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Education in the Era of AI, Enhancing Skills, Challenges and Perspectives – International Context and National Experience

Abstract

The article analysed the main reflections presented by experts from different countries in the area of AI in education, who participated in the round table debate "E-Learning and Enhancing soft skills: Contemporary Models of Education in the era of Artificial Intelligence". The agenda included three topics: 1) E-learning and enhancing soft skills: contemporary models of education in the era of artificial intelligence; 2) Good practice examples using AI in education for soft skills development; 3) AI – perspectives and challenges of its use in education. The conclusions of the round table lead to the reflection that integrating AI and robots can enhance soft skills development and revolutionize education by creating personalized, efficient, and inclusive learning environments. AI offers benefits like task automation, real-time feedback, and support for diverse needs. However, challenges such as equity, privacy, bias, and ethical concerns must be addressed. Success requires adequate teacher training, a focus on equity and accessibility, ethical considerations, strong data protection, and maintaining human interaction and creativity. By addressing these challenges thoughtfully, education systems can fully harness AI's potential to improve learning outcomes.

K e y w o r d s: artificial intelligence (AI), education, robots, E-Learning, soft skills, contemporary models

Introduction

The round table debate "E-Learning and Enhancing Soft Skills: Contemporary Models of Education in the Era of Artificial Intelligence", was moderated by Eugenia Smyrnova-Trybulska and Magdalena Roszak. Experts were recruited on October 15th as part of DLCC2024 – the 16th edition of the International Scientific Conference, "Theoretical and Practical Aspects of Distance learning" DLCC2024 (www.dlcc.us.edu.pl) (subtitle: "E-learning & Enhancing Soft Skills"). The conference took place on October 14th and 15th, 2024, at the University of Silesia in Cieszyn. It was organized by the Faculty of Arts and Educational Sciences in Cieszyn and the Faculty of Computer Science and Materials Sciences in Sosnowiec, the University of Silesia in Katowice (Poland). The participants of the debate were Prof. Nian-Shing Chen – in Taiwan, Prof. Todorka Glushkova – in Bulgaria, Prof. Pedro Isaias – in Portugal; Prof. Anna Ślósarz – in Poland, Prof. Nataliia Morze – Ukraine, Prof. Štefan Gubo – Slovakia, Prof. Małgorzata Przybyła-Kasperek – Poland, Dr Miroslav Hruby – the Czech Republic.

In a recent development, Geoffrey Hinton, dubbed the 'Godfather of AI,' has been named a co-recipient of the 2024 Nobel Prize in Physics for his pioneering work in machine learning. Hinton shares the award with John Hopfield, whose energy-based models revolutionized the field. Their discoveries laid the foundation for today's AI applications, highlighting its growing significance. (https://edition.cnn.com/2024/10/08/science/nobel-prize-physics-hopfield-hinton-machine-learning-intl/index.html)

E-learning and Enhancing Soft Skills: Contemporary Models of Education in the Era of AI

Professor Nian-Shing Chen from the National Taiwan Normal University, Taiwan, brought his extensive expertise to initiate the discussion on integrating artificial intelligence (AI) and educational robots to develop soft skills in modern education. Highlighting the growing importance of soft skills, Professor Chen emphasized that AI and robotics can significantly enhance skill development. Drawing from contemporary research, the discussion delved into the rapid adoption of generative AI (GAI) applications, such as ChatGPT and Midjourney, in educational contexts (Hwang and Chen, 2024). While these tools hold great promise, they also present challenges, such as balancing enthusiasm with concerns about ethical implications and effective implementation. The research underscores the importance of transitioning from merely seeking information to leveraging programming prompts, which aligns closely with the "why" behind learning.

Further, scholars have explored how generative AI reshapes education. Lan and Chen (2024) provide a systematic framework for designing pedagogical AI agents, addressing both teacher and student perspectives. They outline key concepts, functional requirements, and practical templates, supported by a hands-on example of teaching sequencing words. This aligns with the need for well-structured AI applications that support both the cognitive and emotional aspects of learning. Similarly, Chiang, Chang, and Chen (2014) propose that generative AI necessitates a paradigm shift from purely outcome-oriented approaches to a balanced integration of learning processes and outcomes. Their recommendations to incorporate the experiential learning cycle and learning portfolios demonstrate the untapped potential of pedagogical AI agents in achieving this balance.

The necessity for innovative educational models arises from several challenges in traditional education, including an overemphasis on hard skills, a lack of focus on experiential learning, and limited personalization. AI and robotics present opportunities to overcome these barriers by fostering interactive, engaging,

and adaptable learning environments. Technologies such as pedagogical AI agents and the R&T Learning System exemplify how real-time feedback, and personalized support can empower learners to hone their soft skills effectively. Key methodologies include role-playing scenarios, simulations, and interactive activities that immerse learners in experiential learning environments. These approaches are essential to cultivating critical interpersonal and adaptive skills in today's dynamic educational landscape.

Professor Eugenia Smyrnova-Trybulska, from the University of Silesia in Katowice, Poland, the moderator of the debate, emphasized that in the 21st century, certain soft skills have become essential for personal and professional success. Among some of the most important ones are C*ommunication:* Effective verbal and written communication is crucial for building relationships and conveying ideas clearly (Danao, 2024); *Teamwork and Collaboration:* The ability to work well with others, including diverse teams, is vital in today's interconnected world (*Soft Skills: The Competitive Edge, 2024*); *Problem-Solving:* Critical thinking and the ability to solve complex problems are highly valued skills (*Soft Skills: The Competitive Edge, 2024*); *Adaptability:* Being flexible and able to adjust to new situations and challenges is important in a rapidly changing environment (Melnichuk, 2022); *Emotional Intelligence:* Understanding and managing your own emotions, as well as empathizing with others, is key to effective interpersonal interactions (Danao, 2024); *Time Management:* Efficiently managing your time and prioritizing tasks helps in achieving goals and maintaining productivity (Danao, 2024); *Creativity:* Innovative thinking and the ability to generate new ideas are essential for driving progress and finding unique solutions (Clark, 2024); *Leadership:* Inspiring and guiding others, even without formal authority, is a valuable skill in any setting (Danao, 2024); *Resilience:* The ability to recover from setbacks and stay motivated despite challenges is crucial for long-term success (Clark, 2024); *Self-Motivation:* Taking initiative and being proactive in your work and personal development are highly regarded traits (Clark, 2024).

Professor Nataliia Morze, from Borys Grinchenko Kyiv Metropolitan University, Ukraine, presented her perspective on E-learning and enhancing soft skills: contemporary models of education in the era of artificial intelligence. A list of soft skills offered by AI is presented below, along with visual representations in Figure 1 and Figure 2.

Soft skills are interpersonal, emotional, and communication skills that enable people to work well with others and navigate complex social environments. These are different from technical or hard skills which are specific to a particular task or profession. Soft skills are essential for success in most personal and professional situations. In response to a query about essential soft skills in the era of AI, ChatGPT 4.0 provided the following list (OpenAI (2024) :

1. *Communication skills* (Active listening; Verbal and written communication; Non-verbal communication).

