Dennis Gabor Memorial Year

Erasmus+

FTFL2026

THE FUTURE OF TEACHING THE FUTURE OF LEARNING

ABSTRACT VOLUME

FTFL2026

THE FUTURE OF TEACHING
THE FUTURE OF LEARNING

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GÁBOR DÉNES UNIVERSITY

DIGITAL HORIZONS

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- **Päiv Håkkinen** – Professor, University of Jyväskylä – The Future of Learning and Collaboration in the Age of AI
- **Terhi Rikke Toft Nørgård** – Associate Professor, Aarhus University, DPU – Between imagination and innovation: envisioning and engaging the future with hopepunk higher education
- **Márta Takács** – Professor, Hungarian University of Agriculture and Life Sciences, Szabadka – AI × Education: Everywhere, at Every Level – From Everyday Tools to Transformative Innovation in Learning

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- **Vanessza Kapusi (online)** – A multimodal learning environment in the Digital Horizons
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PLENARY SESSIONS

SAME PLATFORM, DIFFERENT JOURNEYS: TALENT, MASS AND MICRO-LEARNING

Krisztina Zimányi – Rita Ősz
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Abstract: Higher education is undergoing a paradigm shift driven by digital transformation, artificial intelligence, and changing learner profiles shaped by lifelong learning and study-work integration. In this evolving context, the future of teaching asnd learning requires new digital educational methodologies that rethink institutional roles, learning environments, and pedagogical practice. This presentation explores how open education models, micro-credentials, and AI-supported learning systems are reshaping teaching and learning in higher education. Using the Hungarian context as a representative case, it highlights the growing presence of working learners and the resulting demand for flexible, modular, and technology-enhanced learning pathways. Particular attention is given to the pedagogical implications of controlled versus unregulated AI use, including challenges related to learning quality, digital information overload, and academic responsibility. The presentation argues that future higher education will increasingly serve differentiated learner groups. A talent oriented learning pathway is emerging that prioritizes deep knowledge, academic quality, and learning supported by micro credentials, while open education formats become more prominent for a broader target audience. Finally, the presentation examines the evolving balance between on-site and online learning, emphasizing the continued pedagogical and psychological value of physical presence—such as immediacy, trust, and adaptive feedback—alongside digital platforms. It outlines the key methodological and technological requirements of a shared educational ecosystem that responsibly integrates AI and immersive technologies to support the future of teaching and learning.

Keywords: future of teaching, future of learning, digital educational methodology, artificial intelligence in education, open education, micro-credentials

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THE FUTURE OF LEARNING AND COLLABORATION IN THE AGE OF AI

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Abstract: Generative artificial intelligence (GenAI) is increasingly entering classrooms and educational institutions. AI can substitute existing instructional approaches while maintaining equivalent instructional functionality, augment instruction by providing additional cognitive learning support, or redefine learning tasks to foster deeper learning processes. However, its educational use also raises critical concerns. Inappropriate implementation may lead to inversion effects, such as over-reliance on AI that reduces students' cognitive engagement. Moreover, successful AI integration depends on several moderating factors, including students' AI literacy as well as teachers' technological, pedagogical, and ethical competencies. Despite growing interest in AI-supported learning, little is known about how GenAI reshapes collaborative learning. Human–AI–human collaboration can be conceptualized as a triadic system that includes student–student, student–AI, and group–AI interactions. At its best, AI progresses from a passive support tool toward an active socio-cognitive and collaborative partner. Recently, collaborative processes between humans and AI have been discussed under the concept of Hybrid Intelligence (HI). HI holds the potential to augment both individual and collaborative learning processes by providing synergistic human–AI system that performs better than either human-only or AI-only systems. This keynote presentation provides conceptual, empirical, and pedagogical design insights into the perspectives described above, focusing on the impact of AI on learning and collaboration and the extent to which AI can transform collaborative learning processes.

Keywords: AI in education, human-AI collaboration, Computer-Supported Collaborative Learning (CSCL), Generative artificial intelligence (GenAI)

BETWEEN IMAGINATION AND INNOVATION: ENVISIONING AND ENGAGING THE FUTURE WITH HOPEPUNK HIGHER EDUCATION

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Abstract: Higher education is increasingly asked to "innovate" while living in an era shadowed by "grimdark" trajectories of market-driven managerialism and neoliberal decay: performative metrics, platformised learning, instrumental AI, and futures narrowed to what is measurable or scalable. Higher education becomes a present haunted by its "lost futures" - promises of imaginative and inventive thinking, exploratory and experimenting practices, and communal solidarity and care - promises that return as maintenance, surveillance, or disappointment. This keynote proposes a "Hopepunk Higher Education": an imaginative, utopian strategy that persists and resists amid "entrepreneurial innovation" and institutional uncertainty. It transforms the ruins of the academy into an "imaginative playground," where fragmented promises of the past and glimpses of desired futures are reassembled into possibilities in the present. To engage such wider and wilder futures, we must rewild educational technology and rewiden our imagination to think, do, and be "otherwise". By fostering hopepunk higher education practices, we can engage technology as a site for exploring and experimenting with materialising our imagination. Hopepunk higher education begins in the in between: between what the university has been and what it could become; between the technologies we inherit and the technologies we might cultivate. It treats educational technology as a relationship rather than a tool. By engaging hauntological "ghostpitality" - hospitality that welcomes the ghosts of promised but lost futures – and utopia as method for "dreamcasting" the future rather than forecasting it, we are invited to "fall in love with the world we want to change," and to become "hopepunk architects" of higher education as a place of social dreaming, collective visioning, and futures worth making real- and to examine what they enable, whom they include, and what worlds they presuppose. Through principles and practices for hopepunk futurescaping - from speculative play with technologies to communal imagination playgrounds, this keynote offers a hopepunk repertoire for academics - students, teachers, and leaders alike - asking: If hope is a discipline and utopia a method, then how can higher education become a place where imagination and innovation is not a shiny surface but academic infrastructure - and where its practices are measured by the futures it dares to make possible?

Keywords: hopepunk, higher education, imagination, innovation, futures thinking, utopia as method, educational technology, speculative pedagogy

"AI × EDUCATION: EVERYWHERE, AT EVERY LEVEL" - FROM EVERYDAY TOOLS TO TRANSFORMATIVE INNOVATION IN LEARNING

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Abstract: Artificial intelligence is rapidly transforming education at all levels – from primary and secondary schools to higher education and lifelong learning. AI is already embedded in everyday educational practices, from personalized learning platforms and automated assessment tools to content generation and student support systems. One of the many critical questions related to it is how and where the teaching of AI tools themselves should be integrated into the education systems of the future. It is expected that AI literacy will have to become a core competency, so it is important to consider how it can be embedded in the curriculum and what role educators, institutions and social frameworks should play in this process. It is important to consider the broader implications of AI for teaching and learning: how it is reshaping the role of educators, re-qualifying essential skills, and raising new ethical and pedagogical challenges. Particular attention is paid to balancing opportunities and risks, including issues such as academic integrity, trust, and overreliance on technology. The continued engagement with AI ultimately challenges educators and policymakers to not only respond to AI, but also to actively shape how it is taught, understood, and responsibly integrated into the future of learning.

