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THE USE OF ARTIFICIAL INTELLIGENCE IN DISTANCE EDUCATION

Abstract

Summary: In this article, the examination of the influence of artificial intelligence (AI) on the educational process is conducted, with a particular focus on its impact on individualized teaching, the monitoring of educational progress, and student motivation. The discussion delves into diverse AI applications, including the customization of educational materials, adaptive progress tracking, and the introduction of innovative motivational techniques. Emphasis is placed on the positive aspects of incorporating AI into education, while concurrently underlining the importance of using this technology with awareness and discretion. Furthermore, the article seeks to dispel common misconceptions about the role of AI, particularly in generating educational content, and stresses the irreplaceable role of the teacher as a mentor in the learning process. A critical point is made about the imperative need to educate all participants involved in the educational sphere to effectively leverage the potential benefits of artificial intelligence.

Objectives: The aim of the article is to review current trends and practices related to the use of technology in education. The authors attempt to understand how various technological tools influence the teaching and learning processes. Key objectives include analyzing the role of technology in supporting educational processes and its impact on students and teachers. Additionally, the authors identify challenges and opportunities associated with implementing new technologies in educational practice. Finally, recommendations are formulated for teachers and educational institutions regarding the effective use of technology in teaching.

Methods: The methodology described in the article is review-based and focuses on the analysis of literature and existing research on technology in education. The authors examine various approaches presented in the literature, avoiding the conduction of their own empirical research. The main methods include a literature review, during which available studies, articles, and publications concerning educational technology are analyzed. Furthermore, the authors compare examples of technology applications in different educational contexts, highlighting both positive and negative aspects of these implementations. Ultimately, the authors provide a critical analysis of the diversity of approaches to technology in education, focusing on their effectiveness and impact on educational processes.

Results: The integration of artificial intelligence (AI) in education enhances personalized teaching, adaptive monitoring of student progress, and engaging motivational strategies. AI customizes learning experiences by analyzing student performance, enabling educators to provide targeted support and foster engagement through interactive platforms.

However, challenges such as data privacy concerns and the risk of over-reliance on technology must be addressed. Striking a balance between leveraging AI's benefits and mitigating potential drawbacks is essential for achieving positive educational outcomes.

Discussion: The article underscores the importance of artificial intelligence (AI) as a supportive tool in education, designed to enhance students' skills without supplanting their own efforts. It addresses common misconceptions regarding AI's ability to autonomously generate content, stressing the necessity for comprehensive education on the responsible use of this technology among students, teachers, and parents. The role of teachers is emphasized as pivotal; they act as mentors and guides, helping students navigate the integration of AI into their learning processes. Moreover, the article highlights the importance of maintaining student motivation, advocating for a balance between the advantages of AI and traditional teaching methods to ensure that the human elements of education remain intact and effective.

KEYWORDS: *distance education, artificial intelligence, pedagogy, information and communication technologies, e-learning*

INTRODUCTION

Artificial Intelligence (AI) is a field of science and technology whose task is to create computer systems and devices capable of performing tasks that require human intelligence (Ghosh, Chakraborty, Law, 2018, p. 208). In today's rapidly evolving landscape, AI is entering educational structures at all levels, from preschools to universities. In the face of dynamic changes in the field of education, AI is entering the structures of education at all levels. Currently, in addition to traditional forms of teaching, AI has found application in the field of distance education, commonly referred to as e-learning. The integration of AI with distance education not only enriches traditional teaching methods but also introduces innovative pedagogical strategies that can engage students in new ways. Distance education itself represents a pedagogical innovation, effectively influencing the learning process (Riad, El-Minir, El-Ghareeb, 2009, p. 109). However, when supported by artificial intelligence, it becomes a hybrid that represents a significant revolution in access to knowledge, the adaptation of teaching materials, and the personalization of the teaching process (Christ, 2013).

The applications of artificial intelligence in the distance education process are multifaceted, encompassing the ability to create personalized teaching materials, advanced interactive working environments, and almost complete automation of the verification process of students' educational

achievements (UNESCO, 2019, p. 12). These advancements facilitate a more tailored learning experience, catering to individual needs and preferences. Advanced AI algorithms, continually refined, become increasingly effective and universal, regardless of the educational level, subject area, or individual predispositions of students.