2. *Emotional intelligence* (Self-awareness; Self-regulation; Empathy; Social skills).
3. *Critical thinking* (Problem solving oraz Decision-making).
4. *Teamwork and cooperation* (Conflict resolution oraz Trust and support).
5. *Leadership* (Conflict management).
6. *Adaptability* (Flexibility; Openness; Resilience).
7. *Time management* (Prioritization; Organization; Meeting deadlines).
8. *Creativity* (Innovation; Curiosity; Original thinking).
9. *Beliefs* (Influence others; Negotiations; Assertiveness).
10. *Interpersonal communication skills* (Building rapport; Diversity Sensitivity; Collaboration).
11. *Resolution of conflicts* (Mediation; Diplomacy).
12. *Mentoring and coaching* (Providing feedback).
13. *Work ethics* (Reliability; Decency; Professionalism).
14. Network (Building Professional Relationships; Relationship Management).

The use of artificial intelligence in education to develop soft skills is a growing trend, as skills such as communication, teamwork, problem-solving, emotional intelligence and leadership are crucial for student success in both personal and professional context s. Here is an overview of how AI can support the development of these skills (OpenAI (2024) ChatGPT):

AI in education has enormous potential to enhance the development of soft communication skills through personalized learning, simulation-based experiences, and real-time feedback. However, these tools should complement, not replace, human interaction, which remains essential for developing deep emotional intelligence, leadership, and collaboration skills.

Professor Todorka Glushkova, from Plovdiv University "Paisii Hilendarski", Bulgaria, contributed to the joint discussion and stressed that in the artificial intelligence (AI) era, e-learning is transforming the way soft skills are developed using technology to enhance education. Some of the approaches and directions for how artificial intelligence is influencing today's e-learning and soft skills development models:

Personalized Learning Experiences – Cyber-physical and Social (CPSS) educational platforms provide personalized learning paths by analysing learners' behaviours, strengths, and weaknesses. An individualized approach to the learning process provides a suitable environment for the development of students' "soft skills" and supports their adaptation to various social interactions. Due to the importance of this approach for the purposes of distance and e-learning, adaptive learning systems (ALS) are being developed which provide resources and services to learners through the collaboration between the physical and virtual worlds, i.e., as cyber-physical and social learning (CPSS) spaces. These platforms use personal assistants, intelligent agents and other intelligent components that, through machine learning and AI algorithms, personalize the learning process based on the individual needs and skills of each student. These systems use different methods

and techniques based on building a portfolio of each student and determining his/her profile characteristics. This allows systems to build a specific learning plan for each student. The educational content is specified, based on the initially constructed plan, the needs and interests of the student, as well as the feedback dynamic relationship with the system in the course of the training itself. Separately, the systems actively monitor the progress of each student so that they can enrich and improve the educational strategies for him/her, expanding the resources provided in the topics with which he/she struggles. In the educational platform Virtual Educational Space (VES), developed in DeLC laboratory of Plovdiv University adaptive information is based on domain models that are implemented through ontologies (Stoyanova-Doycheva et al., 2022). To ensure personalization in learning and the development of social skills among students at school, our team is developing a prototype of a cyber-physical and social educational platform BLISS which provides services and learning resources for students in different forms of learning: classroom, independent, blended, and lifelong learning. (Glushkova et al., 2019; 2024).

Gamification in Learning – Gamified learning environments motivate learners to improve their soft skills through rewards, challenges, and interactive tasks. These platforms use AI to create engaging simulations where users can practice decision-making, team management, and critical thinking. For example, VES, implemented in school education integrates gamification components tailored for students with special educational needs, offering targeted interventions (Toskova et al, 2021).

AI-Powered Feedback and Assessment – AI tools can assess soft skills based on video, audio and text inputs. For example, they can analyse facial expressions, tone and language during mock interviews or presentations to provide constructive feedback on communication and emotional intelligence. Verification of acquired knowledge, in the form of tests, is a service provided by the LMS with access to a test system. In VES, for the automatic generation of relevant questions and the generation of personalized tests, we use the capabilities of semantic networks and ontologies.

Collaborative Learning Platforms are AI-based and offer collaboration tools that enhance mutual learning. These platforms facilitate group projects, virtual discussions, and peer reviews, fostering essential soft skills like collaboration, leadership, and active listening.

Professor Anna Ślósarz, from the University of National Education Commission, Institute of Journalism and International Relations, Poland, continued the discussion and emphasized several other issues related to Topic 1:

1. *Adaptive learning.* Adaptive learning systems identify gaps and needs in students' learning and recommend content and tasks based on their abilities. A noteworthy example is demonstrating ChatGPT's limitations, such as hallucinations, and highlighting its repeatability in tasks like copywriting. AI can also assist in preparing diploma work by supporting tasks such as information

retrieval, analyzing problems from different perspectives, summarization, translation, and inference – though always under human control. Even deepfakes can have numerous positive educational applications.

2. *Virtual Classrooms* enriched with multimedia, 3D simulations, and technologies like Virtual Reality (VR) and Augmented Reality (AR) help cultivate practical abilities while avoiding risks and motivating learners. However, excessive reliance on such technologies may lead to cognitive overload. For example, medical students and future nurses have the opportunity to test their skills using applications like VirtualPT Clinician and DxR Nursing SELECT which provide simulated environments for hands-on learning (Szczeszek, Smelkowska, Karbownik, & Roszak 2023, p. 111).
3. *Student Assessment*: AI can enhance the preparation of tasks, questions, scoring, and evaluation. Tools like E-rater assist in correcting assignments, essays, and tests, while systems like Speech Rater (developed by the *American Educational Testing Service*) evaluate spoken utterances. These tools enable teachers to focus more on each student's moral and intellectual development. Teachers, thus, transition from being disseminators of knowledge to facilitators of learning and soft skills development (Huang, Saleh, & Liu, 2023, p. 211).
4. *Smart School / University / Campus:* Smart campuses integrate AI for identity authentication, facial recognition, and other visual observation enhancements, such as monitoring eye contact and hearing abilities. Programs like NVIDIA's AI tools streamline processes, such as school attendance or automating library borrowing and return without librarian involvement. Additionally, *students' head-up frequency, frequency of mobile phone usage and smile frequency are monitored and analyzed during class to obtain relevant data* (Huang, Saleh, & Liu, 2023, p. 212). Teachers and parents gain the opportunity to understand students' difficulties in developing soft skills and provide timely support.

Professor Eugenia Smyrnova-Trybulska, from the University of Silesia in Katowice added further insights regarding E-learning and the enhancement of soft skills within contemporary educational models in the era of AI.

In context, relations of E-Learning and AI can be emphasized:

- *Adaptive Learning:* AI-driven adaptive learning systems personalize the educational experience by tailoring content to individual student needs. This approach has been shown to improve engagement, retention, and academic performance (Gligorea et al., 2023).
- *Interactive Platforms:* AI enhances e-learning platforms by providing interactive and immersive experiences. Tools like virtual tutors and AI-driven feedback systems help students learn more effectively (Gligorea et al., 2023).

In the context of Enhancing Soft Skills can be noted:

- *AI Tools for Soft Skills:* AI tools, such as ChatGPT, are being used to develop soft skills like communication, problem-solving, and teamwork. These tools

provide real-time feedback and simulate real-world scenarios (González-Rico & Lluch Sintes, 2024).