Keywords: artificial intelligence, education, AI literacy, pedagogy, lifelong learning, ethical implications, teacher roles, educational innovation

1. HORIZONS

ASSESSING COMPUTATIONAL THINKING IN SCHOOLS: IS IT EVEN POSSIBLE TO TEST THE MIND?

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Abstract: In current educational policy, the development of computational thinking is regarded as a key competency, the systematic assessment of which requires valid and reliable diagnostic tools. This paper presents the results of an extensive study focused on the construction, psychometric validation, and standardization of a computational thinking test designed for fifth-grade elementary school students in the Czech Republic. Based on a systematic analysis of international theoretical frameworks and an empirical survey of teachers, an operational definition of computational thinking was developed, comprising three latent dimensions: Algorithmic Thinking, Abstraction and Debugging, and Syntax and Coding. Based on this definition, a 12-item test was constructed, which was pilot-tested and subsequently administered to a sample of 741 students. Psychometric analyses confirmed the instrument's high internal consistency ($\alpha = 0.813$) and adequate construct validity. The study also includes the creation of percentile norms and a proposed classification scale enabling the interpretation of individual results. Analyses further showed that the level of computational thinking is not statistically significantly influenced by the students' gender or age, with the highest performance recorded in the Syntax and Coding dimension. This entry offers not only a new standardized tool for diagnosing computational thinking but also a detailed demonstration of methodological procedures relevant to the construction and validation of educational assessment tools.

Keywords: computational thinking, elementary education, assessment, psychometrics, test development, algorithmic thinking, coding education, educational measurement

BUILDING DIGITAL COMPETENCE FOR THE FUTURE OF LEARNING: INSIGHTS FROM PRE SERVICE AND IN SERVICE EFL TEACHERS IN INDONESIA

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Abstract: As teaching roles evolve in response to new digital learning environments, rapid digitalization is transforming how teachers design, deliver, and sustain language learning. This study investigates how 125 pre service and 125 in service EFL teachers in Indonesia engage with digital tools and to understand how these patterns inform the future of teaching and learning EFL in Indonesia. As digitalisation reshapes pedagogical models, understanding teachers' digital literacy becomes essential for designing responsive Professional Teacher Development (PTD). At this study, digital tool usage was analysed across eight domains: teaching material sources, learning management systems, vocabulary applications, online dictionaries, academic reference sites, quiz platforms, social media, and communication tools. The findings reveal that pre service teachers demonstrate an exploratory, self development oriented digital profile that rely heavily on online dictionaries, vocabulary applications, and open access instructional resources. This reflects a focus on strengthening linguistic competence and preparing for future teaching roles. In contrast, in service teachers rely on institutionally embedded technologies, particularly learning management systems and quiz platforms. These apps and websites support classroom organization, assessment, instructional delivery, and communication with students. Despite these differences, both groups exhibit limited use of academic reference sites, suggesting that academic digital literacy remains underdeveloped. This indicates a persistent gap in academic digital literacy. These results contrasting patterns highlight the need for differentiated PTD pathways. For the pre service teachers, they require structured digital pedagogy and academic literacy training in transitioning from personal digital use to pedagogically grounded integration. Meanwhile, for the in service teachers need to advance toward data driven and research informed digital practices. The study offers insights into how digitalization reshapes teaching roles and informs future PTD design.

Keywords: Digital Competences, Pre-Service Teacher, In-Service Teacher, PTD, EFL, Indonesia

THOUGHTS ON ARTIFICIAL INTELLIGENCE FOR TEACHERS

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Abstract: In this lecture, we approach from a new aspect the sources and the expected development of artificial intelligence. Our starting point is still human creation, which is driven by common sense, the striving for omnipotence of power, and the unlimited nature of the capitalist economy. Artificial intelligence is based on the anthropomorphic model according to the current state of science, i.e., it tries to imitate human thinking and behavior. The basis of human intelligence is the human brain, and the computer for artificial intelligence. People organize themselves into societies according to rules and morality. Common sense contradicts the need to provide machines with such self-organizing ability, and human goals do not require it. This performance tries to explore the difference and possible convergence of the two intelligences. At the same time, it always establishes the superiority and responsibility of man. The unethical, the destruction, is caused by man, the power, even if it is done by machines with intelligence.

Keywords: artificial intelligence, machine learning, human intelligence, formal logic, automated decision-making, danger

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TEACHER BURNOUT AND RE-ENGAGEMENT IN HUNGARIAN SECONDARY EFL EDUCATION IN DIGITALLY CHANGING EDUCATIONAL CONTEXTS

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Abstract: As education undergoes ongoing digital and methodological transformation, increasing attention must be paid not only to innovation in teaching and learning, but also to the wellbeing of teachers expected to adapt to these changes. This qualitative study explores burnout among English as a Foreign Language (EFL) teachers in Hungarian secondary schools, focusing on its impact on teacher engagement, the coping strategies teachers employ, and the ways in which they re-engage professionally after periods of exhaustion and reduced motivation. Drawing on in-depth interview data, the research examines how teachers interpret stress, emotional strain, and professional renewal within changing educational environments. The findings suggest that burnout and engagement are not fixed opposites, but part of a dynamic process shaped by institutional expectations, interpersonal relationships, and evolving professional demands. Participants reported coping through boundary-setting, emotional regulation, collegial support, and reflective practice. Re-engagement was linked to supportive leadership, positive student relationships, increased autonomy, and opportunities for meaningful professional development. In the context of educational transformation, the study argues that sustainable innovation depends not only on tools and methods, but also on the capacity of teachers to remain engaged and supported. The paper contributes to current discussions on sustainable pedagogy, teacher resilience, and the human dimensions of change in contemporary education.

Keywords: teacher burnout; teacher engagement; teacher wellbeing; digital transformation; coping strategies; EFL teachers; secondary education; sustainable pedagogy;

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BREAKING THE "SILENT CODER" STEREOTYPE: INFORMATION SYNTHESIS AND PROFESSIONAL VISIBILITY THROUGH ELEVATOR PITCHES IN ICT EDUCATION

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Abstract: In the current technological landscape, a critical paradox has emerged: while AI tools can instantly summarize vast amounts of data, the human capacity for information synthesis—the ability to discern, prioritize, and articulate core value—is rapidly declining. This is particularly evident in ICT education, where communication has traditionally been a primary weak point. This presentation shares the findings of a large-scale pedagogical initiative where 2,500 student elevator pitch videos were analyzed across four distinct curricula to evaluate the development of communication and synthesis competencies.

The data reveals a profound behavioral evolution among students. Initial stages were characterized by high levels of reluctance and "technological hiding," where students struggled to speak without stuttering or relying on jargon. However, through the iterative process of recording pitches for every project, a clear trajectory was identified: from initial hesitation to active involvement, and from fragmented delivery to clear, well-structured professional communication.