Supporting the education process in a remote environment through broadly defined artificial intelligence not only serves as a didactic tool but, above all, transforms our understanding of the education process (Chen L., Chen P., Lin Z., 2020, p. 8) . This transformation highlights the shift from a one-size-fits-all approach to a more student-centered model that values individual learning journeys. This synergy opens new horizons for access to knowledge, adapting the teaching process to individual student needs, and creating interactive and effective educational environments (Omirzak, Alzhanov, Kartashova, Ananishev, 2022, p. 568).

Artificial Intelligence in the Context of Individualizing the Education Process

Advanced algorithms of Artificial Intelligence (AI) represent a revolutionary direction in the field of education, enabling the creation and customization of educational materials to individual students' needs in an unparalleled way compared to traditional approaches (Ouyang, Zheng, Jiao, 2022, p. 7895-7921). AI, based on advanced data analysis techniques, takes into account a wide range of factors such as biological factors, preferences, learning styles, and knowledge acquisition abilities. This holistic approach allows for a richer understanding of each student, enabling the creation of tailored educational experiences. As a result, the education process becomes multisensory, delivering information through various forms of presentation, such as visualizations, sound, or interactive elements, in line with the principle of illustrativeness in the educational process.

AI-assisted systems not only adapt content to the psycho-physical capabilities of the student but also regulate the pace of work according to individual predispositions (Bhattacharya, Pal, 2021 p. 195-201). This flexibility in pacing and content

delivery is crucial for maintaining student engagement and fostering a deeper understanding of the material. Utilizing automated machine intelligence based on diagnostic tests, computer systems adjust the speed of conveying new information to the assimilation abilities, while introducing explanatory elements for those who require support. This is not just adaptation to the student's skills but the creation of an innovative model of the teaching process, where an effective educational environment provides not only better conditions for self-development but also for independent knowledge and skill acquisition.

Each student, with the use of AI, experiences an individualized approach where algorithms analyze the time spent on tasks and the number of attempts made for each. In the remote education environment, AI systems adjust the difficulty level of tasks in real-time (Sayed, Noeman, Abdellafit, 2023, p. 3303-3333). If a student copes easily, the pace is adjusted by skipping tasks of a similar difficulty level. This dynamic adaptation helps to prevent boredom and frustration, promoting a more positive learning experience. In case of difficulties, algorithms adjust the pace, provide hints, or skip specific tasks. This approach allows for the maximum optimization of the education process, simultaneously adhering to the principles of individualization and teamwork, which would be challenging to achieve in a traditional classroom setting. Individualizing the education process has a very positive impact on developing students' individual talents and passions, preparing them for future challenges (Li X, Li Y, 2023, p. 1-20). Through the development of skills such as creativity, independent thinking, and interpersonal skills, students are likely to find success in the 21st-century job market (Warchoł, 2023, p. 260).

As a result, artificial intelligence in adaptive educational platforms and difficulty diagnostics becomes not only a supporting tool but also a creative partner in the education process, delivering a personalized, effective, and engaging educational experience for each student (Kabudi, Tappas, Olsen, 2021, p. 3-10). This partnership fosters a sense of agency among students, empowering them to take charge of their learning journeys.

Despite the indicated benefits, individualizing the education process is not without its challenges. One of them is the risk of isolation and a lack of integration into the social group of students. While online learning offers convenience, it can inadvertently lead to feelings of disconnection from peers.

Online contact, despite its undeniable advantages, cannot replace direct interaction with peers and teachers. Another important issue to raise is the threat arising from unfair and unequal assessment criteria (Van Hees, Moyson, Roeyers, 2015, p. 1673-1688). Regardless of the sophistication of AI-supported e-learning systems, external factors such as access to broadband internet or the quality of information technology equipment can distort the remote education process. These disparities can widen the educational gap, making it crucial to address equity in technology access. Another factor to consider is the increased workload for teachers. Preparing and implementing personalized teaching plans for each student requires significant time, effort, and resources compared to traditional, classroom-based education.