- *One-to-One Tutoring:* Combining AI with personalized tutoring can significantly enhance the development of soft skills. This hybrid approach ensures that students receive both the technological benefits of AI and the human touch of personalized guidance (González-Rico & Lluch Sintes, 2024).

In the context of Contemporary Models of Education can be noted:

- *Blended Learning:* This model combines traditional classroom methods with online learning, leveraging AI to provide a more flexible and personalized learning experience (Shiohira, 2021).
- *Lifelong Learning:* AI supports lifelong learning by offering continuous education opportunities tailored to individual career paths and personal interests (Shiohira, 2021).

Among the main methods concerning using E-learning for enhancing soft skills in the context of contemporary models of education elaboration in the era of artificial intelligence could be emphasized:

- *Interactive Modules:* These include scenarios, role-playing, and simulations that mimic real-life situations, helping learners practice and develop their soft skills in a safe environment.
- *Gamification:* Incorporating game elements like points, badges, and leaderboards to make learning more engaging and competitive (Hart, 2019).
- *Microlearning:* Delivering content in small, manageable chunks that can be easily absorbed and applied, often through videos, quizzes, and interactive activities.
- *Blended Learning*: Combining online digital media with traditional face-to-face methods to provide a comprehensive learning experience.

Some Technologies are:

- *Virtual Reality (VR) and Augmented Reality (AR):* These technologies create immersive environments where learners can practice soft skills like communication, teamwork, and leadership in realistic settings (Hart, 2019).
- *Artificial Intelligence (AI):* AI can provide personalized learning experiences by adapting content to the learner's progress and needs. It can also offer real-time feedback and support.
- *Simulations:* These allow learners to engage in complex scenarios that require critical thinking and problem-solving, helping them develop skills such as decision-making and adaptability (Talespin Team, 2023).
- *Learning Management Systems (LMS):* Platforms like Moodle, Blackboard, and Canvas facilitate the delivery, tracking, and management of e-learning courses, making it easier to implement and monitor soft skills training programs.

Some benefits are:

- *Flexibility:* Learners can access training materials anytime and anywhere, making it easier to fit learning into their schedules.

- *Engagement:* Interactive and immersive technologies make learning more engaging and enjoyable, which can lead to better retention and application of skills.
- *Scalability:* E-learning can be scaled to reach a large number of learners across different locations, making it cost-effective for organizations.

Professor Nataliia Morze added comments and presented the scheme about AI & Education. Where and How AI fits in Education? (Figure 1.).

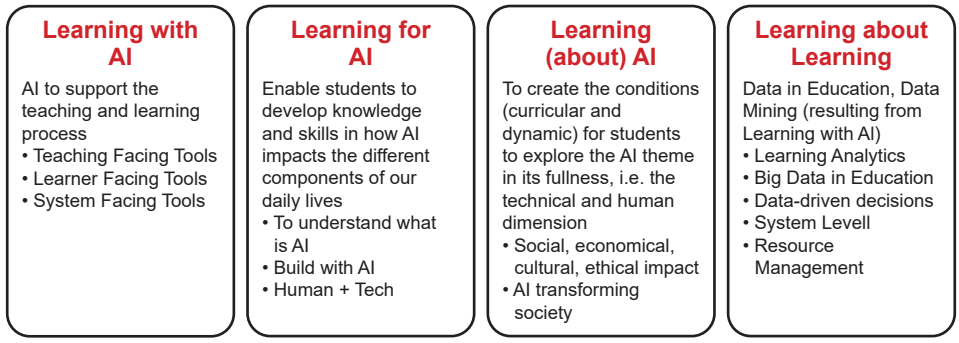

Figure 1: AI & Education. Where and How AI fits in Education?

Source: Based on AI and Education, COE (2022) – Preliminary Report.

Good Practice Examples Using AI in Education for Soft Skills Development

Professor Nian-Shing Chen, from National Taiwan Normal University, Taiwan, described the good practice examples using AI in education for soft skills development in the area of *social-emotional learning and life education*. Taiwan examples on Effects of Children's Trait Emotional Intelligence on Digital Game-Based Learning. On the meso- (national) and micro- (universities, school) level more detail is described in Yang, Quadir, & Chen, (2018); Learning Behaviour Analysis of a Ubiquitous Situated Reflective Learning System with Application to Life Science and Technology Teaching in Hwang, Chen, Chen, Lin, & Chen, (2018). Educational robots, e.g., Kebbi Air robot (Figure 2) as well as AI agents and IoT (Internet of Things) successfully used in preschool and elementary schools of Taiwan. A lot of examples are presented on the YouTube Channel (Robot Mother for Cultivating Multilingual Babies – YouTube).

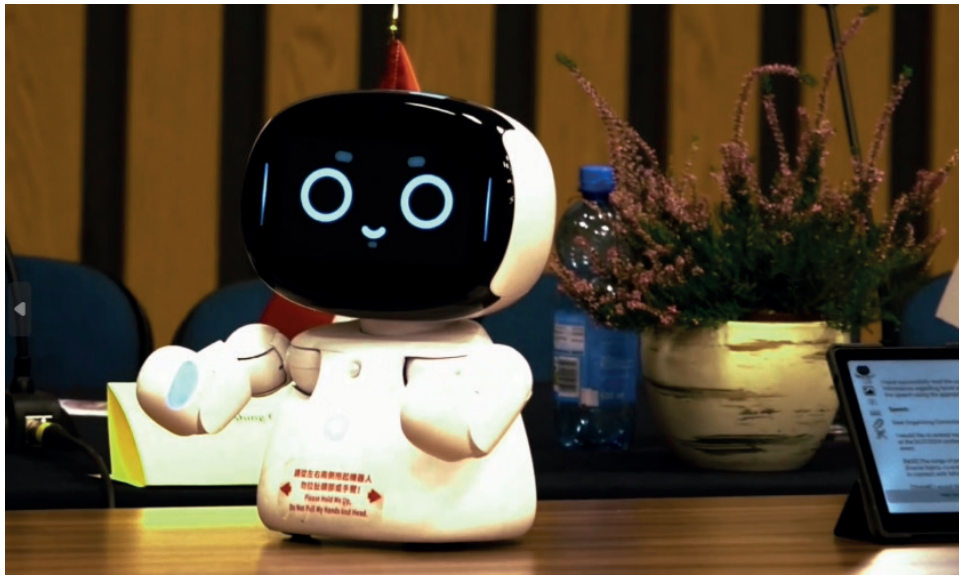

Figure 2: Kebbi Air robot

Author of the photo: Jakub Sacewicz

Professor Todorka Glushkova, Plovdiv University "Paisii Hilendarski", Bulgaria, emphasized that the use of AI in education (AIEd) aims to improve the interaction between learners and intelligent educational systems. CPSS integrates physical and virtual environments, enabling more immersive and adaptive learning. Through the use of ontologies, educational content can be structured and categorized systematically, facilitating better personalization and context-sensitive learning paths.

