunities and spark interest in STEAM disciplines among all students from an early age.



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Session 6. Teacher Education

sciforum-149863: “I Should Now Confess That I Followed the Banking System of Education...”: Reexamining and Reimaging my Teaching Practices Through Critical Pedagogy Lens

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This paper analyzes my prior teaching practices through the principles of critical pedagogy. It interprets my prospective teaching agenda on how education in critical pedagogy is shaping my teaching practices to promote students' criticality. In this paper, I argue that in order to promote critical pedagogy in teaching, a teacher must be transformative intellectual to reinforce students' sociopolitical awareness through a set of critical orientations. It recognizes transformative intellectual as a legitimate teacher's identity to promote critical pedagogy in teaching. It identifies criticality, praxis, and freedom as three notions promoting critical pedagogy through students' voice to address oppression. This paper additionally explores how the banking system of education, linguistic colonialism, and linguistic hegemony function as major oppressional practices, through pedagogical experiences, empowering native speakerism. It utilizes significant theories of critical pedagogy to analyze and interpret my previous teaching practices and established strategies on how to incorporate common orientations of critical pedagogy into my future teaching practices. In this paper, although I did not deny the possibility of promoting orientations of critical pedagogy by everyone, I justify that transformative intellectuals are those types of teachers who predominantly focus on changing students' personality from neutral to sociopolitical and are substantially effective to promote critical pedagogy in teaching. In addition, it recognizes a transformative intellectual as a legitimate instructor in order to enhance students' sociopolitical awareness and consciousness. It finally addresses a possibility that critical pedagogy could be sometimes oriented subconsciously in teaching.



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sciforum-173154: Cultivating Moral Literacy: Australian In-Service Teacher Perspectives on Ethical Reasoning and Initial Teacher Preparation

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National professional standards in Australia mandate ethical practice, yet research indicates a persistent gap in how these capacities are systematically cultivated within Initial Teacher Education (ITE) programs. Grounded in Sanger and Osguthorpe's (2011)'s Moral Work of Teaching framework, this study investigates how educators understand and enact ethical decision-making within complex contemporary moral landscapes. The research aims to move beyond a focus on static codes of conduct to explore the dynamic interplay between personal beliefs, institutional expectations, and professional judgment. Using a mixed-methods approach, this paper reports on data from a large-scale survey of 131 Australian in-service teachers, examining their personal definitions of ethics and their responses to authentic professional dilemmas.

Initial analysis reveals that these educators frequently define ethics as synonymous with professional conduct and legal compliance rather than nuanced moral reasoning. A dominant theme emerged regarding the perceived inadequacy of formal preparation; many respondents described their ethics training as "minimal," "shallow," or "thin". Instead, teachers reported that their primary ethical development occurred through first-hand experiences and challenges encountered during clinical practicums. Participants identified critical contemporary ethical dilemmas, including the misuse of generative artificial intelligence, biased assessment or grading practices, and the complexities of maintaining professional boundaries within digital and social media environments.

The findings suggest that current implicit approaches to ethics education fail to adequately prepare educators for the multifaceted demands of modern classrooms. This work advocates for a shift toward explicit pedagogical strategies, such as case-study analysis and reflective practice, to equip teachers with the "moral literacy" required to act as agents of change. By illuminating the specific nature of ethical understanding, this study provides a framework for enhancing curricula to foster principled, socially responsive educators capable of navigating complex professional landscapes.



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sciforum-172989: Mentoring Practices of Pre-Service Teachers: An Exploration

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Introduction

Mentoring plays an important role in shaping the professional growth and identity development of pre-service teachers within the Indian teacher education system. With the increasing emphasis on reflective practice, school internship, and competency-based preparation under the National Education Policy (NEP) 2020, mentoring during practicum has gained renewed significance. Learning to teach in diverse Indian classrooms characterized by linguistic plurality, socio-cultural diversity, and varied institutional resources is cognitively demanding, socially dynamic, and emotionally intensive. This study explores mentoring practices enacted by pre-service teachers within this context, conceptualizing them as multidimensional processes involving cognitive, social, and emotional engagement.

Method

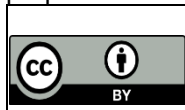
The study adopted a qualitative research design using semi-structured interviews with pre-service teachers enrolled in teacher education programs in India. Participants reflected on their mentoring experiences during school internships, particularly peer support, lesson planning discussions, classroom management challenges, and theory–practice integration. Data were analyzed using a hybrid deductive–inductive thematic approach organized around cognitive, social, and emotional dimensions of mentoring practice.

Results

Findings reveal that pre-service teachers engaged in mentoring practices such as collaborative lesson planning, question-driven reflective dialogue, contextual adaptation of pedagogical theories, and joint problem-solving related to classroom diversity and resource constraints. Socially, mentoring fostered peer collaboration and professional solidarity during the internship. Emotionally, empathetic conversations, reassurance, and confidence-building were crucial in managing anxiety associated with classroom performance and evaluation.

Conclusions

The study highlights mentoring practices of pre-service teachers in India as collaborative and context-sensitive processes that support reflective thinking, pedagogical competence, and professional identity formation. Institutionalizing structured peer mentoring within B.Ed. and integrated teacher education programs can strengthen practicum experiences and enhance teacher preparedness in diverse Indian school settings.



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sciforum-178443: Proposals for Science Education in the Early Years: Implications for Teacher Training

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Early childhood teacher training in Spain prepares educational professionals to work with children from birth to six years old. This stage is divided into two cycles: the first (from 0-2 years) and the second (from 3 to 6 years). Therefore, anyone trained in this field should possess professional skills across this entire age range. However, reality shows a bias towards training geared towards the older children (4-5 years). This is due to multiple factors, but primarily stems from the specific characteristics of children at these ages and the limited research on this period of human development. In this paper, we aim to present some science-based learning activities implemented with 1- and 2-year-olds. These activities were developed within a broader research project on science education in early childhood, involving university researchers, teachers, and educators working with this age group. The results show that it is possible to begin working on scientific processes at these ages by taking into account their individual characteristics. To illustrate this, we present two specific experiments: scientific diapers and the cardboard city. In the first, diapers were used as a familiar object to explore scientific concepts with 2-year-olds, and in the second, we were able to observe the differences between 1- and 2-year-olds. These results are fundamental for initial teacher training, since future teachers must also possess scientific competencies relevant to these age groups.



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sciforum-169207: Study of the Impact of a Teaching–Learning Sequence on Marine Plastic Pollution: Transformative Environmental Education and Serious Games in Initial Teacher Education

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Introduction: Transformative Environmental Education and the One Health approach are key perspectives in initial teacher education for responding to the current ecosocial crisis. **Objective:** This study aims to evaluate the impact of a Teaching–Learning Sequence that employs a serious game (Escape Box) as the central didactic tool to address marine plastic pollution. **Methodology:** A quasi-experimental design was implemented in the Environmental Education course, using pre- and post-questionnaires administered to 27 4th year students, aged between 22 and 23, enrolled in the Primary Education degree at the University of Cádiz (Spain). The Teaching–Learning Sequence was designed following a learning cycle grounded in socioconstructivist principles, integrating Ocean Literacy and the One Health approach. **Results:** Data analysis shows a significant improvement in the understanding of the socio-environmental issue, although it also reveals the persistence of certain learning obstacles. **Conclusions:** It is concluded that the use of Escape Boxes, integrated into a socioconstructivist learning cycle and grounded in the Transformative Environmental Education model, has a relevant impact on teacher education. This study not only identifies key conceptual weaknesses related to marine plastic pollution, but also enables future teachers to experience transferable didactic proposals for classroom implementation to address the current ecosocial crisis, adaptable to other socio-environmental issues.



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sciforum-168720: Teacher's Socioemotional Competence in Continuous Professional Development: Insights from Recent Literature

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Introduction

In recent years, teachers' socio-emotional competence (SEC) has gained increasing attention due to its strong influence on teacher well-being, instructional quality, and classroom climate. Teachers face growing emotional demands related to classroom management, student relationships, and self-regulation, while simultaneously experiencing high levels of stress and burnout. This situation highlights the urgent need to integrate SEC into continuous professional development (CPD) as a foundational component of teacher education.

Methods

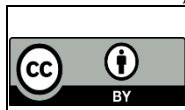
This study presents a systematic literature review. A structured search was conducted in Scopus using a Boolean equation combining terms related to socio-emotional competence, teachers, and professional development. The search was limited to peer-reviewed articles published between 2020 and 2025. After screening titles and abstracts and applying predefined inclusion and exclusion criteria, a set of relevant studies was selected for qualitative synthesis.

Results

Across the reviewed literature, SEC consistently appears as a key factor in enhancing teacher resilience, emotional self-regulation, self-efficacy, and classroom effectiveness. The findings reveal positive associations between SEC and outcomes such as improved classroom management, healthier student-teacher relationships, and reduced levels of stress and burnout. Several studies highlight mindfulness-based interventions as effective strategies for strengthening teachers' emotional resources. However, significant gaps remain in both initial teacher education and CPD, with many teachers reporting insufficient preparation to address socio-emotional demands in diverse educational contexts. Contextual factors, including leadership practices, teaching experience, gender, and equity-oriented approaches, also influence the development and impact of SEC.

Conclusions

Overall, the review suggests that SEC should become an integral component of CPD. Systematic, sustained, and context-sensitive professional development initiatives are needed to foster healthier, more resilient, and more effective teaching communities.



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sciforum-171920: 1The Catalyst for Change: Preservice Educators' Transformative Learning Through a Short -Term Singapore Exchange: Insights from the UAE Context

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This qualitative study analyzes about the impact of short-term international trip to Singapore by five preservice educators. The exchange program involved preservice educators from semester 7 and semester 8 students' professional development, intercultural experience, and pedagogical transformation. Though there is no specific report that officially counts how many UAE preservice educators have gone overseas for short training or trips, this paper will carefully examine how educators who are still in training and some of them graduated when the study was being done, feel about and view short international trips. It will also study the impact of the overseas trips have on their personal growth and their skills as future teachers. Considering UAE 2021 vision and National strategy for Higher Education 2030 , which looks into 21st century skill, the paper explores on perception of Bachelors of Education preservice educators on Early childhood Education program from the UAE to Singapore .Using semi structured online interviews ,the study analyzes four major learning dimensions: holistic and experiential learning, professional and pedagogical development ,intercultural and cross cultural understanding and personal growth. The findings reveal that five preservice educators experienced meaningful shifts in teaching philosophy and the short trip supported child centered and experiential methods while gaining personal development in terms of gaining confidence, openness to change and multicultural appreciation. Despite obstacles such a limited program duration, the short five-day trip facilitated transformative learning and underpinned Dewey's experiential learning principles. Strategic recommendation includes increasing the number of days for the program and executing post exchange workshops. The study revealed policy implications for UAE early childhood education about holistic development, experiential learning integration and sustainable classroom practices. Overall, the paper demonstrates the potential of the short overseas trip to Singapore as high impact competency building tool for nurturing global competent educators.