In conclusion, when considering online education supported by AI in the context of individualizing the education process, one must acknowledge a spectrum of potential benefits while not forgetting the challenges and limitations that educators and students may face (Yang, 2021, p. 105). The effective and efficient implementation of a personalized education process requires concerted efforts and involvement from teachers, parents, students, and all educational entities. Collaborative initiatives, professional development, and resource sharing can enhance the overall effectiveness of AI in education.

Table. 1. *Summary of the benefits of using AI in the context of the educational process*

Aspect	Description
Personalization	AI customizes educational materials to meet individual student needs, considering biological factors, preferences, and learning styles.
Multisensory Learning	The education process incorporates various forms of presentation (visualizations, sound, interactive elements) to enhance understanding.
Pacing and Flexibility	AI systems regulate the pace of learning according to students' capabilities, maintaining engagement and understanding.
Dynamic Adaptation	In remote education, AI adjusts task difficulty in real-time based on student performance, preventing boredom or frustration.
Individualization and Teamwork	AI promotes both individualization and collaboration, developing students' talents and preparing them for future challenges.
Skill Development	AI fosters skills like creativity, independent thinking, and interpersonal skills, essential for success in the 21st-century job market.
AI as a Partner	AI serves as a creative partner in the education process, offering a personalized and engaging experience that empowers students to take charge of their learning.
Challenges	Risks include student isolation, unequal assessment criteria, disparities in technology access, and increased teacher workload.
Collaboration for Success	Effective implementation of AI in personalized education requires the involvement of teachers, parents, students, and educational entities through collaborative initiatives.

Monitoring Educational Progress Supported by AI

Controlling students' educational achievements using Artificial Intelligence (AI) represents a comprehensive process that involves tracking, analyzing, and assessing the development of knowledge and skills of individuals participating in the education process. This multifaceted approach allows for a more nuanced understanding of each student's progress, enabling timely interventions when necessary. This kind of monitoring of educational progress is extremely crucial in improving the teaching process, enabling teachers not only to effectively identify individual predispositions of students but also to precisely determine their strengths and weaknesses. In this way, AI becomes a fundamental tool, supporting teachers in adjusting teaching methods to achieve higher quality education (Jiao, Ouyang, Zhang, 2022, p. 6321-6344).

The role of artificial intelligence in monitoring educational progress extends from creating and constructing devices to collecting and processing various data about students. This data can include academic performance, engagement metrics, and emotional responses, providing a comprehensive view of the learning experience. This complex process involves the analysis of results, progress, behaviors, emotions, goals, and preferences of students, using diverse sources of information such as tests, surveys, observations, educational games, or sensors. Thanks to this, AI can generate a complete and multidimensional picture of an individual student's achievements, allowing for a more focused approach to their educational needs (Yıldız, Börekçi, 2020, p. 378).

An additional benefit of using artificial intelligence is the ability to generate personalized and adaptive teaching plans, tasks, materials, and resources. This adaptability enhances student engagement and satisfaction, as they receive relevant content that aligns with their interests. AI-based systems can adapt to the level, pace, and learning style of each student, simultaneously considering their individual goals and interests. Furthermore, artificial intelligence provides automatic and instant feedback, not only supporting the improvement of students' knowledge and skills but also stimulating their engagement and motivation to learn. This way, technology becomes a dynamic tool, assisting students in dealing with educational difficulties and challenges (Pratama, Sampelolo, Lura, 2023, p. 350-357).
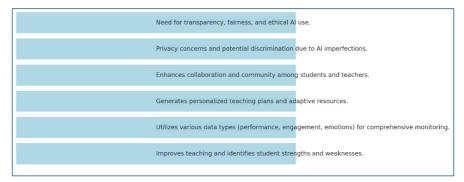
The aspect of interaction and collaboration among students, teachers, and other educational entities is significantly facilitated by the application of artificial intelligence. This interactivity fosters a sense of community, allowing for shared learning experiences that enhance knowledge retention. Using various forms of communication, multimedia, educational games, and simulations allows for instant feedback, promoting continuous error correction and improvement in the learning process.