Central to this discussion is the role of information synthesis as a high-level cognitive competency. As AI increasingly automates the "summary" task, students are losing the "mental muscle" required to weigh information and build a persuasive narrative. This study argues that the elevator pitch is an essential "anti-fragile" tool in the AI era. It forces the human learner back into the loop, requiring them to physically and mentally internalize their technical work and translate it into a concise, high-impact message. The presentation will detail the qualitative shifts observed in the 2,500-video dataset, providing evidence that structured, video-based reflection is one of the most effective tools for restoring professional agency and ensuring that ICT graduates can authentically demonstrate their real capabilities in a competitive, AI-driven market.

Keywords: Information Synthesis, AI-Augmented Education, Pedagogical Longitudinal Study, Metacognitive Development, ICT Communication Gap

Keywords: virtual reality, cybersecurity, digital trust, critical infrastructure

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TEACHING BEYOND REALITY: AI AVATARS, VIRTUAL CAMPUSES AND THE NEXT GENERATION OF EDUCATION

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Abstract: Artificial intelligence is rapidly transforming higher education, opening new possibilities through AI-powered digital teachers, avatar-based instruction, and immersive virtual campus environments. These technologies can make learning more interactive, accessible, and personalized, while also redefining the role of educators in the digital age. This presentation explores the emerging concept of AI-supported education and introduces early research conducted at Gábor Dénes University, where students tested digital teacher avatars in MR and VR learning environments, including hybrid remote teaching scenarios. The talk offers a practical glimpse into how AI and immersive technologies may shape the next generation of university education.

Keywords: artificial intelligence, higher education, AI avatars, virtual campus, immersive learning, mixed reality, virtual reality, digital pedagogy

LINGUISTIC CHARACTERISTICS OF AI-GENERATED AND HUMAN-PRODUCED TEXTS

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Abstract: Generative chatbots have become popular in the field of education among both students and educators for many different purposes. This study investigated the differences in linguistic complexity and cohesive indices between AI-generated and human-produced argumentative essays [1]. A corpus of 113 argumentative essays, composed by EFL undergraduate students [2], was compiled and compared to a corpus of 100 argumentative essays generated by ChatGPT. It was found that ChatGPT-generated essays showed the linguistic characteristics of the academic genre to a greater extent than essays composed by EFL students. Most importantly, ChatGPT-generated argumentative essays were significantly more diverse and varied than human-produced essays. As far as cohesion is concerned, only half of the cohesive devices showed greater values for the AI-generated texts. This talk concludes with pedagogical implications for educators in the field of applied linguistics.

Keywords: AI-generated writing, linguistic complexity, cohesion

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FROM DATA TO UNDERSTANDING: USING ARTIFICIAL INTELLIGENCE AND REAL-TIME ECONOMIC DATA IN PUBLIC FINANCE AND ECONOMICS EDUCATION

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Abstract: Artificial intelligence is increasingly transforming not only public administration and business but also the teaching of economics and public finance. This presentation examines how artificial intelligence tools can support practical economic education by helping students connect theory with current economic realities. The presentation draws on the author's dual perspective as an academic teacher and a public finance practitioner. It discusses how artificial intelligence can be used to prepare teaching materials and analyze current macroeconomic changes. Particular attention is paid to the use of real-life examples such as inflation, interest rates, public debt, local government finances, and economic policy uncertainty. Artificial intelligence should be considered not as a substitute for academic teaching, but as a tool that helps teachers design more engaging, data-driven, and practice-oriented learning experiences. The main conclusion is that the future of economics education will depend on access to artificial intelligence tools and on teachers' skills in using them pedagogically. AI can enhance education by supporting understanding and discussion—rather than replacing human judgment.

Keywords: artificial intelligence, economics education, public finance, real-time data, data-driven learning, pedagogical innovation, practical learning, macroeconomic analysis

HUMAN-IN-THE-LOOP COMMUNICATION: REPOSITIONING COMMUNICATION PEDAGOGY IN AI-DRIVEN EDUCATION

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Abstract: The growing use of artificial intelligence (AI) tools in higher education is changing how students produce written work and how learning is assessed. As generative AI systems are now able to produce coherent academic texts, writing on its own is no longer a dependable indicator of student understanding. This development calls for a reconsideration of how learning is demonstrated and evaluated. This paper introduces the concept of human-in-the-loop communication as a pedagogical framework that places communication, not writing alone, at the centre of learning validation. The framework presents learning as a cyclical process involving three interconnected elements: human cognitive foundations (clarity, structure, audience awareness), AI-supported practice (drafting, structuring, feedback, idea development), and human validation (speaking, discussion, and reflection). Within this model, AI functions as a support tool in the learning process, while human communication remains the primary means through which understanding is made visible and assessed. Drawing on classroom practices in applied sciences and international business education, the paper demonstrates how communication-based assessment formats, such as presentations, peer discussions, and opponent-based feedback, can better capture students' reasoning, adaptability, and depth of understanding. These approaches reflect the realities of AI-supported learning environments while maintaining academic integrity and meaningful assessment. The paper contributes to current discussions on AI in education by offering a practical and transferable framework for redesigning teaching and assessment. It argues that the future of education lies not in resisting AI, but in designing learning environments that distinctly emphasise human communicative competence.

Keywords: Human-in-the-loop communication; artificial intelligence in education; communication pedagogy; assessment in higher education; generative AI; student learning; oral communication; applied sciences education

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ARTIFICIAL INTELLIGENCE IN LANGUAGE TEACHING: OPPORTUNITIES, CHALLENGES, AND FUTURE PERSPECTIVES

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Abstract: Foreign language learning plays an important role in our lives, and artificial intelligence (AI) is increasingly becoming part of this process (Godwin-Jones, 2023. This pilot study revealed how language learners and teachers perceive the role of AI in language education, as well as their attitudes on language teachers' future. It examined whether AI could replace teachers or whether their role will remain essential, what tasks AI models are used for, which teaching skills are considered indispensable, and what threats participants might identify. The study also investigated AI's role in personalized learning and its potential contribution to digital inequalities. The findings revealed mixed attitudes. While many participants considered AI efficient for specific tasks, they emphasized the significance of teacher presence. Only a few teachers actively integrate AI, whereas others have limited knowledge. More than half of the learners reported uncertainty about their AI skills and expressed concerns. Teachers highlighted issues such as low digital competence, lack of resources, and data security. The results suggest that successful AI integration depends more on attitudes than age. Overall, the study highlights that AI can support language learning but cannot replace teachers. Its potential to promote equal opportunities requires well-designed educational policies, targeted training, and adequate support.