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sciforum-172757: A Qualitative Study on Workplace Challenges, Mental Health and Well-Being of Indian School Teachers

Roshni Mukherjee * and Guriya Sharma

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Introduction: School teachers play a crucial role in shaping and directing young minds holistically. The teachers as workers are facing extreme stress in the workplace due to multiple demands and expectations from them, similar to other workers across the globe. Improvement of working conditions is important to safeguard the mental health of workers. The International Labour Organization advocates the promotion of mental health in the workplace. Still, teachers in India are facing stress due to their work and interconnected factors, impacting their mental well-being.

Objectives: The study aims to find out the professional and personal challenges of the public sector and private sector school teachers that affect their mental health and overall well-being.

Methodology: An in-depth face-to-face interview was conducted with school teachers (n= 30) from both the public and private sectors, using a purposive sampling technique participants were selected from various locations in West Bengal, India. Data was collected using a semi-structured questionnaire. Thematic analysis was employed to identify the key themes of the study.

Results: The following themes revealed to the causes of mental distress among the teachers: a) Challenges in Private Sector Schools, further divided into Power dynamics of multiple hierarchies; Continuously appeasing the parents and students; and Everyday extreme productivity pressure to sustain job; b) Challenges in Public Sector Schools further divided into Impact of poor infrastructure, weak collegial relationships, and regular extensive travel; Lifestyle disorder creating health issues, and Complaints about non-academic workload and salary; and c) Shared challenges between public and private schools further divided into Neglect of household duties and responsibilities; violation of right to disconnect; and Lack of career growth & development.

Conclusion: Mental well-being impacts teaching quality, and so to reduce stress, a better scope for promotion, leisure, salary, and higher staff recruitment is essential.



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sciforum-141418: Arab Teachers Attitudes in Israel Toward Facts and Neuromyths About the Brain

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The study aims to examine the attitudes of Arab teachers in the country toward facts and myths about the brain, based on variables such as age, professional seniority, educational specialization, gender, school stage, and the teacher's role in school. It emphasizes their understanding of brain function and its impact on teaching improvement. The study employed a descriptive-analytical approach using a questionnaire consisting of 76 items, addressing various aspects such as teachers' perceptions of facts and myths, brain performance, the role of the brain in learning difficulties and disorders, the relationship between brain regions and education, brain characteristics, and topics such as brain efficiency and the connection between brain disorders and learning difficulties. The questionnaire was randomly distributed among the study sample of 939 teachers from various specializations. The results revealed a high prevalence of brain-related myths among teachers, with a significant portion adopting misconceptions regarding brain functions and their influence on learning. Such as auditory or visual learning, or the notion that the brain operates in a strictly divided manner between the right and left hemispheres. No statistically significant differences were found based on age, seniority, specialization, gender, or role in school. The study recommends organizing workshops and training courses for teachers to correct misconceptions and enhance their understanding of neuroeducation. It also suggests incorporating these topics into teacher preparation programs and encourages further research to apply knowledge about the brain to improve teaching practices.



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sciforum-166117: Bridging the Global Teacher Support Gap: A Conceptual Model for AI-Augmented Job-Embedded Professional Development

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Introduction

Teacher professional development is widely recognized as a critical driver of instructional improvement and educational reform. However, persistent gaps remain between international policy aspirations and classroom-level implementation, particularly where job-embedded professional development (JEPD) relies heavily on human-intensive coaching. Prior research has identified time constraints, administrative burden, and limited access to sustained support as key barriers to teacher growth and retention. This study introduces the S.C.A.L.E. Framework, a conceptual model designed to support scalable, AI-augmented JEPD by centering educator agency and sustainability.

Methods

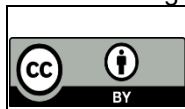
This conceptual study synthesizes findings from a prior qualitative case study (N = 7) examining site-based instructional coaching with a targeted review of recent literature on generative artificial intelligence in education published between 2023 and 2025. The framework is theoretically grounded in Knowles' Adult Learning Theory and Mezirow's Transformational Learning Theory. Conceptual mapping aligned core principles of job-embedded learning with emerging AI-enabled workflows, aiming to address limitations of personnel-dependent professional development models.

Results

The S.C.A.L.E. Framework (Support, Contextualize, Augment, Literacy, and Evaluate) conceptually addresses sustainability challenges in teacher professional development by positioning AI as a reflective and adaptive partner rather than a standalone tool. The model illustrates how AI-supported processes may offload routine reflective and administrative tasks, allowing human mentors to focus on higher-order instructional dialogue and transformational learning experiences. Conceptual analysis suggests the framework has potential to enhance continuity, accessibility, and consistency of professional learning across diverse contexts.

Conclusions

The S.C.A.L.E. Framework offers a theoretically grounded, future-oriented approach to reimagining job-embedded professional development. By integrating established adult learning and transformational theories with AI-enabled support structures, the model provides a scalable architecture for sustained teacher development. It contributes to ongoing discussions on leveraging artificial intelligence to support meaningful, equitable, and sustainable professional learning globally.



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sciforum-173121: Can We Just Learn: Re-Examining Pedagogical Changes and Implications for Teaching and Learning

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Introduction

Promoting inquiry learning can develop science education and contribute to individual development and learning outcomes (Öztürk et al., 2022). Paunova-Hubenova et al (2025) conclude that schools need more integrated learning resources and additional qualifications by teachers to apply STEM methods effectively in Bulgarian schools. This may require collective effort and changes in pedagogy to develop science education. However, Koleva (2011) argues that improving scientific literacy and key competences of students in natural sciences especially chemistry is an objective in Bulgarian school education. Therefore, exploring the challenges faced by schools such as curriculum and assessments requires pedagogical shifts to promote inquiry learning. This study compared various teaching methods employed in secondary schools in Bulgaria and its impact on inquiry learning.

Research questions:

What are students' perceptions of the teaching methods used by teachers and its impact on inquiry learning?

What factors hinder the effective promotion of inquiry learning in schools?

Methodology

This mixed-method research is underpinned by a constructivist learning theory. Data was collected through interviews, questionnaires and lesson observations. The qualitative data was analyzed using thematic analysis and a correlation analysis for the quantitative data.

Results:

The outcomes from the qualitative data identified barriers to implementing scientific inquiry in the classrooms. They included a lack of teacher pedagogical knowledge and promoting student-led learning, tailored professional development and a lack of resources for practical work. A preliminary analysis of the quantitative data shows that traditional modes of teaching persist without marked impact on learning, and practical work was inconsistent and teacher led.

Conclusion

Outcome from the study has informed pedagogical approaches and interventions by providing training opportunities on cost effective micro-scale practical chemistry. However, suggesting that teachers would benefit from enhanced pedagogical support through professional development and knowledge exchange practices.



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sciforum-171965: Contemporary Teaching Methodologies, Their Effectiveness, and the Challenges of Physics Instruction in Secondary Schools in Sierra Leone

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Physics education plays a critical role in developing scientific literacy, technological competence, and problem-solving skills among secondary school students. However, persistent challenges in pedagogy, resources, and institutional support continue to undermine effective physics instruction in many developing contexts. This study investigates contemporary teaching methodologies, their effectiveness, and the challenges of teaching physics in Sierra Leonean secondary schools. Using a mixed-methods approach, data were collected from 66 physics teachers across four geographic regions of the country through structured questionnaires and semi-structured interviews. Descriptive statistics were applied to survey responses, and qualitative insights from interviews were used to enrich interpretation. Findings reveal that group discussion was employed by approximately 61% of teachers, while problem-solving and critical-thinking exercises were used by 50%, suggesting partial integration of learner-centered strategies. Practically oriented methods, such as demonstrations and experiments, were reported by fewer than half of respondents (43.9%), indicating limited hands-on engagement in physics instruction.

Although teachers acknowledge the pedagogical value of practical, inquiry-driven, and ICT-supported instruction, their implementation is constrained by systemic barriers. The most frequently reported challenges include inadequate laboratory equipment and teaching resources (80.3%), large class sizes (68.2%), insufficient training in modern instructional methodologies (54.5%), limited instructional time (48.5%), and minimal access to ICT tools. Teachers who reported using digital tools and interactive strategies consistently perceived these tools and strategies as effective in enhancing student understanding and engagement (100%), suggesting that low adoption is driven by structural limitations rather than resistance to innovation. The study highlights a clear gap between recommended best practices in physics education and actual classroom implementation in Sierra Leone. Addressing these gaps requires coordinated policy interventions that provide resources, sustain teacher professional development, and support institutional frameworks. The findings provide evidence-based insights to inform educational reform efforts to improve the quality of physics instruction and student learning outcomes.



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sciforum-168117: Cost-Effective Authenticity: Generative AI as a Solution to Copyright and Environment Constraints in Vietnamese EFL Classes

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Teaching English as a Foreign Language (EFL) in developing contexts like Vietnam is frequently constrained by two systemic deficits: the absence of an authentic language environment due to a scarcity of native speakers, and the prohibitive cost of copyrighted international teaching materials. These constraints often force teachers into a difficult compromise between providing high-quality input and adhering to legal or budgetary limits, leading to widespread reliance on unauthorized or outdated resources. This study investigates how secondary school teachers are strategically employing Generative AI (GenAI) not merely as an administrative tool, but as a cost-effective solution to these specific environmental and economic challenges. Drawing on qualitative data from in-depth interviews with 15 EFL teachers across diverse socioeconomic settings, the research analyzes teacher agency through the lens of "resource bricolage."