In today's dynamically changing situation, the transition from traditional forms of school learning to the creation of highly adaptable and personalized learning platforms is key to the success of global education goals. The development of a cyber-physical system for school education is a complex task related to considering the standard normatively defined characteristics and providing services for different groups of users. The implementation of personalized services in the cyber-physical and social space for students with special educational needs is particularly important; for students on an independent form of education; as well as working in STEM interest clubs. For these students, services and learning scenarios must consider their location in the physical world, and the characteristics of the surrounding space, and are realized through the interaction of the physical, social, and virtual worlds.

As already mentioned, a CPSS-educational platform called BLISS is being prototyped and tested in the field of secondary education in Bulgaria. BLISS is being developed as a multi-agent system, the core of which is a community of

personal assistants that interact with the other intelligent components of the platform (Todorov et al., 2019). BLISS aims to provide a personalized and dynamically adapted learning process that is tailored to educational standards on the one hand and to the location and background knowledge, desires, plans, preferences and personal characteristics of each individual student on the other. At BLISS, services are developed and prototyped for all participants in the learning process (students, teachers, school administration and parents) through purpose-built personal assistants (PAs). The behaviour of the agents is based on the dynamically changing information from the BLISS server and SchoolDiary (Krasteva et al., 2019), and any change of information is automatically perceived by all "interested" agents and personal assistants. Because we record change-sensitive content like student grades in SchoolDiary, we use blockchain technology. We store the remaining less critical information such as parent meetings, absence notes and student behaviour in a dedicated data module (DM).

The developed architectural framework of BLISS provides an opportunity for prototyping, testing and implementing various educational services related to the education of students with specific educational characteristics and the development of their social skills such as cooperation, communication, and indirect teamwork with other students through the platform's virtual infrastructure. This guarantees an individual approach to each child with specific personality characteristics and a high level of personalization in the learning process.

Prototypes of personal assistants for students in self-study and lifelong learning have been developed and implemented in the experimental school in Brezovo, Bulgaria. These assistants are intelligent agents that, through interaction with the student and according to his/her personal characteristics, provide information about educational resources and services, a suitable route to the exam hall (for students with motor difficulties (Glushkova, 2019)), and information about the results of the study, etc.

Artificial intelligence provides enormous opportunities in the implementation of adaptive training in many areas such as providing appropriate training resources, creating a personalized training process, organizing various forms of knowledge assessment, game-based training project-based and STEAM training, inclusive education and training of students with special educational needs and students with disabilities, etc. An overview of these and other opportunities is presented in Gligorea (2023).

Other Bulgarian examples on the meso- (national) and micro- (universities, school) level are described in more detail in Todorov, Krasteva, Ivanova, and Doychev (2019) and in Krasteva, Todorov, and Stoyanov (2019).

Professor Anna Ślósarz, from the University of the National Education Commission, Institute of Journalism and International Relations, Poland, presented her reflection on Topic 2 on good practice examples using AI in education for soft skills development and noted that:

1. *Primary education* is mainly for content creation, i.e. lessons and syllabus preparation, creation of texts, poems, stories, games, and summaries; personalized teaching for identifying causes of learning difficulties, and knowledge gaps to eliminate them and ludic learning to motivate students.
2. *Secondary education* is mainly for detecting plagiarism, testing and proving, providing feedback, and creation of exercises and videos.
3. *Higher education* is mainly for the usage and analysis of data, i.e. translating, obtaining information, explaining, creating pics, proving (students), syllabus and lesson preparation (Galindo-Domínguez, Losada, & Delgado, 2023, p. 10).

The teacher-written task reviews mainly focused on composition and substantive content. The AI-provided feedback, on the other hand, was more detailed and focused mainly on the correctness of grammar and vocabulary (Galindo-Domínguez, Losada, & Delgado, 2023, p. 2), because AI does not understand the way a teacher does.

Polish teachers increasingly use ChatGPT as a tool for creating lesson concepts, finding teaching materials, and verifying students' independence in completing assignments. In foreign language education, ChatGPT helps demonstrate grammar usage (e.g., Present Perfect Continuous), contextualize vocabulary, explain word meanings, identify errors in texts, propose exercises, and simulate conversational practice in target languages. (Grobelna, 2023). An experiment conducted at Stanisław Pigoń State Higher Vocational School in Krosno explored AI's role in personalizing learning. By analyzing test grades, time spent on tasks, number of attempts, and students' educational paths, the AI tailored individualized teaching content for each participant (Dębska, Kubacka, 2017). While these applications demonstrate the potential of AI in enhancing education, challenges such as data privacy, ethical use, and the risk of over-reliance on AI tools must be carefully managed.

Eugenia Smyrnova-Trybulska mentioned an example of good practice being an international project devoted to AI in education – "Future IT Professionals EDucation in Artificial Intelligence (FITPED-AI)" (grant no. 2021-1-SK01-KA220-HED-000032095), funded with support from the EC under the ERASMUS+ (www.fitped.eu, Skalka, & Valko, 2024; Smyrnova-Trybulska, Przybyła-Kasperek, Kommers, 2023; Przybyła-Kasperek, Smyrnova-Trybulska, & Kommers, 2023). The project aims to enhance digital skills and capacities by utilizing AI technology to create effective and innovative educational solutions while ensuring adherence to privacy and ethical standards (https://fitped.eu/fitped-ai/). The list of partners within the FITPED consortium is gradually growing. Universities and SMEs that have experience in the given field, and bring their own experience and perspective on solving the problem to the consortium are involved in the individual projects. The consortium of FITPED-AI (2021–2024) includes Constantine the Philosopher University in Nitra, Slovakia (coordinator); Mendel University in Brno, the Czech Republic; University of Silesia in Katowice, Poland; Vilniaus University in Vilniaus, Lithuania; Helix5, Netherland; Teacher.sk, Slovakia. September 1,2024

started the new international project devoted to GAI "Future IT Professional Education in Generative Artificial Intelligence" Project 2024-1-SK01-KA220-HED-000249044; 01. 09. 2024 Project end date: 31. 08. 2027; Constantine the Philosopher University in Nitra, Slovakia (coordinator). The project focuses on the design of methods supporting the adaptation of thinking and education in the era of generative artificial intelligence.

Some interesting examples of using AI for adaptive learning are:

1. *DreamBox Learning:* This adaptive math program adjusts the difficulty of problems based on student performance, ensuring learners are engaged and challenged at the right level (Examples of Artificial Intelligence in Education, University of San Diego).
2. *Knewton:* This platform personalizes educational content by adapting to each student's learning pace and style, providing recommendations that enhance understanding and retention (Restack, examples of Adaptive AI Systems).
3. *Realizeit:* Implemented at the University of North Carolina at Charlotte, this software analyzes learner responses to provide immediate feedback and personalized learning paths, improving student retention and achievement. (*Examples of AI-Powered Adaptive Learning in Education Let's Live a Life*).
4. *Smart Sparrow:* This platform uses AI to analyze student responses in real-time, dynamically adapting lessons to help students master concepts at their own pace. (Examples of Artificial Intelligence in Education, University of San Diego).
5. *Knewton Alta:* This platform tracks student performance across various metrics, helping teachers identify learning gaps and adjust their instructional strategies accordingly. (Examples of Artificial Intelligence in Education, University of San Diego).

Moreover, there are:

AI-Driven Personalized Feedback in Writing.

Natural Language Processing (NLP) models, especially transformer-based architectures like BERT and GPT, are being fine-tuned for educational feedback tasks. Research is focusing on providing more context-aware and actionable feedback.