However, despite the abundance of benefits, AI-supported monitoring of educational progress comes with a range of challenges and limitations. These challenges underscore the need for careful implementation and ethical considerations. It is essential to consider the threat to the privacy of students and teachers associated with data collection by information technology systems. Additionally, there is a risk of discrimination due to the imperfections of AI algorithms, which may affect the subjectivity of assessments depending on origin or other factors (Huang, Saleh, Liu, 2021, p. 211-212).

Issues of the quality and reliability of AI systems, as well as the need to maintain ethics and responsibility in their application, pose additional challenges. Ensuring that AI systems are transparent and fair is crucial for maintaining trust among all stakeholders. Adequate training of teachers and conscious use of these technologies become essential to maintain high teaching standards (Walat, 2007, p. 120).

In summary, monitoring educational progress supported by artificial intelligence brings not only numerous benefits but also requires careful regulation, control, and teachers' ability to effectively use modern technologies in the education process (Scherer, 2016, p. 354-398). In the complex educational environment, AI becomes an invaluable tool that, with the right approach, can revolutionize the teaching process and enhance students' competencies (Tuczyński, Walat, 2019, p. 210-211).

Image 1. *Key Aspects of AI in Education*

Need for transparency, fairness, and ethical AI use.

Privacy concerns and potential discrimination due to AI imperfections.

Enhances collaboration and community among students and teachers.

Generates personalized teaching plans and adaptive resources.

Utilizes various data types (performance, engagement, emotions) for comprehensive monitoring.

Improves teaching and identifies student strengths and weaknesses.

Motivating Students in the Era of Easy Access to AI

Student motivation is a complex process that involves stimulating and sustaining interest, engagement, and effort to achieve specific changes, such as increasing knowledge and skills in a particular field (Musiał, 2006). Motivation is a key factor influencing the quality and effectiveness of education, directly tied to students' determination to acquire specific knowledge, skills, attitudes, and behaviors towards the subject of education (Murakami, Sho, Inagaki, 2024, p. 175-181).

In today's educational environment, with easy access to artificial intelligence tools, motivating students becomes a significant challenge. As AI technologies become more prevalent, understanding their impact on motivation is essential for educators. Modern AI algorithms have broad capabilities, influencing student motivation both positively and negatively. The first part of the analysis examines elements influencing the stimulation of internal motivation, followed by the presentation of threats to motivation arising from AI applications (Maghsudi, Lan, Xu, Schaar, 2021, p. 37-50).

Current technologies allow for the execution of tasks that previously required human intelligence. Artificial intelligence enables the customization of educational content to the individual needs of each student through appropriate queries (prompts) delivered to language models, such as ChatGPT 3.5. This customization creates opportunities for deeper engagement

and personalized learning paths. This personalized learning support can motivate students to achieve a deeper understanding of the subject, contributing to increased engagement.

A crucial element positively affecting internal motivation is the ability to receive immediate feedback on educational progress. Rapid error correction and guidance for further work stimulate students to greater focus, awareness of their progress, and engagement in acquiring knowledge, considering the constant availability of a virtual teacher. This immediacy in feedback can enhance learning outcomes and encourage a growth mindset among students.

Student motivation also depends on the form of information delivery. AI algorithms supporting remote learning use interactive teaching methods, making the educational process more attractive and engaging. The integration of gamification elements can further amplify student interest and enjoyment in the learning experience. Utilizing the *learning through play* technique increases student motivation, regardless of their age (Goh, Dai, Yang, 2023).

A new educational trend involves organizing competitions based on the application of artificial intelligence. Students, using appropriate software, are engaged in solving tasks that support AI algorithms. These competitions foster a spirit of collaboration and friendly rivalry, enhancing engagement among participants. Competition serves as a significant motivational factor, encouraging involvement in acquiring skills related to artificial intelligence.