The findings reveal that teachers are actively constructing a "low-cost authentic environment" by deploying AI-driven text-to-speech technologies as "synthetic native speakers," thereby providing students with consistent, high-quality listening exposure previously accessible only in affluent international schools. Furthermore, the study demonstrates a significant shift in material development, where teachers move from relying on copyright-infringing content to engaging in "personalized creation." By using GenAI to generate original, linguistically accurate reading materials and assessments tailored to local contexts, educators are effectively bypassing the need for expensive commercial textbooks. The study concludes that the primary value of GenAI in resource-scarce contexts lies in its ability to democratize access to authentic language input and provide a legally sustainable, ethical model for material design. These insights suggest that AI integration should be framed as a matter of educational equity and economic strategy rather than just technological innovation.



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sciforum-159412: Creative Thinking Skills: The Perceptions, Practices, and Challenges of Moroccan English First Language Teachers

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The language classroom in the 21st century extends beyond language skills and components, like grammar, vocabulary, reading, speaking and listening. Students are required to acquire essential competencies deemed crucial in the 21st century, which mainly include creative thinking, collaboration, and communication. Hence, fostering the development of these skills should be an integral component of education at all levels. This study seeks to address teachers' perceptions, practices, and challenges regarding the infusion of creative thinking skills in teaching English. The study employs an exploratory design to clarify the exact nature of the problem to be solved. Furthermore, the data are mainly qualitative as the aim of this study demands a qualitative inquiry. A qualitative survey questionnaire is used in order to assess thoughts, opinions, and experiences of the participants. 82 Moroccan English language teachers from various educational levels participate in this study. Thematic analysis is used to identify, analyse and report the occurrence of themes in the data collected from the field. The findings highlight both the opportunities and challenges faced by Moroccan EFL teachers in integrating creative thinking skills into their instructions such as; limited resources, rigid curriculum requirements, and large class sizes which hinder their efforts to integrate creative thinking skills into the classroom effectively. To this end, this study contributes to the broader discourse on language education by shedding light on the specific context of Moroccan EFL classrooms.



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sciforum-178741: Did Teachers Become More Isolated or More Collaborative After COVID-19? Changes in Professional Collaboration, Workload, and Teacher Well-Being in TALIS 2018 and 2024

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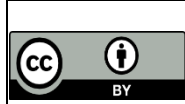
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The COVID-19 pandemic substantially disrupted teachers' work environments, requiring educators to rapidly adapt to distance and hybrid instruction while navigating new digital tools and instructional practices. Prior research indicates that these disruptions increased teachers' workload, stress, and professional demands (Mankki & Rähä, 2022; Gunnþórsdóttir et al., 2021). At the same time, some studies suggest that teachers expanded collaboration with colleagues to cope with these challenges and to exchange instructional resources (Anis, 2024). These developments raise an important question for the post-pandemic era: did teachers become more isolated in their work, or did collaborative professional practices strengthen?

Using data from the OECD Teaching and Learning International Survey (TALIS) 2018 and TALIS 2024, this study examined changes in teachers' professional learning, professional collaboration, and perceived workload before and after the COVID-19 pandemic. First, we investigated whether teachers' reported participation in professional learning, collaboration with colleagues, and perceived workload differ across the two survey cycles. Second, we examined whether the relationships among collaboration, workload, and teacher well-being have changed over time.

Prior to comparing structural relationships, measurement invariance across TALIS 2018 and TALIS 2024 was tested to ensure the comparability of constructs across survey cycle. A mediation model was then estimated in which professional collaboration was associated with teachers' perceived workload, which in predicted teacher well-being, operationalized as job satisfaction or intention to leave the profession. Multi-group structural equation modeling was used to compare these relationships between pre-pandemic (TALIS 2018) and post-pandemic (TALIS 2024) contexts.

The findings contribute to understanding how collaboration functions as an organizational resource supporting teacher well-being in the post-pandemic educational environment.



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sciforum-173071: Digital Tools for the Development of Teaching Materials

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Introduction

Digital technologies have become a central part of teaching practice. Educators are expected to design attractive, up-to-date, and accessible learning materials using a wide range of digital tools. These include presentation software, graphic design platforms, video editing applications, interactive quiz tools, authoring software, and learning management systems. While these resources offer many possibilities, teachers often face practical and pedagogical challenges when creating their own materials. This study explores the current use of digital tools for developing mathematics teaching resources in secondary education in Spain and examines the main difficulties teachers encounter in this process.

Methods

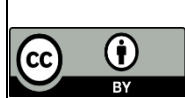
The study combined a review of commonly used digital tools with qualitative data collected from teachers. First, widely adopted software for creating presentations, visual content, videos, and interactive activities was analyzed in terms of usability, pedagogical value, and accessibility. Then, interviews and questionnaires were conducted with mathematics teachers working in a public secondary school located in the city of Elche (Spain), specifically in compulsory secondary education (ESO), with a focus on the final two years (ages 14–16), in order to identify common barriers in material design. Based on defined educational and technical criteria, one digital tool was selected and applied to develop a complete instructional unit for a mathematics course at this level.

Results

The findings show that digital tools increase flexibility, creativity, and student engagement in the analyzed educational context. However, teachers frequently report limited time, uneven digital skills, and uncertainty about how to align materials with learning objectives. The practical implementation demonstrated that careful selection of a tool and clear instructional planning significantly improve both efficiency and coherence in material design.

Conclusions

Choosing appropriate digital tools and applying clear design criteria can help teachers create effective and accessible learning materials in secondary mathematics education. Practical guidance and targeted support are key to improving the quality of digital instructional resources.



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sciforum-172607: Educating Teachers for Multilingualism: A Critical Reflection

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Introduction: Multilingualism is a defining characteristic of contemporary classrooms, particularly in linguistically diverse contexts such as India. While policy frameworks advocate mother tongue-based instruction and multilingual pedagogies, the preparedness of teachers to respond effectively to linguistic diversity remains contested. This study examines how teacher education conceptualizes multilingualism and supports the development of teachers' professional multilingual competence across institutional and practical learning arenas.

Methods: The study adopted a mixed-methods design involving structured questionnaires and semi-structured interviews with pre-service and in-service teachers, along with an analysis of teacher education curriculum documents. Quantitative data were examined using descriptive statistics, while qualitative responses were analyzed thematically. The interpretation was guided by a critical pedagogical lens to explore the relationship between policy discourse, curriculum design, and classroom realities.

Results: Findings indicate that multilingualism is widely acknowledged as a social and educational reality; however, it is frequently framed as a general pedagogical concern rather than as a systematically developed professional competence. Teachers reported limited formal preparation in multilingual instructional strategies, translanguaging practices, and language-responsive pedagogy. Practical school experiences and personal linguistic backgrounds were perceived as more influential in shaping confidence than campus-based coursework. Curriculum analysis further revealed insufficient integration of applied multilingual frameworks.

Conclusions: The study concludes that educating teachers for multilingualism in India remains a complex but essential task. Strengthening curriculum design, integrating theory with practice, and providing structured experiential learning opportunities are necessary to bridge the gap between policy aspirations and classroom realities, thereby promoting inclusive and equitable multilingual education.



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sciforum-172958: Educating to Transform: Feminist Critical Digital Literacy in Teacher Professionalization

Pablo Cantero-Castelló

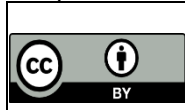
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This abstract is framed within a doctoral dissertation that examines the challenges of education in the twenty-first century, particularly at the intersection of digital training and identity construction in sociotechnical environments. In a context where digital interaction dynamics (e.g., likes, shares, trends, and comments) shape processes of socialization and identity formation, digital (Redecker, 2020), democratic (Evans et al., 2018), and educational competences (RD 126/2022; RD 218/2022), together with the requirements established for pre-service teachers (LOSU, 2023), call for preparation grounded in an intersectional gender perspective within the digital sphere.

In response to this need, the study analyzed the critical capacity of pre-service teachers through the examination of social media excerpts widely consumed by Generation Alpha. The research was grounded in Grounded Theory and Feminist Critical Discourse Analysis, complemented by a mixed-methods approach to data analysis.

Findings reveal a significant lack of critical digital competence from a gender-informed perspective, regardless of participants' gender identity. Notable resistance emerged regarding expressions related to new masculinities, transgender identities, and diverse sexual orientations. Low scores were also identified in areas concerning racialization, sexualization, gender roles and stereotypes, and affective-sexual relationships.

The study underscores the need to develop the SoGenDigCompEdu framework in order to foster comprehensive teacher education capable of promoting meaningful “onlife” social transformation.



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sciforum-167231: Educational Stakeholders' Perceptions of Factors Contributing to Resistance to Pedagogical and Policy Changes in Rural Schools

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The aim of this study is to explore the factors that contributes to educational stakeholders' resistance to pedagogical and policy changes in rural schools in the Bojanala District, South Africa. In this qualitative study, fifteen volunteers comprised of five members of the School Governing Body (SGB), five members of the School Management Team (SMT), and five Grade 12 learners were purposively sampled to participate in this study to share their lived experience concerning the phenomenon under investigation. The findings revealed various factors contributing to resistance to pedagogical and policy changes among educational stakeholders in rural schools. These factors included lack of understanding and awareness, cultural and traditional beliefs, Socioeconomic challenges and attitudinal and psychological barriers. In relation to the study at hand Lewin's Change Model have been adopted, an organization of actors, context, and opportunities, is applied to examine the factors facilitating resistance to change among major stakeholders in rural schools in Bojanala District. The study showed that the quality of teaching is being affected with regards to limited implementation of curriculum innovations, learner disengagement and low motivation, erosion of school culture and morale. To mitigate resistance, the study advocates for a multi-tiered integration strategy: establishing transparent stakeholder communication frameworks to align policy with local realities; institutionalizing sustained, context-specific professional development; and fostering transformational leadership capable of modelling pedagogical shifts within the unique socio-economic constraints of rural environments.



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sciforum-178705: Empowering Teachers to Foster Data Science Literacy for Civic Engagement and Social Justice, Design Based Approach

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In today's datafied world, the ability to critically interpret, analyze, and act on data is essential for civic participation and informed decision-making. However, data science literacy—recognized as both a scientific skill and a civic competency—remains underdeveloped in many school systems. The Erasmus+ project *Data Science Education in STEAM for Civic Engagement and Social Justice from the Early Years (DataScEd4CiEn)* (2023–2026) addresses this challenge by embedding data science into STEAM education for students aged 9–15. Coordinated by the European University Cyprus and funded by the Cyprus Foundation for the Management of European Lifelong Learning Programmes (IDEP), the project brings together partners from Cyprus, Greece, Ireland, Germany, and Spain to develop an innovative framework for integrating data science into STEAM curricula.