Adaptive Learning for STEM with Simulated Labs.

Combining AI with simulations and game-based learning environments is gaining traction. The research is exploring how to provide more realistic and engaging learning experiences while still offering personalized support.

AI for Personalized Learning in Large Online Courses (MOOCs). AI algorithms analyze student behavior and performance data in MOOCs to provide personalized recommendations for learning resources, study schedules, and peer interactions.

AI-Based Early Intervention Systems.

AI is used to analyze student data from various sources (e.g., learning management systems, assessments, online activities) to identify students at risk of falling behind and provide timely interventions.

Affective Computing in Adaptive Learning. AI is used to detect and respond to students' emotional states during learning. This can involve analyzing facial expressions, voice patterns, and other physiological signals to adapt the learning experience and provide emotional support. The research by Maestro-Prieto, & Simon-Hurtado (2018) describes the Pedagogical Model of an Intelligent Tutoring System (ITS) for learning Computational Logic: SIAL.

The examples and the taxonomy illustrate how AI can support and enhance various aspects of the learning process, making education more personalized and effective as presented in Azevedo, et al. (2025). The taxonomy of learning with AI can be structured around Bloom's Taxonomy, which categorizes educational goals into levels of complexity and specificity. Below is presented how AI can be integrated at each level:

1. *Remembering:* AI tools like flashcard apps (e.g., Quizlet) use spaced repetition algorithms to help students memorize facts and concepts.
2. *Understanding:* AI-driven tutoring systems (e.g., Carnegie Learning) provide explanations and answer questions to ensure students grasp underlying concepts.
3. *Applying:* Adaptive learning platforms (e.g., DreamBox) present practical problems tailored to the student's current understanding, allowing them to apply knowledge in new situations.
4. *Analyzing:* AI tools (e.g., Knewton Alta) analyze student performance data to identify patterns and gaps, helping students break up complex information.
5. *Evaluating:* AI systems (e.g., Gradescope) assist in grading assignments, providing consistent and objective feedback that helps students evaluate their work.
6. *Creating:* AI-powered platforms (e.g., Smart Sparrow) enable students to design and create projects, offering real-time feedback and suggestions to enhance creativity.

Alternatively, a taxonomy of learning with AI can be structured around the different ways in which AI can support and enhance the learning process. Here is a possible framework:

AI as a Tutor: AI systems can provide personalized instruction, feedback, and guidance to students, adapting to their individual needs and learning styles.

AI as a Tool: AI tools can assist students with various learning tasks, such as writing, research, and problem-solving.

AI as a Learning Companion: AI agents can engage students in interactive learning experiences, providing support and motivation.

AI as a Data Analyst: AI can analyze large datasets of learning data to identify trends and patterns, providing insights for improving teaching and learning.

AI as a Curriculum Designer: AI can assist in the design of personalized learning paths and the development of adaptive learning materials.

AI – Perspective and Challenges Used in Education

Professor Nian-Shing Chen, from National Taiwan Normal University, Taiwan, initiated the discussion on the third topic, focusing on the perspectives and challenges of using AI in education. He highlighted key emerging trends, including adaptive learning systems that tailor educational experiences to individual learners (Chang & Yen-Yi Chen, Chen, Lu & Fang, 2016) and AI agents capable of recognizing and responding to students' emotions (Huang, Yu, Wu, Wang, & Chen, 2024; Lan & Chen, 2024). These advancements exemplify the transformative potential of AI in education. However, Professor Chen also drew attention to critical challenges, such as the need for comprehensive teacher professional development (Wang, Chen & Levy, 2010), the importance of addressing ethical concerns like privacy and data security, and the persistent issues of accessibility and resource disparities across different educational contexts.

Adding to the discussion, Professor Nataliia Morze, from Borys Grinchenko Kyiv Metropolitan University, Ukraine, emphasized that while AI offers transformative possibilities, certain considerations must be addressed to ensure its effective integration into education (Figure 4). These include:

- *Human Element*: While AI can simulate the development of soft skills, real-world practice with peers and mentors remains indispensable. Authentic human interaction is vital for nurturing emotional intelligence, leadership, and collaboration skills.
- *Ethical Use of Data***:** The extensive use of personal data by AI systems necessitates stringent attention to privacy and ethical considerations. Ensuring that these technologies are used responsibly is paramount.
- *Bias in AI Systems***:** AI systems can inadvertently introduce biases that may skew feedback and hinder the learning process. Mitigating these biases is critical to fostering equitable educational experiences.

Professor Morze concluded by underscoring that AI holds immense potential to enhance the development of soft skills through personalized learning experiences, simulation-based interactions, and real-time feedback mechanisms. However, she cautioned that these tools must complement, rather than replace, the irreplaceable value of human interaction. Maintaining a balanced approach is essential to achieving deep emotional intelligence and effective collaboration within educational environments.

Artificial intelligence has a key role in the transformation of modern education and helps provide tools for effective and accessible education, in particular, in personalized learning, allowing to create individual learning trajectories that are adapted to the needs and characteristics of each student (Aggarwal, 2024; Bayly-Castaneda, 2024).

AI tools enable the adaptation of educational materials to meet the individual needs of students, providing a more flexible learning experience. They also automate routine tasks for teachers, allowing more time for creative and engaging activities, which can improve the overall quality of education and increase student satisfaction (Rakya, 2023). Furthermore, AI facilitates effective interaction between students and teachers and supports adaptive learning for students with special needs (Nganji & Brayshaw, 2017). The use of AI provides a high level of personalization and adaptability, and contributes to increasing the involvement of students and their progress in learning (Möller, 2024; Imran, Almusharraf, Abdellatif, & Abbasova, 2024).

An adaptive and personalized learning model based on the use of AI can be effectively used to teach students with special needs (Nganji & Brayshaw, 2017), because AI can adapt educational materials to their individual needs, contributing to their effective integration into the educational process.

The use of AI can significantly increase student engagement and accelerate their learning progress (Möller, 2024). Analyzing the behaviour of students who stop studying in massive open online courses (MOOCs), scientists note that AI allows for identifying potential difficulties and can support students, which can help reduce the dropout rate (Zhang, Gao, and Zhang,2021) in such courses.

The insights provided by Professor Anna Ślósarz focus on both the opportunities and challenges associated with using AI in education, including the following:

1. *Prediction of academic performance and school dropout, analysis of student and teacher perception, development of virtual robotics, learning on generative models, implementation of AI and ML, insertion of computational thinking at all levels, strengthening the legal framework in education, efficiency of school management, social robotics intervention, computer security training, incorporation of AI in clinical education, STEM for forensic analysis and AI support in students with special educational needs (SEN)* (Forero-Corba & Negre Bennasar, 2024, p. 21).
2. Assessment transformation: podcast and presentation assignments are recommended because AI assistance in preparing them is limited – unlike essays (Alier, Garciá-Peñalvo & Camba, 2024, p. 10).
3. Learner-centred and personalized AI-supported learning is needed (Ouyang & Jiao, 2021, p. 5).