Keywords: artificial intelligence, foreign language learning, role of language teachers, digital competence, personalised learning

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2. NEXUS

TRANSFORMATION OF LEARNING OPPORTUNITIES IN DIGITALLY MEDIATED HIGHER EDUCATION ENVIRONMENTS

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Abstract: Over the past decade, the learning opportunities and environments available to higher education have undergone significant transformation as a result of the expansion of digital technologies. Learning activities are increasingly taking place in fragmented, shorter segments, while students simultaneously use multiple digital platforms (Molnár & Szűts, 2019/1.). Learning is becoming increasingly platform-based and often supported by mobile devices. This process of knowledge transmission occurring simultaneously across multiple platforms creates new challenges for both teaching and self-regulated learning. At the same time, the diversified flow of information presents considerable challenges for students in terms of achieving a deeper understanding of the learning material. In parallel with these changes, the role of teachers and the required pedagogical competencies are also evolving (Buda, 2017). In addition to traditional knowledge transfer, increasing emphasis is placed on the conscious design of digital learning environments, the tutoring of learning processes, and the support of students' self-regulated learning, including the necessity of professional mentoring. Developing digital pedagogical competence and effectively utilizing ICT opportunities—particularly ensuring coherence across different platforms—has become a key responsibility for educators. In line with these didactic changes, transversal teacher competencies are also gaining importance, such as critical thinking, problem-solving, collaboration, digital literacy, and adaptability (Dringó-Horváth, T. Nagy, & Weber, 2021). These competencies not only enhance the effectiveness of the learning process but also become essential prerequisites for success in a rapidly changing labor market environment. The aim is to explore how digitally mediated learning environments reshape the structure of learning, teacher roles, and the scope of competencies to be developed, and to identify what pedagogical responses these changes necessitate in higher education.

Keywords: digital learning environments, higher education, self-regulated learning, teacher roles, digital pedagogy, transversal skills, learning design

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ARTIFICIAL INTELLIGENCE AND TEACHERS IN DEBRECEN

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Abstract: Artificial intelligence (AI) offers numerous opportunities for educators (Celik et al. 2022), enabling more effective, accessible, and personalised teaching and learning than ever before (Binhammad et al. 2024). At the same time, the use of AI based solutions may also entail several negative consequences. For example, they may induce cognitive laziness (Fan et al. 2025), contribute to digital fatigue (An et al. 2025), and raise various ethical and legal concerns. Despite these drawbacks, the expansion of AI cannot be halted; it is appearing in an increasing number of forms and subfields within education. Whether AI is used—or not used—is no longer primarily a technical issue; rather, it is largely shaped by teachers' attitudes and knowledge, which strongly influence how AI is integrated into teaching and learning. In our research conducted in the schools of the Debrecen School District Centre (n = 32), we examined how teachers relate to artificial intelligence and what advantages and disadvantages they perceive in its application. We mapped their knowledge and personal experiences with this emerging innovation, as well as the extent to which AI-based solutions have become part of their pedagogical practice. In 2024, 535 teachers, and in 2025, 638 teachers completed our online questionnaire. The data indicate significant progress both in AI-related knowledge and in the conscious use of AI; however, the responses also reveal several areas where further development is needed. In the planned presentation, we intend to present the detailed findings and insights of our research.

Keywords: artificial intelligence, teachers, research, online questionnaire

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THE COMPETENCY-REDUCING EFFECT OF USING ARTIFICIAL INTELLIGENCE IN INSTRUCTIONAL DESIGN WORKFLOWS

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Abstract: In the field of instructional design, the integration of generative artificial intelligence (AI) carries the risk of professional competency erosion alongside increased efficiency. A central element of this broader phenomenon is cognitive offloading, which can lead to a decrease in individual cognitive engagement and mental passivity. [1] The unstructured use of AI tools may lead to a long-term decline in performance, as users are relieved of the challenges associated with complex pedagogical synthesis and critical analysis. [2] While the speed of AI-supported workflows increases, conceptual depth and didactic coherence may be compromised. [3] The shift in the instructional designer's role from an autonomous creator toward an editor overseeing generated content raises the risk of professional competency decline. [4] The primary research question is how AI influences the various phases of the ADDIE model in terms of the supplementation, extension, or replacement of competencies, and what subjective competency loss developers identify in their daily practice. A pilot empirical study was conducted (N=64), based on an online questionnaire consisting of 9 questions. The sample comprised students who either graduated from (46%) or are currently enrolled in (54%) a specialized postgraduate program in e-learning development. The questionnaire focused on the mode and quantity of AI usage, the extension and replacement of competencies, the identification of competency loss, and metaphorical descriptions of the software. The average weekly workload in instructional design shows no significant correlation with the estimated extent of AI usage ($r=0.07$, $p>0.05$). Furthermore, the intensity of usage is essentially independent of the duration of experience since the first AI use ($r=-0.18$, $p>0.05$). AI is primarily used for brainstorming, generating text content, and creating course outlines; meanwhile, its use for learning support, testing, and data analysis is not significant. These latter results may have been influenced partly by the specific characteristics of the training and partly by professional expectations arising during work. The risk of skill degradation is most pronounced in the Design phase, which involves the highest degree of pedagogical decision-making. Nearly half of the respondents perceive competency loss, primarily in textual operations. Conversely, competency expansion was reported in media production and text generation processes. While AI currently serves as a functional aid, the perceived competency loss and the significant involvement of the design phase validate the cognitive risks outlined in the theoretical framework.

Keywords: Instructional design, Artificial intelligence, Competency loss

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LEARNING ENVIRONMENT AND DROPOUT - EXAMINING STUDENT PERCEPTIONS

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Abstract: The spread of digitalization and online learning formats has led to significant transformations in higher education learning environments in recent years. In research on student dropout, alongside structural and institutional factors, approaches have also emerged that emphasize students' subjective experiences and perceptions as potential explanatory dimensions of dropout processes (Tinto, 1993; Qvortrup et al., 2024). Some studies suggest that students' perceptions of their learning conditions may be related to student persistence (Nasner et al., 2022; Segovia-García et al., 2022). The study is based on a questionnaire survey conducted among first-year students entering a Hungarian higher education institution. The analysis focuses on student-reported learning conditions, with particular attention to access to digital devices, the availability of a quiet study environment, and perceived difficulties that may hinder academic progress, including perceived digital competence. The analysis applies descriptive statistical methods as well as non-parametric and regression techniques. The results suggest that certain aspects of student-reported learning conditions may be associated with dropout risk, although their effects are not equally clear across all examined dimensions. The study contributes to the institutional-level understanding of student dropout by highlighting the role of subjective aspects of the learning environment.