A central component of the project is a modular, blended professional development (PD) program designed to empower primary and secondary teachers to collaboratively design and implement data-rich STEAM learning scenarios addressing civic issues such as environmental justice, equity, and socio-economic challenges. Grounded in situated learning and a Communities of Practice approach, the PD program combines interactive workshops, case-based discussions, collaborative design activities, and hands-on exploration of digital tools such as CODAP, Gapminder, and Teachable Machine.

Using a design-based research (DBR) methodology, the study followed an iterative process involving two rounds of implementation and refinement of the PD program. Data from the first pilot implementation in Cyprus were collected through surveys, focus groups, teacher reflections, and classroom observations and analyzed to inform revisions to the course structure, content, and pedagogical strategies before the second implementation. This iterative process allowed the research team to refine the program based on classroom experiences and teacher feedback. Early findings indicate improved teacher confidence and capacity to foster students' data science literacy, ethical reasoning, and civic awareness through interdisciplinary STEAM learning.



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sciforum-171429: Enhancing Assessment Literacy in Polytechnic Educators Through Structured Pre-Service Training

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This study investigates the impact of a structured pre-service assessment training programme on the assessment literacy of polytechnic educators in Singapore. The training intervention, delivered as part of the Certificate in Teaching and Learning for Polytechnic Educators (CTLPE), comprised 18 hours of interactive tutorials over 6 months, covering Assessment Fundamentals, Feedback for Learning, Assessment Methods and Strategies, and Performance Assessments. These modules addressed critical competencies including assessment design aligned with intended learning outcomes, rubric development, formative and summative assessment implementation, and ethical assessment practices.

Using a mixed-methods research design, the study evaluated 58 pre-service educators from multiple disciplinary backgrounds through pre- and post-training surveys adapted from the Scale of Teacher Assessment Practices (STAP). The survey measured five domains of assessment literacy: selection and development of assessment methods, administering and scoring assessments, using assessment results for instructional decisions, ethical use of assessment, and communication of results to stakeholders.

Quantitative analysis revealed statistically significant improvements across all five domains, with effect sizes ranging from medium to large (Cohen's $d = 0.61$ to 0.96). The most substantial gains occurred in assessment administration and scoring ($d = 0.96$, large effect), where participants reporting certainty or high certainty increased from 20% to 60%. Assessment development and selection showed marked improvement ($d = 0.72$, medium-large effect), with confident participants rising from 22% to 61.3%. Mean scores increased significantly across all components: Component 1 (+0.63), Component 2 (+0.85), Component 3 (+0.59), Component 4 (+0.64), and Component 5 (+0.57), with all medians shifting from "moderately certain" to "certain" post-training. Qualitative findings revealed enhanced understanding of assessment principles, increased confidence in rubric design, and intentions to improve assessment practices through better alignment with learning outcomes.

The study demonstrates that structured pre-service training can meaningfully enhance assessment literacy among polytechnic educators. The findings support expanding practical application components, integrating technology tools, and establishing post-training support, including communities of practice and assessment clinics to sustain and further develop assessment competencies in practice-oriented tertiary education contexts.



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sciforum-169690: Evaluation of Teacher Formative Assessment Practices Scale in West Africa: A Multidimensional Approach

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Formative assessment is essential for improving instructional quality and supporting student learning, yet valid and contextually appropriate instruments for measuring teachers' formative assessment practices remain limited in West Africa. This study examined the dimensional structure and psychometric properties of the Teacher Formative Assessment Practices Scale (TFAPS) among in-service teachers in West Africa and identified the most appropriate multidimensional item response theory (MIRT) model for ordered-category data. Using a cross-sectional design, data were collected from 182 teachers in Ghana and Nigeria via an online survey. The TFAPS comprises 10 Likert-type items representing two theoretically grounded dimensions: teacher-directed and student-directed formative assessment practices.

To evaluate dimensionality, ordinal confirmatory factor analyses were conducted using maximum likelihood and weighted least squares mean and variance adjusted (WLSMV) estimators. Both two-factor and bifactor models demonstrated acceptable global fit; however, the bifactor model estimated with WLSMV showed superior fit, supporting a multidimensional structure with a substantive general factor. Based on this structure, multidimensional Partial Credit Models (PCM) and Generalized Partial Credit Models (GPCM) were estimated and compared using information criteria, limited-information fit indices, item-level statistics, and reliability estimates.

Results consistently favored the GPCM, which demonstrated better global and item-level fit, higher incremental fit indices, and slightly improved person reliability across both dimensions. Additionally, the GPCM yielded lower latent factor correlations, indicating clearer separation and enhanced interpretability of the constructs. Wright Map analyses revealed disordered thresholds and limited alignment between item difficulty and teacher ability, suggesting that the six-category response format may be overly granular. Overall, findings support the TFAPS as a psychometrically sound instrument in the West African context, with evidence favoring the GPCM and indicating the need for response-category refinement to improve measurement precision and practical utility.



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sciforum-173196: Fostering Holistic Education through Experiential Learning: A Phenomenological Study

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Experiential learning can usher a powerful blend that can transform the way we learn holistically. Experiential learning makes learning more engaging and relevant with projects, simulations, community-based activities, virtual trips, online teaching-learning activities etc. coupled with access to information and tools. This qualitative study unlocks the potential of experiential learning towards enhancing holistic education by exploring how students and teachers perceive, interpret, and experience holistic education in their unique ways. Drawing upon the theories of transformative learning and skills acquisition, the research explores the perceptions, lived experiences and interpretations of teachers (sample size-25) and undergraduate students (sample size-100) of social science discipline (comprising subjects like-Sociology, Political Science and Education). The study context includes randomly selected five Higher Educational Institutions (HEIs) of Kolkata, the capital city of the state of West Bengal in India that practice and advocate experience-based learning approaches. Data collection methods include in-depth interview, focus group discussion and document analysis of student work samples. The study follows ethical considerations from its planning to executions through informed consents and voluntary participation of the teachers and students. Data analysis includes transcription of interviews and focus group discussions verbatim, coding by identifying themes and patterns using coding techniques. Interpretation involves careful analysis of the interview transcripts to identify key themes, patterns, and structures in the participants' descriptions of their experiences. The analysis of the coded data (qualitative) would encourage to develop insights and draw conclusions, thereby ascribing to realize and understand how experiential learning contributes to the development of cognitive, social-emotional, and personal-ethical dimensions of holistic education. The present study intends to recommend educators and institutional leaders about the potential of experiential learning to foster critical thinking skills, problem solving skills, analytical skills, decision making skills, team building and collaborative skills to thrive in the dynamic society.



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sciforum-173276: From Compliance to Reconfiguration: Reflective Writing and the Re-Education of Ethnic-Racial Relations in Pre-Service Teacher Formation at the Federal University of São Carlos (UFSCar), Brazil

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This paper examines reflective journals written by pre-service teachers enrolled in a course on Ethnic-Racial Relations Education (ERER) in Brazil as a privileged archive for observing how racial identities are constructed, avoided, negotiated, and reconfigured within teacher education. Rather than treating the journal as a confessional narrative, we approach it as a situated pedagogical technology in which school memory, family genealogy, normative language, and theoretical frameworks intersect. Students are invited to articulate Brazil's legal framework for ethnic-racial education with their own racial self-location, tracing family histories, silences, migrations, and experiences of racialization.

Drawing from a broader corpus of 113 journals and a curated analytical sample of 18 texts, the study identifies recurring narrative and affective patterns that reveal how the legal mandate for ethnic-racial education is translated—or neutralized—within everyday schooling. Findings show that compliance often coexists with curricular ornamentation, superficial adhesion, euphemistic language, and the transformation of structural racism into administrable “cases.” At the same time, the journals document moments of rupture, pedagogical intervention, and durable displacement capable of reorienting professional trajectories.

We argue that effective implementation of ethnic-racial education in teacher preparation requires more than normative alignment; it demands a precise pedagogical lexicon capable of distinguishing surface adherence from implication, representation from curricular redistribution, and presence from belonging. By naming the micro-mechanisms through which racial hierarchies persist or are interrupted, teacher education can move from performance to structural reconfiguration.

Methodologically grounded in ethical rigor and reflexive analysis, this study contributes to debates on teacher education by proposing that documenting and naming these mechanisms is itself a form of institutional responsibility and pedagogical care.



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sciforum-178728: From NetLogo to LLMs: A Decade of STEM Integration Professional Development and an Emerging Verification Competency Model for Educators

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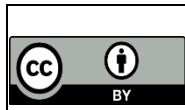
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Introduction. Educators report that the hardest part of integrating new technology into STEM instruction is knowing how to control it and understand its outputs. This finding recurs across a decade of the authors' research, from agent-based modeling with NetLogo, through micro:bit programming, through NSA-funded GenCyber camps where most participants embedded cybersecurity in their classrooms, to statewide CS integration (WySLICE) and an NSF-funded RET site (WySTACK). Each intervention introduced a different technology; each exposed the same bottleneck. Generative AI amplifies this: LLMs produce fluent, plausible content requiring verification skills most STEM educators have never been taught.

Methods. This study synthesizes data across multiple STEM integration PD cohorts. Pre/post self-efficacy measures from earlier WRNN sessions and GenCyber follow-ups provide baseline trajectories. An NSF-funded Noyce workshop series scaffolds a three-stage competency progression: AI-assisted curriculum design, verification of AI-generated STEM content, and applied integration, all using AI tools within authentic disciplinary practice. Instruments capture self-efficacy, verification confidence, and implementation intent. University data (128 course experiences, nine semesters) contextualize the policy environments educators are preparing students to enter.

Results. Across cohorts and technologies, verification-focused sessions produce the largest self-efficacy gains. Educators completing full progressions describe goals differently than single-session participants, framing AI as something students need to evaluate rather than a tool that saves planning time. University data reinforce this: engineering students in courses with no explicit AI policy report the lowest clarity and highest uncertainty about academic integrity.

Conclusions. Each new technology introduced to educators, NetLogo, micro:bit, GenCyber platforms, and LLMs, required the same scaffolding: guided adoption, structured verification, and disciplinary integration. Self-efficacy gains become most apparent at the verification stage, with novices most challenged by output evaluation. This technology-agnostic competency model, grounded in longitudinal evidence, offers PD designers a replicable framework for whatever classroom technology comes next.