Some of the main challenges in using AI in education include:

1. Generative AI is not impartial or reliable, though it changes the information ecosystem, i.e. it can assist with fact-checking combating misinformation, and answering questions posed by students. However, it may introduce inaccuracies, deepfake videos or other misinformation, such as *hallucinations*.
2. Chatbots can control traffic on news sites and applications.
3. Publishers continue efforts to combat Big Tech, which exploits news copyrighted content and data archives for AI-model training. For example,

BBC is looking to build its own AI model and sell its vast archives to Big Tech (Newman, Fletcher, Robertson, Arguedas, & Nielsen 2024, p. 64). In contrast, a contract was conducted between OpenAI and the Ringier Axel Springer media company, the owner of the most popular tabloid newspaper in Poland "Fakt", the political weekly "Newsweek," the largest information portal "Onet", and, in Germany, tabloids like "Bild" and "Die Welt", as well as "Politico" and "Business Insider". Springer will supply ChatGPT with selected news to train ChatGPT on current events (Newman, Fletcher, Robertson, Arguedas & Nielsen 2024, p. 64). As a result, Springer's point of view may dominate ChatGPT, deepening existing biases.

4. Prohibitions on certain uses of AI: The European Parliament has prohibited using AI to determine the emotional state of a student or employee (European Parliament, 2024, p. 44), and *the placing on the market, the putting into service for this specific purpose, or the use of AI systems to infer emotions of a natural person in the areas of workplace and education institutions* (European Parliament 2024, Art. 5 d). Similarly prohibited are manipulations on children, social scoring, and facial recognition (ibid.).
5. Detecting students' unacceptable behaviour during tests using AI is risky, as it can lead to students being denied employment. Malfunctioning systems can unjustifiably violate the right to education, and perpetuate unequal treatment, and discrimination (European Parliament 2024, p. 56).
6. The teacher must verify AI's assessment of students' learning progress and their allocation to different levels of education (European Parliament, 2024, Annex III). However, there are individual and cultural differences that AI may not classify appropriately, and it may deepen the educational gap.
7. AI *is an integral component of an emerging surveillance society* (Linderoth, Hultén & Stenliden, 2024, p. 10). Therefore, the European Commission is requesting information on generative AI risks from Bing, Google Search, Facebook, Instagram, Snapchat, TikTok, YouTube and X (European Commission Press Release, 2024). School is not a place for economic growth, political influences or a testing ground for AI. Teachers are not facilitators of technology. Software and algorithms should not influence policymakers and legislative processes according to *neoliberal visions of the future of AIEd* (Linderoth, Hultén & Stenliden, 2024, p. 14).

Professor Małgorzata Przybyła-Kasperek, from the University of Silesia in Katowice, Institute of Computer Science, Poland, emphasized several perspectives on using AI in education:

- *Support for Educators*

AI can be used for Personalized Learning Experiences. AI systems analyse student performance in real-time, adjusting the difficulty and type of content presented. Applications like DuoLingo exemplify this.

AI also provides personalized feedback on assignments and assessments. Tools like Grammarly offer tailored suggestions for writing improvement, helping students refine their communication skills while learning from their mistakes.

By analysing data on student engagement, AI can introduce diverse learning modalities–videos, interactive simulations, or gamified elements–to maintain student interest. This variety not only sustains attention but also fosters adaptability as students learn to approach problems from different angles.

Gamification incorporates game-like elements into educational contexts to enhance engagement and motivation. For example, in the FITPED project (Skalka et al., 2021; McKay, Asquith & Smyrnova-Trybulska, 2022) a system called Priscilla was created, where students earn coins for correct answers and can use them for tips or to tackle difficult questions. This approach introduces fun and competition to learning. Gamified learning often includes challenges that require critical thinking and collaboration. Tools like Kahoot! also enable teachers to create engaging quizzes that actively involve students and promote teamwork as they discuss answers in groups.

AI technologies can significantly enhance the support provided to educators, allowing them to focus more on teaching while improving educational outcomes. For example, AI can automate administrative tasks, grading, and basic tutoring, allowing educators to focus on more complex teaching challenges or offer support to a larger number of students. By analysing data trends, teachers can identify students who may need additional support or intervention, allowing for timely and targeted assistance. This capability fosters a proactive approach to education and improving overall student outcomes.

- *Data Privacy and Security*

The integration of AI in education raises significant concerns regarding data privacy and security due to the sensitive nature of student information being collected and analysed (Issa, Kommers & Isaias, 2015). Ensuring that students and parents understand what data is being collected and how it will be used is crucial for maintaining trust. Transparency about data practices is very important. Educational institutions must develop clear policies that outline what data is being collected, how it is used, and who has access to it. This information should be shared with students and parents in straightforward language, enabling them to make informed decisions about their participation in AI-enabled activities. Building trust with students and parents requires full transparency about data practices. Schools should obtain informed consent for data collection and processing, explaining the purposes of data usage and any potential risks. This includes communicating the benefits of AI, as well as the measures taken to mitigate privacy concerns. Protecting student data requires secure storage practices and strict access control measures. Institutions should utilize encryption, secure data centres, and multi-factor authentication to safeguard sensitive information. Additionally, access to data should be limited to authorized personnel and regulated through role-based permissions.

- *Need for Teacher Training*

Training should start with the basics, helping educators grasp AI concepts, terminology, and foundational principles (Tammets & Ley, 2023). This knowledge allows teachers to recognize AI's capabilities and limitations, providing context for its use in various subjects and activities. Understanding AI basics also helps educators communicate more effectively with students, fostering a critical and informed perspective on AI.

Teachers should receive hands-on training on integrating AI tools into their existing curriculum. This can include personalized learning platforms, automated grading systems, and AI-driven tools that help create interactive learning experiences. Training should showcase how AI can enhance lesson plans, streamline administrative tasks, and support differentiated instruction tailored to individual student needs.

Given the rapid evolution of AI technologies, it is essential to provide up-to-date training. Teachers need access to resources and professional development opportunities that keep them updated on new tools, best practices, and emerging trends in AI. Online courses, workshops, webinars, and collaborative teacher networks can be valuable sources of ongoing support and knowledge exchange (Przybyła-Kasperek et al., 2023). Teachers equipped with AI knowledge can foster AI literacy among their students, preparing them for the future where AI plays a significant role in various fields. It is also essential that training programs educate teachers about data privacy regulations (such as GDPR or FERPA) and ethical concerns like bias in AI algorithms, surveillance, and the potential impact on students' digital well-being. By understanding these issues, teachers can make informed decisions and advocate for student rights in digital spaces.

Doctor Miroslav Hruby, from the University of Defence in Brno, the Czech Republic, discussed the appropriate place and role of AI in contemporary education. He stressed that AI is undoubtedly one of the important milestones in the development of contemporary technologically based civilization. It is a technology that can enrich education, but it also has the potential to undermine it. A modern human being is the product of a development spanning millions of years, and the real effects of rapidly implemented changes in education may not be immediately apparent.

For instance, one of the modern approaches to teaching in recent years has been the use of mobile phones for preschool children and the youngest pupils. The emergence of dependence on these devices can also be documented with the help of modern medical imaging devices that register changes in brain tissue. At the same time, the number of child patients in the offices of child psychologists and psychiatrists is increasing.