Keywords: higher education dropout, learning environment, access to digital devices, digital competence, student perceptions

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LONGITUDINAL RESEARCH ON DIGITAL COMPETENCIES IN HIGHER EDUCATION

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Abstract: In our presentation, we report on a comprehensive longitudinal applied research series conducted between 2023 and 2025, examining the digital competences of higher education instructors and students, their patterns of digital platform use, and their attitudes towards artificial intelligence (AI). The research design of the institutionally representative research combines internationally validated measurement instruments – DigCompEdu for instructors [1] and DigCompSat for students [2] – with institution-specific practical task sets and attitudinal surveys. Data collection was carried out over three consecutive years with a substantial sample size. Between 2023 and 2025, a total of 22,988 individual certificates were issued, including 1,117 in instructor assessments and 21,871 in student assessments. Data were collected primarily through online questionnaires administered via the Neptun (UniPoll) system, supplemented by secondary data derived from the university's digital platforms (Neptun and CoSpace) [3]. The key innovative features of the research programme include: Multi-layered competence assessment: In addition to DigComp-based self-reflective questionnaires, practical task sets were used to assess participants' actual performance and applied knowledge. Certificates: based on the measurement results, we provided 5-10 pages of personalized, developmental, reflective feedback, which is unique in higher education research. AI focus: From 2024 onwards, particular emphasis was placed on investigating the practical use of artificial intelligence and related attitudes across both target groups. Comparability: Special attention was given to the representativeness of the findings and the limitations of longitudinal comparison, with particular regard to modifications in questionnaire design and the reliability of the samples. The findings provide more than a cross-sectional snapshot of digital maturity; they offer evidence-based input for the development of higher education digitalisation strategies, while also highlighting the differences between instructor and student competences.

Keywords: digital competence, longitudinal assessment, institutional representative research, applied research, mixed methods

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THE HIDDEN USE OF GENERATIVE ARTIFICIAL INTELLIGENCE IN ELEMENTARY SCHOOLS. DIFFERENCES BETWEEN STUDENT USE AND TEACHER PERCEPTIONS

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Abstract: Nowadays there is growing interest in how artificial intelligence (AI) is being used by stakeholders in education. Generative AI is playing an increasingly significant role in supporting teaching and learning processes, as well as in creating personalized learning opportunities (Jauhiainen & Garagorry Guerra, 2024). These tools can contribute to the development of students' autonomy and open new possibilities in the teaching-learning process (Almohesh, 2024). The literature primarily focuses on higher education. In secondary education as well, the focus is typically on teachers (Kreijkes et al., 2026), while empirical research targeting elementary school students is limited (Chen et al., 2023; Jauhiainen & Garagorry Guerra, 2024). The aim of this study is to explore how elementary school students use generative AI and to what extent this differs from teachers' perceptions. The study is based on a questionnaire survey comprising responses from students and teachers in grades 3-8 at a rural elementary school. The results show that a significant proportion of students regularly use generative AI, primarily for doing homework, asking for explanations, and translation. Use typically occurs independently and is less directly related to classroom work. Teachers' observations, in contrast, paint a more subdued picture, suggesting that student use remains partially hidden within the school environment. The results highlight that the conscious pedagogical application of generative AI and the development of critical usage are of paramount importance today.

Keywords: generative artificial intelligence, public education, teacher perception

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PEDAGOGICAL CHALLENGES IN HIGHER EDUCATION IN THE ERA OF MASS HIGHER EDUCATION

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Abstract: The social role of higher education has undergone significant repositioning in recent decades, and this social transformation has not been fully followed by the self-definition and operational models of universities. Although by 2020 the proportion of graduates among the population aged 25–65 had increased to 37% in Europe and 23% in Hungary, university education is still often perceived as an elite form of education serving only a narrow intellectual segment of society. However, both experience and statistical data indicate otherwise. The expansion of higher education has also forced universities to adopt a more inclusive approach. When discussing supportive pedagogy and educational equity, we usually think of primary and secondary education or preschool education, even though the growing massification of higher education increasingly brings challenges related to the appearance of students who are atypical in various respects.A major limitation to providing personalized education for these students is that, although research shows that the pedagogical preparedness of instructors has the greatest impact on higher education pedagogical practice (Korpics & Bajnok, 2023), nearly half of university instructors have no formal pedagogical training. For many of them, teaching still primarily means one-way knowledge transmission, and their motivational structures differ from the expectations of 21st-century higher education (Jármai & Végh, 2017). In the 21st century, the emphasis within higher education is increasingly shifting from the traditional triad of research, teaching, and service toward the teaching-learning function and the Scholarship of Teaching and Learning (Halász, 2021). For a long time, international university rankings — primarily based on research performance — dominated higher education quality management. However, as a consequence of the Bologna Process, the effectiveness of teaching and learning, that is, higher education pedagogical effectiveness, has also become a key element of quality assurance. Based on the findings of a higher education pedagogy handbook published in 2025, our presentation identifies the most important challenges related to higher education pedagogy and explores possible responses to them. The phenomena mentioned as risks or sources of problems also contain opportunities for change. They highlight that the understanding and differentiated treatment of various psychological and learning difficulties represent significant potential in supporting successful student life paths; that by making rigid assessment systems more flexible, failure itself can become a source of learning; and that diverse and unconventional learning organization methods may create opportunities for groups of students to enter higher education who, due to their individual life circumstances, would currently have little chance of successfully beginning university studies.

The presentation is intended for the conference section titled Changing Teaching Roles and Pedagogical Models.

Keywords: higher education pedagogy; atypical students; student-centered higher education

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THE EDUCATIONAL SUPPORT ROLE OF SOCIAL PEDAGOGY IN THE PREVENTION OF PEER BULLYING

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Abstract: Introduction and Objectives: Peer bullying is a complex social and psychological phenomenon whose effective management extends beyond the framework of public educational institutions. This presentation examines the role of the Family and Child Welfare Center (FCWC) in the prevention and resolution of bullying cases. The aim of the research is to explore the factors underlying bullying behavior, the impact of teachers' empathy on case management, and the necessity of involving external professionals. Methodology: The research methods included a literature review and interviews conducted with employees of public educational institutions and social professionals. Results: The research revealed that environmental harms play a more significant role in the development of bullying behavior than innate psychological disorders. A particularly important finding is that uncontrolled and excessive use of digital devices can be directly linked to the emergence of aggression: stimuli experienced in the digital environment and unrestricted content consumption reduce children's frustration tolerance and distort their conflict-management patterns. Digital devices not only "steal time" but also transform the socialization environment, making bullying less visible to teachers. It was also found that teachers' empathy skills are crucial in identifying bullying cases. Professionals with higher levels of empathy pay more conscious attention to the bully's family background and online presence, while striving to find internal solutions. At the same time, the results confirm that due to the limited resources of schools, the external professional support and specialized preventive programs provided by the FCWC are essential for addressing conflicts that spill over from the digital environment. Conclusions: The extent of bullying can be significantly reduced through targeted programs and individual therapeutic support organized by the FCWC. The conclusion of the research is that a systemic solution requires both the development of teachers' attitudes and closer cooperation with external helping professionals.