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sciforum-168088: From Tool to Pedagogy: Proposing a Training Model for AI-Integrated English Language Teaching in Vietnamese Secondary Schools

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The rapid emergence of Generative Artificial Intelligence (GenAI) has introduced a transformative paradigm shift in language education globally. However, within the specific context of Vietnamese secondary schools, the adoption of these technologies remains predominantly instrumental rather than pedagogical. While a growing number of English as a Foreign Language (EFL) teachers are leveraging AI tools for administrative expediency—such as streamlining lesson planning, creating exercises, or translating materials—they significantly lack the methodological frameworks and official guidance necessary to deploy these tools ethically and effectively for student-centered learning. Addressing this profound disconnect, this paper proposes a comprehensive, competency-based professional development model designed to facilitate a critical shift from passive tool adoption to active, strategic pedagogical integration.

Grounded in the theoretical underpinnings of the TPACK and DigCompEdu frameworks, the study draws on a rigorous mixed-methods inquiry involving surveys of 100–150 teachers and 15 in-depth interviews with practitioners in Da Nang city, Vietnam. The findings reveal an urgent need for structured guidance, particularly in the areas of assessment design, material adaptation, and digital ethics. Consequently, the proposed model introduces a robust "Four-Pillar Competency Framework" that encompasses Technical Competence, Digital-Pedagogical Competence, Assessment Competence, and Ethical-Legal Competence. This framework is operationalized through a practical three-module training curriculum that guides teachers from mastering basic AI tools to integrating them into the teaching of the four language skills and conducting automated assessments. By prioritizing pedagogical intent over mere technical proficiency, this study offers a scalable, evidence-based roadmap for policymakers and teacher educators to foster a generation of AI-literate practitioners capable of meeting the demands of the new General Education Program.



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sciforum-140002: From Trash to Class: Teaching Kindergarten Mathematics Using Child-authored Repurposed Materials.

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Repurposed materials in early childhood mathematics refer to manipulatives made from recyclable or reusable items that, in this study, were co-created by children in the classroom with teacher facilitation to support developmentally appropriate, hands-on numeracy learning. This study investigates the pedagogical value of integrating student-generated repurposed manipulatives into kindergarten mathematics instruction in a government school in the United Arab Emirates (UAE). Using a mixed-method design, the research examined growth in key emergent numeracy competencies, verbal counting, one-to-one correspondence, number identification, numeral comparison, and number combinations, among children aged 4–5. Participants included 62 KG-1 and 70 KG-2 students, and 12 Mathematics teachers. Quantitative evidence was generated through pre- and post-assessments to determine learning gains following implementation. To capture the affective and behavioural dimensions of learning, attitude measures were triangulated with classroom observations and analysis of student artefacts produced during learning-centre activities. Teachers' perceptions of feasibility, instructional impact, and sustainability alignment were explored through interviews. Findings indicate statistically significant improvements in children's emerging mathematical performance, alongside increased engagement, creativity, and problem-solving behaviours during interactive tasks. Teachers perceived the approach as strengthening mathematical participation while meaningfully advancing sustainability practices within early years settings. The study contributes evidence that child-authored, repurposed learning resources can function as both a numeracy intervention and a sustainability-oriented pedagogy, with implications for scalable professional development for teachers supporting high-quality implementation in early childhood classrooms.



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sciforum-178851: Influence of the Coach's Self-Defined Profile and Mode of Action in School-Age Football Training

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School-age football represents a key tool for the comprehensive development of young people, as it combines physical, technical, tactical, and psychosocial aspects. However, various studies show that coaches tend to use traditional methodologies that limit meaningful, contextualised, and player-centred learning. In this regard, it is emphasized that realistic tasks should be designed, with opposition and a playful approach, to foster decision-making, group cohesion, and participant motivation. Likewise, it is important to delve deeper into research that analyzes coaches from different categories within the same sports club, in order to better understand the methodological and pedagogical coherence of the training process. Therefore, this study aimed to analyze the self-defined profile and mode of action of four school-age football coaches from the same sports club. A quantitative and descriptive approach was adopted to determine the coaches' self-defined profile: (i) Coach Orientation Questionnaire; (ii) Coach Knowledge and Skills Questionnaire; (iii) Coach Decision Questionnaire; and (iv) Coach Planning Style Questionnaire, and the Integral System for Training Task Analysis (SIATE, acronym in Spanish) to analyze 169 tasks. For this purpose, descriptive statistical analyses and studies of associations between the examined variables were performed. The results indicate that the coaches mainly identify with traditional and technological profiles, display predominantly democratic leadership styles, and use flexible planning. Likewise, the tasks designed are mainly based on real game situations, with numerical equality, high player participation, and an integration of technical-tactical components. In conclusion, it is recommended to reinforce ongoing coach training, promoting a balance among practical experience, academic foundation, and pedagogical leadership to optimise the comprehensive development of school-age football.



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sciforum-163826: Journey between Poles: Built-in Tension in the Teaching Profession as Fostering Critical and Reflective Thinking for Pre-Service Teachers

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This research deals with the tension between conflicting values and the teacher's behavior as a movement across sequences to promote an optimal classroom climate. The purpose of this qualitative phenomenological study was to examine the contribution of critical thinking about classroom atmosphere to students in their practical training for teaching. The teachers' role is full of tensions and contradictions, and navigates between different needs and demands from parents, students, colleagues, and superiors. Optimal navigation between these poles and tensions may assist the teacher in creating an optimal educational climate in the educational setting. The study examined the perceptions of female teaching students regarding the tensions in their work during practical experience. The research tools were conversations between the course instructor and focus groups from within the course and reflective diaries – written by the students in the course forum throughout the year. Participants were 75 teaching students at the Israel Teacher Training College who studied in the course "The Educator's Personal and Professional Identity" as part of training in special education. The study was conducted in 2023-2025. The students were asked to point out aspects of daily life in the classroom that express each of the axes, and to suggest an additional axis that they believe is missing and should appear. Awareness of the existence of opposing and conflicting aspects of a teacher's work in the context of classroom management and establishing a pleasant and optimal classroom climate is extremely significant in the teaching training phase. This awareness helped the participants to understand the complexity of the profession and anticipate future difficulties. The research indicates a growing basis for critical thinking how to integrate the poles on each axis for the well-being of the student, the teacher, and the educational framework. Especially in special education.



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sciforum-178621: Knowing but Not Acting: The Paradox of Sustainability Consciousness Among Pre-Service Teachers

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Prospective educators represent one of the most strategic populations in the global effort to advance Education for Sustainable Development (ESD). As future transformative pedagogical agents, they are not only required to possess mature sustainability knowledge and attitudes but are also expected to model sustainable behaviors that can be observed, internalized, and emulated by students. However, the scientific literature has documented a persistent gap between stated sustainability awareness and actual practice—a phenomenon that is particularly crucial when it comes to those tasked with educating the next generation. This cross-sectional descriptive-correlational survey study examined the Knowledge-Attitude-Practice (KAP) profiles of 159 teaching students at universities in West Nusa Tenggara, Indonesia. Data were collected through a 37-item dichotomous (agree/disagree) instrument covering three dimensions of sustainability: knowledge (15 items), attitudes (10 items), and behavior (11 items), supplemented by one factual item on the SDGs. The findings revealed very high mean scores for knowledge ($M = 94.0\%$) and attitudes ($M = 96.4\%$), but significant behavioral deficits ($M = 91.6\%$). More critically, only 59.7% of respondents correctly identified the number of SDGs, a result that contradicts their high conceptual scores and reveals a gap between declarative and structural knowledge. Spearman correlation analysis demonstrated a significant positive relationship between knowledge and behavior ($r_s = 0.712$, $p = 0.001$) and between attitudes and behavior ($r_s = 0.769$, $p = 0.001$). Further item-level analysis revealed that physical sustainability behaviors, particularly active transportation (76.1%) and recycling practices (84.3%), showed the largest gaps with stated normative commitments. These findings challenge simplistic assumptions embedded in the current ESD framework.



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sciforum-175800: Modelling the Interplay among Students' Perceived Teacher Support, Self-Esteem, and Demotivation in English Learning

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The persistent challenge of demotivation within the realm of English as a Foreign Language (EFL) education has become a focal point for researchers, given its detrimental impact on student engagement and long-term academic achievement. Understanding the psychological antecedents of this phenomenon is critical for developing effective intervention strategies. This research specifically delves into the intricate interplay between demotivation, self-esteem, and students' perceived English teacher support, constructing a conceptual framework to examine how various dimensions of teacher support influence demotivation through the mediating mechanism of self-esteem.

This quantitative study involved a sample of 628 senior high school students from northern China. Data were meticulously collected using validated Likert-scale questionnaires assessing three core dimensions: perceived English teacher support (emotional, instrumental, and academic), self-esteem, and demotivation. The complex structural relationships among these latent variables were examined using Structural Equation Modeling (SEM).

The findings revealed a nuanced picture of teacher influence: emotional support and instrumental support were found to significantly and indirectly reduce demotivation by bolstering students' self-esteem. This suggests that when students feel psychologically secure and practically assisted, their self-worth increases, creating a buffer against demotivating factors. In contrast, academic support did not yield a significant effect on either self-esteem or demotivation in this specific context. These results underscore the vital importance of the affective and practical dimensions of teaching. The study concludes that fostering a supportive emotional climate and providing tangible learning tools are essential for enhancing learners' self-esteem and, consequently, mitigating the erosion of motivation in the English language classroom.



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sciforum-171180: Personalized Professional Learning through a Master's Degree: Learning Disabilities Specialists

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Introduction: Experienced teachers pursuing graduate specialization in learning disabilities (LD) anticipate profound professional transformation. However, while acquiring advanced diagnostic frameworks and evidence-based interventions, many encounter a "practice-gap" when re-entering schools. This reflects the tension between individual expertise and organizational contexts where formal support for specialist roles is often absent. Drawing on Avidov-Ungar's (2024) multidimensional personalization framework, this study examines how LD specialists navigate professional development following an MA degree, specifically under conditions of structural isolation and limited institutional recognition.