The goal of education should be the formation of well-rounded, physically and mentally developed personalities. At an early age, upbringing and education are traditionally the tasks of the child's parents. Can this education and training be provided by AI-based robots? What will the psychological effects be on these children?

Education using the formulation of the student's questions answered by AI is possible, but is this method suitable for all students? Is the submission of intelligent students to an AI-based technical system acceptable? Can an AI-based technical system test intelligent persons so effectively that it can determine how to proceed in their education?

A technical system based on AI can contribute to the education of students, but human subordination to such a system must never occur.

Education, especially university education, requires a certain degree of freedom. The student should be provided with suggested paths to achieve the learning goals but must retain the freedom to choose their preferred paths. A student's behavior during his/her studies is his/her private matter. Relevant data cannot be collected and processed without the student's knowledge. AI-based systems that monitor a student's behaviour during his/her studies can create a very uncomfortable study environment and undermine the student's personality.

Soon, AI-based systems will undoubtedly improve, but their superiority to people is unacceptable. Further research on the use of AI in education with the possibility of significant application is strongly needed. AI systems could initially focus on educating individuals with lower IQs who are easier to assess. Such systems based on AI could provide them with an education that facilitates their integration into society. Simultaneously, methodologies for implementing AI as partners to teachers and students should be formulated and recommended for discussion. These approaches should be tailored to the specifics of various subjects and the ages of children, pupils and students.

Professor Eugenia Smyrnova-Trybulska emphasized several perspectives and benefits of using AI in education. They include the following: *Personalized Learning:* AI can tailor educational experiences to individual students' needs (*Autonomous University of Lisbon – Private for Excellence*), helping them learn at their own pace and style. For example, adaptive learning platforms like DreamBox and Knewton adjust content based on student performance (Ji Hyun Yu et al., 2024). *Efficient Administrative Tasks:* AI can automate administrative tasks such as grading and scheduling, allowing educators to focus more on teaching (*AI for Goods & Services. Expert analysis, news, trends on AI*). Tools like Gradescope use AI to assist with grading assignments (Artificial Intelligence and Future of Teaching and Learning: Insights and Recommendations, 2023).

Enhanced Tutoring Systems: AI-powered tutoring systems, such as Carnegie Learning, provide students with additional support outside the classroom, offering explanations and practice problems tailored to their needs (Ji Hyun Yu et al., 2024).

Simultaneously there are some challenges to using AI in education, such as *Ethical Concerns:* The use of AI in education raises ethical issues, including data privacy, bias in AI algorithms, and the digital divide. Ensuring that AI systems are fair and transparent is crucial (Ji Hyun Yu et al., 2024). *Teacher Training:*

Educators need proper training to effectively integrate AI tools into their teaching practices. This requires ongoing professional development and support.

(Artificial Intelligence and Future of Teaching and Learning: Insights and Recommendations, 2023). *Cost and Accessibility:* Implementing AI technologies can be expensive, and not all schools have the resources to afford them. This can exacerbate existing inequalities in education (Ji Hyun Yu et al., 2024).

Professor Stefan Gubo, from J. Selye University, Faculty of Economics and Informatics, Komárno, Slovakia, emphasized that according to the Artificial Intelligence Index Report 2023 by Maslej et al., (2023), the number of newly reported ethics incidents and controversies in the AI, Algorithmic, and Automation Incidents and Controversies (AIAAIC) database was 26 times greater in 2021 than in 2012, as shown in Figure 3.

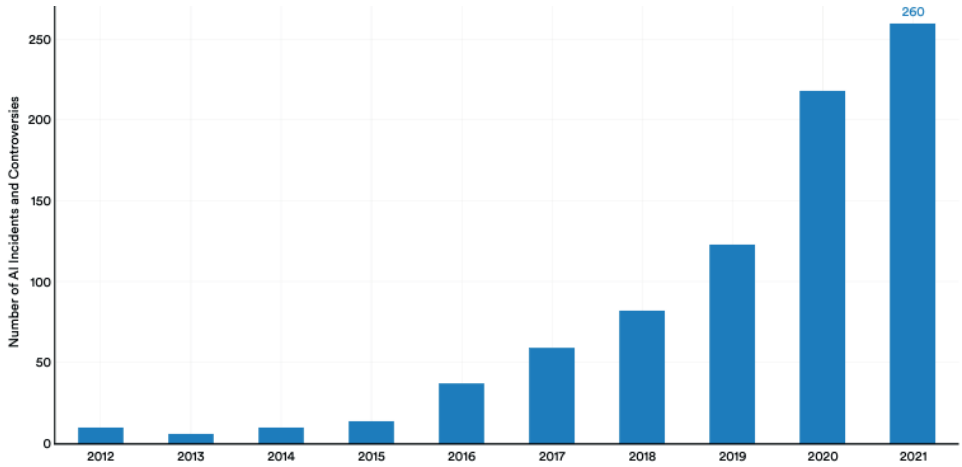

Figure 3: Number of ethics incidents related to AI

S o u r c e: Maslej et al (2023, p. 133). (Licensed under Attribution-NoDerivatives 4.0 International)

In recent years, although several AI ethical initiatives have emerged (e.g., UNESCO's Recommendation on the ethics of artificial intelligence), yet only a few guidelines address the specific issues raised by AI in education. Exceptions include the European Commission's Ethics guidelines for Trustworthy AI (AI HLEG, 2019), UNESCO's ChatGPT and Artificial Intelligence in Higher Education: Quick Start Guide (Sabzalieva & Valentini, 2023), and also the forthcoming UNESCO IESALC Manual on AI in Higher Education, which will include recommendations on implementing AI in line with the ethical principles set out in the UNESCO Recommendation, and tailored guidance for higher education stakeholders on adapting the UNESCO guidance on AI and education. Kamalov et al., (2023) emphasize the importance of carefully adopting AI in schools and universities as there is a real danger that the involved partners are not fully aware of them.

Among the main trends in AI in education are:
Explainable AI (XAI): There is a growing focus on making AI systems more transparent and understandable. Explainable AI helps educators and students understand how AI makes decisions which can build trust and improve educational outcomes (Singh et al., 2024). *AI in Educational Policy:* Policymakers are increasingly considering AI's role in education, focusing on creating guidelines and frameworks to ensure the ethical and effective use of AI technologies (Luan et al., 2020). *Global Collaboration:* Educational institutions worldwide are collaborating to share AI resources and best practices, aiming to create more equitable and effective educational systems (Ji Hyun Yu et al., 2024).

Conclusions

Professor Nian-Shing Chen, from National Taiwan Normal University, Taiwan, synthesized the discussions and reflections presented during the roundtable, emphasizing the multifaceted impact of AI on education and its potential to revolutionize the learning experience. The integration of AI into educational settings offers profound opportunities for enhancing soft skills, personalizing learning, and fostering more inclusive and contextualized learning environments. However, these advancements also introduce significant challenges that require thoughtful and strategic solutions.

The key points include the potential of AI and robots to transform education by automating routine tasks, providing real-time feedback, and enabling adaptive and experiential learning. These technologies can enhance student engagement and address individual differences, thereby creating a more equitable educational experience. However, successfully implementing AI in education requires tackling key issues like protecting privacy, ensuring ethical use, and preventing resource gaps from worsening existing inequalities. From a pedagogical perspective, the design and application of AI agents must prioritize enhancing both cognitive and affective domains of learning. Educational technologies must not only support knowledge acquisition but also cultivate critical soft skills such as collaboration, problem-solving, and adaptability. Achieving this balance involves integrating experiential learning approaches, such as hands-on practices, role-playing scenarios, and interactive discussions, into AI-driven educational systems.