Keywords: social pedagogy, peer bullying, Family and Child Welfare Center, empathy, digital vulnerability, prevention, multidisciplinary cooperation

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ARTIFICIAL INTELLIGENCE AS A FIELD OF RELIGIOUS EDUCATION: METHODOLOGICAL RENEWAL AND THE DEVELOPMENT OF A NEW INTERDISCIPLINARY MODEL

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Abstract: This presentation introduces the concept and developmental logic of a new interdisciplinary undergraduate programme to be launched at the Jewish Theological Seminary – University of Jewish Studies under the title "Artificial Intelligence, Religion and Society." The programme is based on the recognition that artificial intelligence is not merely a technological tool, but creates a new environment for interpretation, decision-making and responsibility, one that also necessitates methodological renewal in religious education. The significance of the topic lies in the fact that the educational integration of AI is currently discussed mainly from informatics and pedagogical perspectives, while religious traditions, ethical interpretive frameworks and models of religious education receive little attention in this discourse. This gap is particularly important because, in an AI-shaped environment, mastering tool use is not sufficient: there is also a need for the critical interpretation of machine-generated responses, the recognition of biases, the examination of meaning-making processes and the reconsideration of human responsibility. The programme is built on four pillars: religious and ethical traditions, linguistic approaches, informatics and technological foundations, and economic and social contexts. The aim of this structure is to enable students to become not only users of AI systems, but also critical analysts and responsible interpreters of them. The methodological novelty of the programme lies in the development of question-based, problem-centred, reflective and research-based learning situations instead of answer-based knowledge transmission. Students compare human and AI-generated responses, conduct pragmatic and psycholinguistic analyses, and examine the impact of algorithmic environments on trust, authority and decision-making. The aim of the presentation is to demonstrate that religious higher education can not only adapt to the age of AI, but can also actively shape its ethical, interpretive and methodological frameworks.

Keywords: artificial intelligence, answer-based education, question-based education, renewal of methodological frameworks, higher education reform

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AFFECTIVE LEARNING PROCESSES IN MULTIMODAL ENVIRONMENTS: A FOCUS ON DISADVANTAGED LEARNERS

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Abstract: In recent years, digital and multimodal learning environments have become central components of educational practice. The combined use of multiple modes of representation—text, image, video, and interactive content—has opened new dimensions for supporting learning processes. International research indicates (Pekrun, 2006, 2014, 2017; Wang et al., 2015; Harley et al., 2019; Parker et al., 2021) that learning outcomes cannot be interpreted solely through cognitive factors, but are also significantly influenced by affective components, including motivation, emotional engagement, and the quality of the learning experience. This issue is particularly salient for disadvantaged learners, who often enter the education system with lower levels of motivation, more fragile self-efficacy, and limited cultural capital (Bourdieu, 1986; Sirin, 2005; Tan, 2024). The presentation aims to explore the affective implications of applying multimodal learning environments in the learning processes of disadvantaged students. The theoretical framework is grounded in the social semiotic approach to multimodal learning (Kress & van Leeuwen, 2001; Kress, 2010; Jewitt, 2014), as well as in research on learning-related emotions and student engagement (Fredricks, Blumenfeld, & Paris, 2004; Pekrun, 2006, 2014; Dominek, 2025). From this perspective, the integration of multiple meaning-making modes may contribute to enhanced emotional engagement in learning. While a substantial body of research focuses on cognitive outcomes and technological aspects, the interplay between social background and affective learning processes remains less emphasized. This gap is particularly critical in the case of disadvantaged learners, for whom the characteristics of the learning environment, access to resources, and the quality of learning experiences play a decisive role in shaping participation and academic progression (Csapó, Molnár, & Kinyó, 2009; Kertesi & Kézdi, 2016). The study is based on a systematic literature review. It examines empirical and theoretical publications indexed in Scopus, Web of Science, and ERIC, with a primary focus on research published after 2010, a period marked by the increasing prominence of digital and multimodal learning environments in both educational practice and research. The aim is to identify the affective dimensions through which these environments support learning and to analyze how social background is reflected within these contexts. The findings are expected to contribute to a more nuanced understanding of the affective aspects of multimodal pedagogy and to provide a theoretical foundation for future research on the learning experiences and participation patterns of disadvantaged students.

Keywords: multimodal learning; affective learning; disadvantaged learners; student engagement; digital learning environments

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THE ROLE OF AUTOMATED FEEDBACK IN SELF-REGULATORY DECISIONS IN ONLINE LEARNING ENVIRONMENTS

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Abstract: In online learning environments, information needed for self-regulatory decisions becomes particularly salient; consequently, feedback plays a crucial role in supporting the learning process (Jensen et al., 2021). With the development of digital technologies, instructor comments are increasingly complemented or replaced by automated, data-driven, and artificial intelligence-based mechanisms that enable immediate and scalable support (Kiziltepe et al., 2026). Although traditional models of feedback primarily focus on reducing the gap between current and desired performance (Hattie & Timperley, 2007), more recent process-oriented approaches, such as the REFLECT model, emphasize that the effects of feedback are not direct but mediated by learners' individual cognitive, metacognitive, and emotional processing (Daumiller & Meyer, 2026). Despite the fact that formative feedback in online contexts has been widely studied, relatively few analyses have examined how different automated solutions support specific self-regulatory decisions (Kiziltepe et al., 2026). The aim of this scoping review is to identify the measurement approaches, task types, and regulatory outcomes reported in empirical studies on automated feedback, with particular attention to feedback elaboration and timing. The review was conducted in line with PRISMA guidelines and the PCC model across three databases (Scopus, ERIC, and Web of Science), focusing on the 2016–2026 period. After applying the inclusion criteria, 28 empirical studies were included in the analysis. The findings indicate that the studies are primarily situated in course-embedded online or blended environments and in computer-based assessment settings. Measurement approaches typically combine performance data with questionnaire-based, scale-based, perceptual, or log-file data. Findings on feedback elaboration are mixed: some studies suggest that minimal, score-based feedback may trigger greater self-regulatory activity and information seeking (Say et al., 2024), whereas other studies indicate that more elaborated feedback supports error correction and motivation more effectively (Kuklick, 2023). Among individual learner characteristics, the most frequently examined variables are self-efficacy, anxiety, receptivity to feedback, feedback literacy, and the level of self-regulation.

Keywords: automated feedback, self-regulation, online learning, higher education

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3. SYNERGY

SPEECH AND IMPROVISATION - CREATIVITY DEVELOPMENT AND COMMUNICATION TRAINING IN THE AGE OF ARTIFICIAL INTELLIGENCE

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Abstract: We improvise in every moment of our lives. Yet, most institutions do not teach either everyday or artistic improvisation. Free association and improvisation are sources of creativity. Human creativity is something that even artificial intelligence cannot compete with, which makes its development particularly important. The mechanism of impact for training aimed at developing creative abilities is implemented in the method called “Speech and Improvisation,” which is no longer just a costly training methodology used for developing market competitors, but can also be applied across numerous educational and pedagogical areas. The program is unique because it does not focus solely on psychological and communication techniques or tricks, but on the human being and human functioning itself. All of this can only be learned through practice-oriented methods, in which improvisational games are connected to speech-technical challenges, teaching both body and mind new habits. Artistic improvisation, in both spiritual and mental terms, must primarily be about discovering our true selves and returning to the joyful, childlike, creative beings we once were or could be.