Methods: We conducted semi-structured interviews with 15 MA-qualified LD specialists in Israel (13 in schools, 2 in private practice). The study utilized a retrospective qualitative design, focusing on professional learning trajectories, post-degree integration, and perceptions of organizational support. Data were analyzed using abductive thematic analysis, mapping the interplay between individual agency and systemic constraints.

Results: Findings reveal a recurring "Organisational Void", a systemic lack of professional supervision or peer consultation that fails to reinforce graduate-level expertise. To bridge this gap, specialists engage in what we term Compensatory Personalization. Individual initiative and self-sourced resources, ranging from peer networks and social media groups to generative AI tools, substitute for missing institutional infrastructure. While this enables immediate functioning, it places heavy emotional and professional burden on specialists, leading to a precarious "migration of expertise" where highly qualified professionals increasingly turn toward private practice.

Conclusions: The study conceptually distinguishes Supported Personalization, fueled by organizational scaffolding, from Compensatory Personalization, which relies solely on individual resilience. We argue that for specialist expertise to be sustainable within public education, systems must move beyond individual resourcefulness toward structural integration. Implications for policy-making and teacher retention in specialized fields are discussed.



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sciforum-178700: Prepared or Unprepared? Examining the Effectiveness of Special Educational Needs Teacher Training Programs in Inclusive Education Context

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This study examines Special Educational Needs (SEN) teachers' perceptions of how adequate, relevant, and effective their training programs are. The research is guided by Kolb's Experiential Learning Theory, which emphasizes the importance of learning through experience and reflection. A qualitative research design was used, involving thirteen SEN teachers from different regions of Malaysia who participated in semi-structured interviews. Although the sample size was relatively small, thematic saturation was reached, allowing for an in-depth understanding of participants' experiences. The collected data were analyzed using Braun and Clarke's six-step thematic analysis framework, developed by Virginia Braun and Victoria Clarke. To ensure the credibility of the findings, the study applied strategies such as member checking, peer debriefing, and maintaining audit trails. The analysis revealed three major themes. First, the practical relevance of training to classroom needs, including skills related to behavior management, differentiated instruction, and authentic assessment. Second, systemic challenges, such as inconsistent mentorship, limited teaching resources, and weak professional collaboration. Third, contextual gaps in training content, particularly regarding its alignment with Malaysia's cultural environment and national education policies. While some teachers appreciated hands-on workshops and inclusive education modules, others reported feeling insufficiently prepared to handle the realities of classroom practice. The findings are discussed in relation to Malaysia's developing inclusive education policies that involve many SEN teachers working in multiple roles with little support from their institutions. In addition, the overall research highlights the need for the development of training programs that are in accordance with policies, relate to local contexts, and are regularly updated for the purpose of preparing teachers and improving outcomes for students with disabilities.



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sciforum-177912: Promoting Teachers' Wellbeing through Gamified Learning: Qualitative and Quantitative Evidence from the Teaching to Be Project

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Teacher wellbeing has become a growing concern in educational research and policy, particularly in light of increasing professional demands and the heightened emotional pressures experienced by teachers in recent years. The Teaching to Be (T2Be) project was developed to address this challenge by translating research on teacher wellbeing into an innovative professional development programme combining reflective learning and gamification. The programme includes an Online Wellbeing Course (OWC) centred on a serious game designed to foster teachers' socio-emotional competences and promote sustainable professional wellbeing.

This contribution presents findings from two complementary studies examining teachers' experiences with the programme and its effectiveness. Study 1 explored teachers' perceptions of the OWC through focus group interviews conducted with participants who completed the intervention. Thematic analysis highlighted several perceived benefits, including increased emotional awareness, stronger self-care practices, improved empathy and communication with students and colleagues, and greater reflective capacity when dealing with challenging classroom situations. Participants reported that the serious game format facilitated engagement and allowed them to experiment with emotionally complex scenarios in a safe and reflective environment. Study 2 quantitatively evaluated the effectiveness of the intervention using a quasi-experimental pretest/posttest design involving a large sample of Italian teachers assigned to either an intervention group or a waiting-list control group. Results showed significant improvements in teachers' socio-emotional competence and self-efficacy, together with a significant reduction in perceived stress among participants who completed the OWC. Mediation analyses indicated that increased self-efficacy played a key role in explaining the reduction in stress levels.

Overall, the findings provide mixed-methods evidence supporting the potential of gamified professional development programmes to enhance teachers' psychological resources and wellbeing, offering promising implications for teacher training and whole-school approaches to wellbeing.



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sciforum-173027: Reframing the Concept of Gravity in Teacher Education: Bridging Vedic and Classical Sanskrit Insights with Newtonian and Quantum Theories

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Introduction:

Re-examining fundamental scientific ideas through indigenous intellectual traditions provides significant scope for innovation in teacher education. This paper critically explores the conceptualization of gravitational force in Sanskrit literature, tracing its development from Vedic cosmology in the Rigveda to systematic astronomical discussions in the Siddhanta Shiromani by Bhāskara II [1]. The notion of gurutva (attractive force) described in these sources presents a qualitative understanding of gravitational attraction, which may be pedagogically aligned with later scientific formulations.

Methods:

The study employs qualitative textual analysis and comparative hermeneutics. Primary Sanskrit sources were examined alongside foundational works of modern physics, including *Philosophiæ Naturalis Principia Mathematica* by Isaac Newton (1687) and the General Theory of Relativity proposed by Albert Einstein (1915). Conceptual correspondences were analyzed within a teacher education framework to evaluate their curricular and epistemological relevance for pre-service and in-service teacher training.

Results and Discussion:

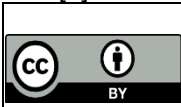
The findings indicate that classical Sanskrit scholars articulated a reasoned qualitative account of Earth's attractive property and spherical structure. Although lacking mathematical formalization comparable to Newton's inverse-square law (Newton, 1687) [2], these interpretations reflect an early awareness of centripetal attraction. Einstein's relativistic reconceptualization of gravity as spacetime curvature further broadens the comparative dialogue. Integrating these historical-scientific perspectives into teacher education promotes interdisciplinary engagement, strengthens epistemological reflection, and supports culturally responsive science teaching.

Conclusions:

Incorporating Sanskrit perspectives on gravitational thought into teacher education enriches science curricula by situating modern physics within a broader global intellectual history. Bridging insights from Vedic and classical traditions with Newtonian mechanics and emerging quantum gravity discourse fosters reflective, inclusive, and conceptually integrated science pedagogy.

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sciforum-178924: Reimagining the Transition from Basic Education Teaching to Higher Education Lecturing: Insights from Early Career Academics

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Although extensive literature captures the experiences of established academics, far less attention has been paid to the transitional journeys of early career academics entering the field of teacher education. This paper foregrounds the voices of novice lecturers of English, who have moved from teaching in Basic Education (BE) to lecturing in Higher Education (HE).

The study investigates how these emerging academics navigate the complexities of HE while drawing on their prior professional identities and competencies shaped in BE. Using a qualitative research design, the study incorporates semi-structured interviews, solo vlogs, and visual reflective artefacts to uncover the thematic challenges that surface during this transition. These include the need to recalibrate pedagogical approaches, respond to increasingly diverse and vulnerable student cohorts, and translate BE teaching expertise into the distinct demands of HE.

Early findings reveal that foundational skills developed in BE often serve as stabilising resources, supporting novice lecturers as they cultivate adaptive and resilient teaching practices within HE. Anchored in *Transformative Learning Theory*, the research underscores the significance of supportive institutional structures, evolving professional identities, and ongoing development opportunities in shaping resilient academic trajectories during times of systemic disruption.

By offering a narrative inquiry into how early teaching experiences inform and transform tertiary teaching practice, this paper contributes valuable insights for educational leaders, policymakers, and teacher-education scholars seeking to strengthen resilience and quality within HE settings navigating persistent and emerging crises.



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sciforum-173158: Rethinking Teacher Professional Development for Inclusive Practice: A Collaborative Design Approach

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Collaborative work among teachers is widely recognized as a key factor for professional identity and sustainable school change. When teachers collectively engage in reflecting on practice, developing alternative pedagogical approaches, and responding to daily challenges, they strengthen their professional autonomy and capacity to transform educational processes into concrete interventions. This perspective aligns with the vision of schools as learning communities, encompassing cognitive, ethical, and relational dimensions of learning. This study aimed to identify teachers' conceptions of inclusive practices and to develop a professional development plan grounded in effective approaches. The research addressed: teachers' conceptions of inclusive practices; challenges and advantages associated with their implementation; and strategies for student engagement. A mixed-methods design was adopted: a World Café with 22 teachers generated data to inform a continuous professional development plan, later validated by 10 teachers. Content analysis revealed that, although inclusion is widely recognized as essential, its enactment is frequently framed as contingent upon external conditions, indicating a tendency to position inclusion outside teachers' immediate sphere of agency. These findings expose a critical gap between inclusive values and pedagogical action, suggesting that professional development must explicitly address underlying beliefs about responsibility, efficacy, and student diversity. Moreover, the results indicate that structured collaborative spaces can operate as transformative arenas where teachers not only exchange strategies but also critically interrogate assumptions, negotiate meanings, and reconstruct professional identities. The proposed plan integrates Differentiated Instruction and Universal Design for Learning as complementary, practice-oriented frameworks. Its positive evaluation ($M = 3.9$; $SD = 0.51$) suggests relevance and feasibility; however, its impact depends on sustained, context-sensitive implementation. The study further implies that effective professional development requires longitudinal engagement, distributed leadership, and organizational conditions that legitimize experimentation, risk-taking, and reflective inquiry. Ultimately, it reframes professional learning as a collective, inquiry-driven, and identity-forming process, central to fostering equitable and genuinely inclusive school cultures.



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sciforum-178053: Rethinking Teacher Professional Development for Inclusive Practice: A Collaborative Design Approach

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Collaborative work among teachers is widely recognized as a key factor for professional identity and sustainable school change. When teachers collectively engage to reflect on practice, develop alternative pedagogical approaches, and respond to daily challenges, they strengthen their professional autonomy and ability to transform educational processes into concrete interventions. This perspective aligns with the vision of schools as learning communities, in which learning involves not only cognitive development but also ethical and relational dimensions. Within this framework, student participation is considered a priority; however, evidence indicates variability in the extent to which students and their families are genuinely involved in meaningful decisions that affect them.