Furthermore, the critical role of educators must be recognized. AI is not a substitute for teachers but a tool to amplify their effectiveness. Providing adequate professional development and training for educators is essential to equip them with the skills and confidence to harness AI effectively. This includes fostering AI

literacy, understanding ethical implications, and promoting a culture of lifelong learning among teachers.

Finally, a collaborative approach is essential for the successful integration of AI in education. Policymakers, researchers, educators, and technology developers must work together to address challenges and leverage the opportunities presented by AI. This involves establishing clear ethical guidelines, investing in equitable access to AI tools, and continuously evaluating the impact of these technologies on learning outcomes.

Professor Nataliia Morze further emphasized the revolutionary potential of AI in education, particularly its ability to create personalized, efficient, and inclusive learning environments. It offers significant benefits in terms of automating tasks, providing real-time feedback, and supporting students with diverse needs. However, challenges related to equity, privacy, bias, and the ethics of AI-driven decision-making must be addressed for the technology to be truly transformative.

For AI to succeed in education, there must be:

- Adequate training for teachers,
- Focus on equity and accessibility,
- Ethical considerations and strong data protection mechanisms,
- Commitment to maintaining human interaction and creativity in learning.

The participants concluded that addressing the challenges of AI in education requires a holistic approach, considering formal-legal, ethical, technological, psychological, didactic, and social aspects. Broad international research is essential to explore these dimensions.

Additionally, while children and young people already use AI in various ways, it is crucial to direct and teach them how to use these technologies correctly and safely. Only by fostering a balanced, inclusive, and ethical framework can education systems truly harness AI's potential to improve learning outcomes.

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Nian-Shing Chen, Eugenia Smyrnova-Trybulska, Nataliia Morze, Anna Ślósarz, Todorka Glushkova, Małgorzata Przybyła-Kasperek, Miroslav Hrubý, Štefan Gubo

Edukacja w erze AI, rozwijanie umiejętności, wyzwania i perspektywy – kontekst międzynarodowy i doświadczenia krajowe

S t r e s z c z e n i e

W artykule przeanalizowano refleksje ekspertów z różnych krajów w dziedzinie AI w edukacji, którzy uczestniczyli w debacie okrągłego stołu „E-learning i rozwijanie umiejętności miękkich: współczesne modele edukacji w erze sztucznej inteligencji". Program obejmował trzy tematy: 1) E-learning i rozwijanie umiejętności miękkich: współczesne modele edukacji w erze sztucznej inteligencji; 2) Przykłady dobrych praktyk wykorzystania AI w edukacji do rozwoju umiejętności miękkich; 3) AI – perspektywy i wyzwania związane z jej wykorzystaniem w edukacji. Wśród niektórych wniosków z debaty okrągłego stołu znajdują się: integracja AI i robotów może usprawnić rozwój umiejętności miękkich i zrewolucjonizować edukację poprzez tworzenie spersonalizowanych, wydajnych i inkluzyjnych środowisk edukacyjnych. AI oferuje korzyści, takie jak automatyzacja zadań, informacje zwrotne w czasie rzeczywistym i wsparcie dla różnych potrzeb. Należy jednak zająć się wyzwaniami, takimi jak równość, prywatność, stronniczość i kwestie etyczne. Sukces wymaga odpowiedniego przeszkolenia nauczycieli, skupienia się na równości i dostępności, rozważań etycznych, silnej ochrony danych oraz utrzymania interakcji międzyludzkich i kreatywności. Poprzez rozważne podejście do tych wyzwań systemy edukacyjne mogą w pełni wykorzystać potencjał AI w celu poprawy wyników nauczania.

S ł o w a k l u c z o w e: sztuczna inteligencja (AI), edukacja, roboty, e-learning, umiejętności miękkie, współczesne modele

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Educación en la era de la IA, potenciación de competencias, retos y perspectivas – Contexto internacional y experiencia nacional

Resumen

El artículo analiza las principales reflexiones presentadas por expertos de diferentes países en el área de IA en educación, quienes participaron en la mesa redonda "E-Learning y potenciación de las competencias blandas: modelos contemporáneos de educación en la era de la inteligencia artificial". La agenda incluyó tres temas: 1) E-learning y potenciación de las competencias blandas: modelos contemporáneos de educación en la era de la inteligencia artificial; 2) Ejemplos de buenas prácticas en el uso de la IA en educación para el desarrollo de competencias blandas; 3) IA – perspectivas y retos de su uso en educación. Entre algunas conclusiones de la mesa redonda se encuentran: la integración de la IA y los robots puede potenciar el desarrollo de las competencias blandas y revolucionar la educación al crear entornos de aprendizaje personalizados, eficientes e inclusivos. La IA ofrece beneficios como la automatización de tareas, la retroalimentación en tiempo real y el apoyo a diversas necesidades. Sin embargo, se deben abordar desafíos como la equidad, la privacidad, los sesgos y las preocupaciones éticas. El éxito requiere una formación docente adecuada, un enfoque en la equidad y la accesibilidad, consideraciones éticas, una fuerte protección de datos y el mantenimiento de la interacción y la creatividad humanas. Si se abordan estos desafíos de forma reflexiva, los sistemas educativos pueden aprovechar al máximo el potencial de la IA para mejorar los resultados del aprendizaje.

Palabras clave: inteligencia artificial (IA), educación, robots, aprendizaje electrónico, habilidades blandas, modelos contemporáneos

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Образование в эпоху ИИ, развитие навыков, проблемы и перспективы – международный контекст и национальный опыт

Аннотация

В статье проанализированы основные размышления, представленные экспертами из разных стран в области ИИ в образовании, которые приняли участие в круглом столе «Электронное обучение и повышение гибких навыков: современные модели образования в эпоху искусственного интеллекта». Повестка дня включала три темы: 1) Электронное обучение и повышение гибких навыков: современные модели образования в эпоху искусственного интеллекта; 2) Примеры передовой практики использования ИИ в образовании для развития гибких навыков; 3) ИИ – перспективы и проблемы его использования в образовании. Среди некоторых выводов круглого стола: интеграция ИИ и роботов может улучшить развитие гибких навыков и произвести революцию в образовании за счет создания персонализированных, эффективных и инклюзивных учебных сред. ИИ предлагает такие преимущества, как автоматизация задач, обратная связь в реальном времени и поддержка различных потребностей.

Однако необходимо решать такие проблемы, как равенство, конфиденциальность, предвзятость и этические проблемы. Успех требует адекватной подготовки учителей, акцента на равенстве и доступности, этических соображений, надежной защиты данных и поддержания человеческого взаимодействия и креативности. Вдумчиво решая эти проблемы, образовательные системы могут в полной мере использовать потенциал ИИ для улучшения результатов обучения.

К л ю ч е в ы е с л о в а: искусственный интеллект (ИИ), образование, роботы, электронное обучение, гибкие навыки, современные модели