Keywords: improvisation, creativity development, free association, speech technique, self-knowledge, personality development

AI AS AN EDUCATIONAL RESOURCE: DIGITAL COMPETENCE, TEACHING ROLES, AND INSTITUTIONAL RESPONSIBILITY IN HIGHER EDUCATION

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Abstract: Adaptability, creative learning, and digital-technological innovation play a prominent role among higher education's responses to global environmental challenges. The literature emphasizes the importance of learning outcomes-based higher education, creativity, and constructivist pedagogical approaches (Biggs–Tang 2007). The COVID-19 pandemic has accelerated digitalization, while artificial intelligence (AI) has raised new pedagogical and ethical questions (Ferri et al. 2020; Bond et al. 2024). According to research, AI can be particularly effective in personalized learning, supporting teachers' work, and enhancing student motivation; however, its ethical and mindful application is essential (Horváth 2023; Viberg et al. 2023). The empirical part of the study examines adaptive higher education practices implemented at the Faculty of Political Science and International Studies at the National University of Public Service. The research was based on qualitative methodology, document analysis, case studies, and action research. The analysis covered training programs, course descriptions, and experiences with the introduction of an artificial intelligence module, as well as the development of a creative, AI-supported course. The aim of the research was to explore how AI can be integrated into the creative learning paradigm and how it can support the creation of an adaptive, student-centered higher education environment.

Keywords: adaptive higher education, creative learning, artificial intelligence, case study, innovation

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THE TRANSFORMATION OF SOCIAL PEDAGOGY IN THE DIGITAL AGE

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Abstract: As a consequence of the COVID-19 pandemic, digital education has posed numerous challenges for educators, field instructors, and students in social higher education. The development of the information society demands new solutions from teachers and social pedagogues. What should and how should we teach in this new world? Can everything be taught digitally (and subsequently assessed)? Is there a gap in skills and knowledge between educators and students? How should we (or should we not) use artificial intelligence (AI)? What should be done about skills development and practical exercises? How can gamification be integrated into education? What roles do e-sports and drone football play, and how can they be utilized? In social pedagogy, where practical exercises are of particular importance, can virtual reality or simulations in cyberspace provide a solution? How might all of this affect the teacher-student relationship? What about continuing education? Should lifelong learning (and teaching) be conducted in traditional, online, or hybrid formats? These questions are intended not only for discussion in the presentation but also in the session as a whole.

Keywords: social pedagogy, digital education, practice, simulation, e-sports, drone football

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DEVELOPING ALGORITHMIC AWARENESS AND CRITICAL THINKING IN THE AGE OF VIRTUAL ENTITIES

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Abstract: This study examines the transformation of digital identity construction in the age of hyperreality, focusing on the impact of virtual influencers on the self-concept development of younger generations. The research posits that AI-driven, algorithmically controlled entities—such as Lil Miquela or Shudu Gram—are no longer merely media artifacts but active socialization agents participating in the identity formation of the Alpha generation. The theoretical framework is based on Jean Baudrillard's concept of hyperreality and Erving Goffman's dramaturgical model, complemented by critical perspectives on emotional capitalism. Using a qualitative case study and digital content analysis of three prominent virtual influencers, the research explores the role of "invisible agency" and the mechanisms of strategic sincerity. Findings indicate that AI aesthetics and simulated perfection establish a new normative framework where biological reality may be perceived as a "system error". This presents a significant pedagogical challenge: education must move beyond technical literacy. The study concludes that digital literacy must be integrated with algorithmic awareness and simulation recognition competencies. The objective is to develop ethical and pedagogical responses that help preserve the autonomy and identity integrity of young individuals in artificially generated media environments.

Keywords: algorithmic awareness, virtual influencers, hyperreality, Alpha generation, critical thinking, digital socialization

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AN EXAMINATION OF ATTITUDES TOWARD LEARNING, SOCIAL ATTITUDES, AND STRUCTURES OF MEANING IN HUNGARY

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Abstract: Artificial intelligence is transforming not only educational methodologies but also the ways individuals and communities interpret the meaning and value of learning. Understanding the social embeddedness and meaning structures of learning is particularly important in the context of expanding digital educational environments, which reshape learning attitudes and practices (Illeris, 2009; Jarvis, 2006). This presentation examines social attitudes toward learning in Hungary through an empirical research framework, with a particular focus on attitudes emerging in digital learning environments. The study identifies three societal patterns: (1) low embeddedness of learning, where digital opportunities remain underutilized; (2) a learning-supportive model, where digital tools are integrated into knowledge sharing and competence development; and (3) a learning-indifferent environment, where learning does not become an internalized value despite the availability of digital tools. The empirical component is based on a questionnaire survey (n=228), focusing on attitudes toward learning, perceptions of digital learning environments, and expectations regarding individual and collective utility. Beyond participation, the study analyzes the cognitive and affective dimensions of learning meaning, aligned with broader value-oriented perspectives on education (Biesta, 2010). The findings contribute to understanding how social attitudes toward learning influence the acceptance, use, and effectiveness of digital educational tools. The study highlights that technological innovation alone is insufficient; the social meaning of learning plays a decisive role in shaping educational outcomes.

Keywords: digital education; artificial intelligence; learning attitudes; educational innovation

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THE DRONE SOCCER AS AN EDUCATIONAL INNOVATION PLATFORM (MOTIVATION, COMPETENCY DEVELOPMENT, AND INSTITUTIONAL IMPLEMENTATION)

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Abstract: The presentation demonstrates how drone soccer — a technology-driven sport originating from South Korea — can become an educational entry platform capable of simultaneously increasing student motivation and supporting the development of digital, technical, and collaborative competencies. Based on the experiences of its introduction in Hungary, drone soccer can be interpreted not merely as a sport, butas an experience-based learning environment that creates a bridge between play and structured STEM education. The presentation outlines the main stages of building the Hungarian ecosystem, including the establishment of international partnerships, the creation of the organizational framework, the introduction of equipment and arena systems, and the integration of drone soccer into educational institutions. The 2025 pilot championship and the 2026 national championship are also presented in detail. Special emphasis is placed on the dimension of social impact: through the cooperation of the Ludovika University of Public Service, the Fiľakovo Grammar School, and Drone Soccer Hungary, equipment support programs enabled the technology to become directly accessible to secondary school students, thereby creating new entry opportunities toward technical and engineering career paths. The presentation interprets the Hungarian model within the context of international trends, highlighting that while drone technology education in Western Europe is increasingly organized on an ecosystem basis, in Hungary drone soccer appears as an effective, scalable, and low-threshold motivational platform capable of supporting the development of future learning environments.

Keywords: drone soccer; STEM education; experience-based learning; digital competencies; educational innovation; drone technology

PROBLEM SOLVING WITH EDUCATIONAL FLOOR ROBOT IN DIGITAL CULTURE COURSE FOR STUDENTS WITH LEARNING DISABILITIES

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Abstract: In the curriculum designed for students with special educational needs, one of the topics in the digital culture course is “Problem Solving with Digital Tools and Methods”. For students with learning disabilities, this is a particularly important area for development. To carry out the activities in this topic, the curriculum recommends the Imagine Logo program. Based on my experience, I concluded that using turtle graphics is an extremely difficult task for our students with learning disabilities, so it cannot achieve its intended goal of development. In order to ensure that these goals could still be achieved, I chose a different tool: the floor robot. Unlike turtle graphics, which require a high degree of abstraction, problem-solving with robots is reinterpreted as a manual activity based on spatial orientation. Our students with learning disabilities are capable of operating and using the floor robot appropriately, so the developmental activities set by the curriculum can be achieved just as effectively with this tool. In my presentation, I will demonstrate how, drawing on the experiences of the past four years, I have integrated the floor robot into the “Problem Solving with Digital Tools and Methods” unit of the Digital Culture course—replacing the Imagine Logo program—for students with learning disabilities.