This study aimed to identify teachers' conceptions of inclusive practices and develop a professional development plan based on approaches considered effective. The research questions addressed: i) teachers' conceptions of inclusive practices; ii) the challenges and advantages associated with their implementation; and iii) effective strategies for engaging students in classroom activities.

A mixed methodology was adopted. A World Café with 22 elementary school teachers generated data that underpinned the design of a continuous professional development plan, which was subsequently validated by a panel of 10 elementary and high school teachers. Content analysis revealed that, although inclusive practices were generally regarded as essential, their implementation was often perceived as dependent on external or structural conditions, raising questions about the extent to which they are conceived as a shared pedagogical responsibility.

The proposed professional development plan incorporates Differentiated Instruction and Universal Design for Learning as collaborative strategies that respond to diversity. Its positive evaluation (M= 3.9; SD= 0.51) suggests potential as a viable framework for professional learning. However, rather than presenting a prescriptive model, the findings invite critical reflection on professional development not as technical training, but as a transformative process central to building more inclusive educational communities.



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sciforum-178687: Smartphone-Assisted Pocket Experiments in Teacher Education for Promoting Inquiry-Based Science Learning

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Introduction:

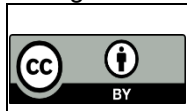
In recent years, particularly after the COVID-19 pandemic, many students have become increasingly disengaged from conventional classroom learning while spending substantial time using digital technologies, especially smartphones. Although smartphones are often considered a source of distraction, their widespread presence also provides an opportunity to integrate technology productively into the learning process. Teacher education programs therefore need to equip future educators with strategies to transform commonly used digital devices into effective educational tools. This study proposes a classroom-oriented approach in which smartphone-assisted, low-cost “pocket” experimental setups are used to demonstrate scientific concepts and enhance students’ involvement in science learning.

Methods:

The proposed activity utilizes a compact experimental setup suitable for classroom demonstration and student participation. A simple droplet-based apparatus is used to measure the surface tension of liquids, which in turn helps estimate the concentration of dissolved impurities in water. The method can serve as an alternative or complementary approach to conventional polarimetry, which is mainly limited to optically active solutions. In this experiment, droplets produced from a burette or syringe are recorded using a smartphone camera, and droplet formation and detachment are analyzed through video-based visualization techniques. The recorded data enable estimation of droplet parameters and facilitate discussion of key theoretical concepts such as surface tension, density, viscosity, gravitational acceleration, and Reynolds number. Visual analysis tools assist students in observing and interpreting experimental phenomena more effectively.

Results:

Classroom implementation indicates that smartphone-assisted pocket experiments successfully combine theoretical explanations with real-time measurement and visualization. Students demonstrate increased interest and engagement when familiar technology is incorporated into experimental activities. The approach improves conceptual understanding and encourages curiosity, critical thinking, and creativity. For teacher trainees, the activity highlights how low-cost experimental strategies can be used to teach complex scientific concepts effectively, particularly in educational settings with limited laboratory infrastructure.



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sciforum-170087: Sociodemographic Differences in Teachers' Rationales for Using Active Learning Methodologies: A Descriptive Phenomenological Qualitative Study in Spain

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Active learning methodologies have become a key approach to addressing contemporary educational challenges. However, teachers' rationales for implementing these methodologies are not uniform and may differ depending on sociodemographic and professional characteristics. This study explores the purposes and underlying rationales teachers attribute to active learning and examines differences by sex, age, educational level, and disciplinary field. A qualitative study with a descriptive phenomenological design was conducted using an open-ended survey. A total of 1,067 Spanish teachers participated through non-probability snowball sampling. Data were collected via an online questionnaire (Google Forms) and analyzed inductively through qualitative content analysis supported by NVivo. Twelve categories were identified within a central meta-category on rationales for active learning. Comparative matrices were then developed to examine patterns across sociodemographic variables. Student motivation and improved learning outcomes emerged as the most frequent rationales across all groups. Male teachers placed stronger emphasis on motivation, achievement, and competency development and expressed greater concern about ethical issues and risks associated with technology use. Female teachers more often highlighted contextualized learning, inclusion, student-centered participation, and pedagogical innovation. Age-based differences showed that teachers under 35 prioritized student agency, innovation, and relevance to contemporary contexts, whereas older groups emphasized effectiveness, academic performance, and competency development, with the oldest group also stressing personalization and autonomy. Disciplinary differences revealed that Health Sciences and Engineering emphasized professional preparation, performance, and practical relevance, while Arts/Humanities and Social/Legal Sciences favored participatory, reflective, and meaning-oriented purposes. By educational level, primary education focused on inclusion and holistic development, vocational education on applied competencies and employability, and official language schools on contextualization, communication, and interaction. Teachers' rationales for active learning vary systematically across sociodemographic and contextual factors, supporting the need for differentiated professional development policies aligned with teacher profiles and institutional contexts.



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sciforum-168704: Supporting Teachers in Crisis Contexts: INGO Interventions in Education and Health in Afghanistan (2020–2025)

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This study examines how International Non-Governmental Organizations (INGOs) supported teachers in Afghanistan during a period of prolonged crisis from 2020 to 2025, with particular attention to education and health interventions. Ongoing political instability, economic decline, and humanitarian challenges significantly affected teachers' professional conditions, well-being, and capacity to deliver quality education. In response, INGOs played a critical role in sustaining educational activities and supporting teachers in both formal and community-based learning environments.

Adopting a qualitative, descriptive approach, the research draws on secondary sources including INGO reports, policy briefs, and academic literature. The analysis reveals that INGOs implemented a range of interventions aimed at strengthening teacher capacity, such as professional development, provision of teaching and learning materials, and psychosocial support. In addition, health-focused initiatives addressing physical safety, hygiene, and mental health were integrated to reduce barriers that hinder effective teaching and learning.

The findings underscore the interconnected nature of teacher education and health in crisis contexts and demonstrate how integrated INGO interventions contributed to teacher resilience and continuity of education. This paper contributes to teacher education discourse by highlighting practical lessons for designing responsive support systems for teachers working in fragile and conflict-affected settings.

INGOs strengthened teacher resilience by integrating education and health support in crisis contexts



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sciforum-178269: Supportive Behavior of Senior University Teachers Aged Over 45

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The characteristics and supportive behaviour of senior human resources in higher education are a relevant topic in society, with a growing number of aging people. The role and the number of university teachers increase with the expansion, massification, and internationalization of higher education. A scoping systematic review of teacher research, covering the period 2010-2019, highlighted a gap in empirical, evidence-based research in this field. In our previous research, we analysed academics' work-life conflict and found a negative correlation with the institutional social support factor. I explore here two research questions: What are the characteristics of senior academic workers? How do they support fellow teachers in their career development? We consider "seniors," teachers, and researchers working in different higher education fields aged 45 or above. The Centre for Higher Education Research and Development – Hungary collected data from universities in Romania, Hungary, Slovakia, Serbia, and Ukraine using a questionnaire titled Central and Eastern European Teachers in Higher Education (CEETHE 2023). We analysed the data using SPSS (principal factor analyses and correlations). 432 respondents were seniors aged 45 and older. More than half of teachers discussed educational, scientific, or other topics with a fellow teacher or worked as a co-author in a research group. Not characteristics discussions about future plans; to arrange a meeting outside of work; or support in preparing for a doctorate, habilitation, or tender. The majority of seniors (56%) did not work with a fellow teacher on an online workspace. Principal component analyses yielded two factors: 1) informal conversations and 2) working partners' behaviour. There is a significant and positive correlation between informal conversations and work satisfaction; working partnership relations with working hours, and multiple roles of teachers. Working partnership behaviour and mentor relations with a fellow are additional roles that require additional work and time.



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sciforum-178664: Teachers' Interest, Self-Confidence, and Ability to Integrate Historical Scientific Instruments into Their Teaching

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This study examines the interest, self-confidence, and ability of primary and secondary school teachers to integrate historical scientific instruments into their teaching practices. The research was conducted within the framework of the European Erasmus project INSIGHT, which promotes the educational use of historical scientific instruments in science education.

The research sample consisted of 25 primary and secondary education teachers who participated in a 26-hour professional development seminar. Of these, 20 teachers completed the questionnaire and were included in the quantitative phase of the study.

The seminar combined four face-to-face laboratory workshops with 18 hours of asynchronous distance learning. The workshops focused on: (a) introducing the educational use of historical scientific instruments, (b) integrating Inquiry-Based Learning (IBL) approaches into teaching, (c) reconstructing historical scientific instruments using simple materials, and (d) reflecting on teaching practices and learning experiences. During the asynchronous component, participants explored project resources, selected a historical instrument for further study, and developed educational materials based on it.

The study adopts a mixed-methods design, combining quantitative and qualitative approaches. The quantitative component uses a retrospective pre–posttest design, while the qualitative component includes semi-structured interviews. Data were collected through a structured questionnaire containing Likert-scale statements, multiple-choice questions, and open-ended responses.

At this stage, the analysis focuses exclusively on questionnaire data. Initial findings indicate a strong positive impact of the INSIGHT project on teachers' interest, confidence, and ability to integrate historical scientific instruments into teaching. Participants reported increased access to educational resources, improved pedagogical skills, and high overall satisfaction. Hands-on activities, historical context, and practical guidance emerged as the most influential aspects of the program.

A more comprehensive presentation at the conference will include the full questionnaire analysis and findings from the semi-structured interviews.



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sciforum-178929: Teaching English to Very Young Learners: Insights from Pre-Service Teachers in Ecuador

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Practicum programs provide pre-service teachers with the skills and competencies to navigate the teaching experience effectively. The insights gained from three pre-service teachers participating in a practicum program aimed at instructing very young learners within the Ecuadorian context are invaluable for understanding the iterative process that student teachers engage in and informing necessary adjustments to educational programs. This study involved six-semester students enrolled in the Pedagogy of National and Foreign Languages at an Ecuadorian public university and sought to explore their experiences during the practicum. Data was collected through document analysis, a written narrative with a visual component, and semi-structured interviews. The collected data was analyzed thematically using grounded theory. The findings revealed a cyclical process experienced by the pre-service teachers, beginning with their initial emotions and teaching beliefs and culminating in a sense of fulfillment regarding their experiences, consisting of six specific stages. Special emphasis was placed on psychological factors, such as managing emotions before and during the teaching experience, highlighting the need to incorporate this emerging issue into teacher development within higher education programs. The study also emphasizes the importance of linking theory and practice as a continuous process to better prepare future English teachers for real-world classroom environments.



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sciforum-172923: The Instrument of Discursive Analysis: A Heuristic Tool Supporting the Educational Community

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In a social context increasingly marked by individualistic behaviors, conflictual language, and a common lack of ethical passion, it has become urgent to examine how students engage in dialogue and co-construct meanings. Consequently, educational practice requires educational tools that support teachers – from preschool through secondary school – in understanding specific conversational dynamics among students.

This contribution aims to address this need by proposing a research-validated tool that highlights how students dialogue with one another. This tool is the *Instrument of Discursive Analysis* (Mortari & Silva, 2018; Mortari, 2001): a heuristic and educational instrument that, by embracing the Empirical Phenomenological Method (Mortari et al., 2023), allows for capturing the essence of discursive acts and the conversational profile that emerge during classroom dialogue.

The objective is to provide operational guidelines regarding the *Instrument of Discursive Analysis*, adaptable to the context of educational practice. Thus, the study empowers teachers by introducing a tool for daily classroom use that supports systematic observation of verbal exchanges, identification of conversational moves, and characterization of the conversational profile of the group-class. To support this proposal, the results of an educative research study at school are presented, featuring the implementation of the *Instrument of Discursive Analysis* in a student conversation on ethical concepts.



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sciforum-178810: The Educational Potential of the EduSpaces Laboratories: A Multilingual and Interdisciplinary Initiative at the Free University of Bozen-Bolzano (Italy)

Stefania Moser

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The EduSpaces are a network of educational laboratories located at the Free University of Bozen -Bolzano (Italy), characterized by plural disciplinary perspectives and multilingual orientations. Their activities integrate research, teaching, and third-mission initiatives, with the shared objective of fostering a continuous exchange between theoretical reflection and educational practice. The network originated within a collaborative project involving four partner institutions (2016–2019) and has expanded since 2022, currently comprising nine laboratories operating across pedagogical, disciplinary, historical-documentary, cognitive, psychological, artistic, environmental, linguistic, digital-media, and children's-literature fields.

The EduSpaces are conceived as both physical and conceptual learning environments. Their design is informed by educational research that emphasizes the role of the lived body in learning processes and critically addresses mind-body dualisms. On this theoretical basis, the present contribution investigates the educational and formative potential of the EduSpaces through the framework of Embodied Education.

Within the contemporary educational landscape—marked by global challenges that call into question the purposes of education and by the fragmentation of knowledge into separate disciplinary domains—the EduSpaces initiative proposes an alternative understanding of education as a multidisciplinary and transdisciplinary process. At the same time, it foregrounds the situated nature of learning, emphasizing the socio-territorial contexts in which educational practices take place. From this perspective, embodied learning processes are understood as emerging through interactions with place, community, and context-dependent meaning-making within higher education settings.



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sciforum-145963: The Impact of Digital Literacy Training Programs on Teachers' Instructional Quality in Kaduna State.

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This study assesses the impact of digital literacy training programs on teachers' instructional quality in public secondary schools across Kaduna State, Nigeria. Driven by the imperative of the Fourth Industrial Revolution and national digital transformation policies, the research addresses a critical gap in empirical evidence regarding the effectiveness of these initiatives. Employing a convergent parallel mixed-methods design, quantitative data were gathered through structured questionnaires administered to 1148 teachers from 12 purposively selected secondary schools across Kaduna State's three senatorial zones, drawing from a larger pool of 7700 teachers recruited in 2022. Teacher participation for questionnaires utilised convenience sampling, and quantitative data were analysed using simple statistical methods. Complementing this, qualitative data were obtained from a focus group discussion with both experienced and newer staff, and in-depth interviews with 12 principals, who were purposively selected from across the state's senatorial zones. Findings reveal that while digital literacy training demonstrably holds substantial potential to improve instructional quality by fostering engaging, personalised, and collaborative learning environments, its effective integration is significantly hampered by pervasive systemic barriers within Kaduna State's educational system. Challenges identified include inadequate ICT infrastructure such as lack of functional devices, unreliable internet access, frequent power outages), insufficient and often impractical teacher professional development, persistent funding gaps, and varying teacher attitudes and motivation towards technology adoption. The study concludes that these obstacles are deeply interconnected; suggesting that isolated interventions will not yield sustainable improvements in instructional quality. The paper recommends sustained and strategic investment in ICT infrastructure, coupled with the design and delivery of continuous, context-specific, and pedagogically-focused training programs that not only build technical proficiency but also cultivate digital pedagogical competence.



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sciforum-170174: The Role of Teacher-related Factors in Critical Language Assessment Literacy Among Moroccan EFL Teachers

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In the last couple of years, researchers' interest in teachers' language assessment literacy (LAL) has grown significantly. Although there has been a noticeable increase in scholarly attention to teachers' LAL, little empirical research has been conducted on how teacher-related factors, such as academic qualification and teaching experience, influence its critical dimension. This highlights a clear gap, which the present study seeks to address. In light of this, the present study aims to examine the extent to which teachers' academic qualification and teaching experience influence their Critical Language Assessment Literacy (CLAL). To this end, the study employed a cross-sectional quantitative design. To collect the data, a validated scale of CLAL was administered to 194 Moroccan EFL teachers from various high schools using a combination of purposive and snowball sampling procedures. To analyze the data, both descriptive and inferential statistics were used. The results revealed that while there were no significant differences in teachers' CLAL based on academic qualifications, statistically significant differences were found across groups of teachers with different levels of teaching experience, which indicates that CLAL is influenced by teaching experience. The findings are important as they offer implications and insights for pedagogical and policy practices, particularly in shaping assessment-driven teacher training and educational policy in Morocco.



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sciforum-173123: Turning Pages into Voices: Supporting Listening and Speaking and Affective Growth in Intermediate Phase English

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Intermediate Phase reading often emphasises reading aloud and comprehension tasks, which can heighten anxiety, limit participation, and reduce authentic speaking and listening opportunities. Drama reading provides a context in which these affective challenges can be addressed while simultaneously developing oral engagement. This paper reports on Cycle Two of a Participatory Action Learning and Action Research (PALAR) project, investigating how pre-service English teachers integrated listening and speaking into drama reading lessons to support learner motivation, confidence, and reduce anxiety. Drawing on Transformative Learning Theory (TLT) and Krashen's Affective filter hypothesis, the paper explores how scaffolded reading activities can transform learners' participation and encourage reflective teaching. Cycle One focused on reflection: pre-service teachers explored their school English experiences, analysed prior teaching strategies, and reflected on their teaching practices. Cycle Two progressed to collaboratively designing strategies and implementing them during Teaching Practice. Data were collected from pre-service teachers' lesson plans, reflective journals, and a group discussion. Thematic analysis examined how listening and speaking were incorporated, how learners responded affectively, and indications of changes in teachers' pedagogical approaches. Findings indicate that pre-service teachers viewed drama reading as providing a scaffolded environment in which oral engagement could occur safely, supporting learner participation and confidence. They reflected that learners appeared more willing to participate, remained engaged, and seemed less anxious, while the pre-service teachers themselves reported increased confidence in facilitating listening and speaking activities and a transformation from teacher-led recitation to more dialogic, interactive approaches. Although balancing curriculum pacing with extended discussion was challenging, drama reading fostered learner motivation, confidence, and reduced anxiety. The study also highlights how reflective, collaborative practice within PALAR can help pre-service teachers support learners' engagement and oral confidence.



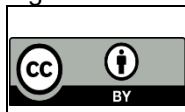
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sciforum-156386: What is Culturally Responsive and Sustaining Teaching Practice through Primary Science in Aotearoa New Zealand

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The need for better education through science is not a new idea in Aotearoa New Zealand. Through several curriculum changes 1993 and 2007, and currently now in 2025 teachers have not been well supported by the Ministry of Education in how to implement these changes. The Education and Training Act 2020 requires all classroom teacher to demonstrate how they are culturally responsive in their planning and teaching. Schools and their teachers are to embed as reasonably as possible te reo me ngā tikanga, te ao, and Mātauranga Māori (te reo Māori = the Māori language, tikanga = the ways of being Māori, te ao = the Māori worldview, Mātauranga Māori = the Maori knowledge systems). In addition, the governing body that registers teachers and renews teaching certificates in New Zealand, The Teaching Council, requires teachers to demonstrate year-on-year how they are working to be more culturally responsive in their teaching practice as they demonstrate a commitment to Te Tiriti o Waitangi (the treaty signed in 1840 between the Crown and Māori). This presentation will report on how teachers and preservice teachers in an Initial Teacher Education programme are being supported to have more culturally responsive and sustaining teaching in their classroom practice. Specifically, it will report on how to meaningfully and non-tokenistically weave together both science curriculum and Mātauranga Māori (Indigenous knowledge).



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sciforum-172939: When Confidence Meets Context: How Qualification Pathway and First-Career Status Shape Teachers' Digital Tool Use

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As digital technologies become increasingly central to classroom instruction, teachers are expected not only to possess digital competence but also to translate that competence into effective instructional practice. However, growing evidence suggests a persistent gap between teachers' digital self-efficacy and their actual classroom use of digital tools. This study examines how teachers' professional backgrounds shape this confidence–practice relationship by focusing on two key contextual factors: qualification pathway and first-career status. Using data from 1,094 U.S. teachers nested within 149 schools from the TALIS 2024 dataset, we employed multilevel modeling to investigate how digital self-efficacy and digital attitudes predict classroom digital tool use and how these associations differ across teacher subgroups. Results indicate that both digital self-efficacy and digital attitudes are strong, positive predictors of classroom digital use. While qualification pathway and first-career status show limited direct effects, they play an important moderating role. Teachers who entered through traditional qualification pathways and had prior professional experience demonstrated the strongest alignment between digital confidence and classroom practice. In contrast, first-career teachers—particularly those entering through alternative routes—exhibited a weaker translation of digital self-efficacy into instructional use, revealing a pronounced confidence–practice gap. These findings suggest that teachers' ability to enact digital competence depends not only on individual beliefs but also on their preparation and career backgrounds. Implications highlight the need for differentiated induction and professional development supports, especially for first-career teachers in alternative pathways, to help bridge the gap between perceived competence and classroom implementation of digital tools.



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