Keywords: special education, students with special education needs, digital literacy, floor robots, problem-solving

INTERPRETIVE INTELLIGENCE AS A HIDDEN CONDITION OF LEARNING THE IMPACT OF HUMAN-AI MEANING FORMATION ON LEARNING PROCESSES IN HIGHER EDUCATION

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Abstract: Artificial intelligence has entered learning environments not as a tool, but as a participant in the formation of meaning. This shift exposes a structural condition that remains largely unexamined in education. Learners increasingly operate in situations where identical information gives rise to divergent interpretations, without any explicit indication that such divergence has occurred. The paper addresses this condition by focusing on the moment when understanding fails without being recognised as failure. In these instances, the breakdown does not originate in the absence of knowledge, but in the instability of meaning itself. The difficulty lies in the inability to detect when interpretation has shifted and when communication no longer rests on shared reference. The Meaning Intelligence System provides a diagnostic perspective for examining these phenomena. It does not introduce a new instructional method, but identifies a dimension of learning that has remained implicit. Interpretive intelligence is understood here as the capacity to detect, articulate and respond to discrepancies in meaning across human and artificial agents. Empirical observations from institutional application suggest that a decisive change occurs when learners begin to recognise that misunderstanding is not an exception but a structural possibility. At that point, communication becomes a field of inquiry rather than a transparent medium. The argument developed in this paper is that education in AI-mediated environments cannot rely on the assumption of shared meaning. Its central task is to make interpretation visible as a condition of learning. Without this shift, educational processes maintain the appearance of coherence while operating on unstable ground.

Keywords: Interpretive intelligence, meaning formation, interpretive gap, human–AI interaction, learning processes, epistemic instability, digital education, communication, MÉDÉSZet, organisational learning

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CONTROL IMPLEMENTATION OF PNEUMATIC SYSTEMS USING VARIOUS PLC PROGRAMMING METHODS

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Abstract: In my following thesis, I would like to present, through case studies, what educational methods and strategies can be used to implement the different PLC programming modes with students studying control technology (electronics technician, mechatronics technician, mechatronics engineer), and how they can operate, diagnose and, if necessary, modify and further develop a real pneumatic system using different types of programming. Three fundamental aspects must be implemented in the educational structure, such as system security, economy, and environmental protection. Recently, I was fortunate enough to attend a pneumatics and electropneumatics course, and then a PLC programming course. In the pneumatics (electropneumatics) course, I had the opportunity to learn about the devices regularly used in pneumatic systems, as well as the specific compressed air system, thus developing a systems approach, based on which the cause-and-effect relationships became known, thus the diagnostic examination of the system also became transparent. During this training, the instructors only made references to the fact that PLC-controlled systems are now used to control pneumatic systems almost everywhere where safety regulations do not prohibit the use of electrical equipment (e.g., explosive areas). In the PLC programming course, we dealt almost exclusively with the control technology itself, PLC programming, and almost not at all with the physical implementation related to the control. That's why I feel very lucky that I was able to gain knowledge and experience from both the control implementation side and the physical implementation side, and based on these experiences, I was able to develop my own educational concept for PLC programming. I believe that education can be much more effective if students can implement the knowledge they have acquired during education by operating and testing real-world systems, leaving the virtual world provided by IT systems. In my thesis, I would like to demonstrate through various case studies how we progress with students from theoretical knowledge to practical knowledge, from simpler projects to more complex projects, and how a given theoretical topic is related to practice, and in what practical implementation we can see the given theoretical knowledge. I consider the latter very important because I have often experienced that the fundamental question for students was where and how they could utilize the given theory in the gay community, i.e. to what extent they would receive “marketable” knowledge. In my thesis, I start from the basic state that this is a practice-oriented theoretical education, where frontal education is only present at a minimal level, I mostly prefer differentiated education, group and pair work, where group members can brainstorm together and work on a given project in different ways, for example with different programming methods.

When presenting the project, the groups can exchange experiences with each other about who implemented the given project, what problems they encountered, and what experiences they gained from it. In the PLC programming course I attended, I had the impression in several cases that a PLC programmer, who had no knowledge of any other electrical or pneumatic systems, did not really feel the difference between a PLC programming degree and a general IT programming degree. He did not feel that he could actually connect the knowledge he had gained through PLC programming to something. Based on this, I start the education with a few hours of basic pneumatics training. This way, the students will learn which elements of the pneumatic system can later be controlled by PLC programming, how to implement, for example, a timing or a counting completely mechanically, and how we will replace this with PLC control for completely electronic control. This makes it completely clear what the difference is between a general programming activity and a PLC programming activity. At the same time, it is very important to note how important the application of existing computer science knowledge is, since on the one hand, we regularly prepare truth tables and assignment tables for the projects to be implemented, during university education we prepared a program for generating motion equations and path-step diagrams based on a given motion sequence, pneumatic system sizing, and other calculations. It is important to note that in my experience, a PLC programmer's tasks primarily consist of development and testing (diagnostics), so this is what should be focused on most during education. https://siva.bgk.uni-obuda.hu/SzaFARi/2026/

Keywords: PLC programming, pneumatic systems, control engineering education, practical learning, mechatronics, applied engineering education, project-based learning

BLENDED LEARNING IN PRACTICE: DARTS MATEK AS AN INTEGRATED DIGITAL AND PHYSICAL LEARNING MODEL

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Abstract: The aim of this presentation is to introduce an innovative, blended learning-based educational model that integrates a digital learning environment with physical activity and gamification elements to develop mathematical skills. The Darts Matek system employs a comprehensive approach in which tasks completed on the online platform are directly connected to movement-based activities performed on a darts board. This integration enhances student motivation and promotes active engagement in learning. The effectiveness of blended learning is supported by numerous studies: Graham (2006) and Means et al. (2013) highlighted that integrating online and face-to-face learning components can improve learning outcomes. The role of gamification in increasing student motivation has been examined by Deterding et al. (2011). Currently, the model is implemented in several hundred institutions and reaches tens of thousands of students. Results indicate that integrating digital, physical, and motivational elements provides an effective tool for supporting cognitive development. During the development process, I actively participated in product and methodology development: based on inputs from educators and existing practices, I designed new methods, and I supported the development directions through competitive analysis and market benchmarking. I play a key role in creating new task types and difficulty levels and enhancing the learning experience. The application of AI is also being explored.

Keywords: blended learning, gamification, cognitive development, movement-based learning

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