In the context of analyzing the role of artificial intelligence (AI) in student use, it is essential to point out negative factors influencing their motivation. Easy access to ready-made solutions may tempt students to lose self-discipline, as the ability to generate pre-existing content limits the development of creative skills, relying solely on solutions provided by AI algorithms. This dependency can stifle originality and critical thinking, skills that are vital in today's world. Additionally, attempts at cheating, plagiarism, or copying fully generated content by the system can negatively impact students' sense of responsibility, honesty, and engagement (Wang, Liu, Tu, 2021, p. 116). The role of the teacher as a supportive figure for students is significantly diminished. Feedback received from an electronic machine, devoid of empathy and understanding, can lead to disengagement from educational activities and the minimization of motivation. The human element in education remains irreplaceable, as teachers can provide

context and understanding that machines cannot. Students, realizing that many tasks that previously required significant effort can now be completed in a few minutes, may lose the sense of needing knowledge and developing their own competencies, crucial for their motivation.

To counteract the negative effects of AI in the educational process, it is necessary to strengthen the role of the teacher as a leader, mentor, and partner for students, rather than merely a provider of ready-made content or an enforcer of educational achievements. Teachers should embrace their role as facilitators of learning, guiding students through challenges and fostering critical thinking skills. Teachers, by understanding students' thoughts and emotions, have the ability to shape their attitudes and behaviors. Unlike information and communication technology, a teacher devoid of empathy should monitor and regulate students' emotions, support their coping with fear, stress, or low self-esteem. Building proper relationships stimulates curiosity, develops responsibility for one's actions, and arouses enthusiasm, which is crucial for motivation to learn.

Those responsible for the education process should also promote students' honesty regarding the ethical use of AI algorithms in education. This ethical framework is vital in shaping responsible digital citizens. Maintaining a balance between using tools that assist in generating ready-made content and developing creative thinking skills is crucial. Excessive dependence on technology can lead to a lack of initiative in students, equating to a loss of motivation to work on self-improvement.

Motivating students in the era of easy access to AI tools is a challenge for 21st-century teachers. his challenge calls for innovative approaches to education that leverage AI while maintaining essential human elements in teaching. The key factor is close cooperation between teachers, parents, students, and all educational institutions, aimed at fostering creativity and independent thinking in students.

Table 2. *Influences on Student Motivation in the Context of Artificial Intelligence in Education*

Aspect	Positive Influences	Negative Influences
Internal Motivation	Stimulation of interest and engagement through personalized learning paths via AI.	Easy access to ready-made solutions can decrease self-discipline and reliance on AI for creativity.
Feedback Mechanism	Immediate feedback on progress fosters engagement and awareness.	Electronic feedback lacks empathy, leading to potential disengagement.
Information Delivery	Interactive teaching methods and gamification enhance student engagement.	Over-reliance on AI tools may reduce the development of critical thinking and originality.
Learning Competitions	AI-based competitions foster collaboration and healthy rivalry, enhancing engagement.	Competition can lead to unhealthy comparisons and stress if not managed properly.
Teacher's Role	Teachers as mentors and facilitators can nurture curiosity and critical thinking.	Diminished teacher influence may reduce students' motivation and emotional support.
Ethical Framework	Promotion of honesty in the ethical use of AI shapes responsible digital citizens.	Lack of initiative in self-improvement due to dependency on AI tools can lead to reduced motivation.
Collaborative Environment	Close cooperation between teachers, parents, and students encourages creativity and independent thinking.	Insufficient human interaction and support can lead to a sense of isolation and disconnection in learning.

SUMMARY

In summary, the application of artificial intelligence in education brings significant benefits as well as challenges. Personalization of the teaching process, monitoring educational progress (Tuczyński, Walat, 2019, p. 210), and interactive motivational methods form the foundation of modern AI-supported education. Acknowledging both the advantages and challenges of AI in education is essential for its successful implementation (Yufei, Saleh, Jiahui, Abdullah, 2020, p. 553). However, it is crucial to understand that artificial intelligence should serve as an assisting tool, fostering critical and creative thinking skills. Moreover, it is imperative to recognize the potential of AI in enhancing educational accessibility. By utilizing AI-driven platforms, educators can reach diverse student populations, including those with disabilities or those from underrepresented backgrounds, ensuring that everyone has equal opportunities to succeed (Yang, Zang, 2019).

In the context of student motivation, it is important to emphasize the role of the teacher as a mentor and leader, providing not only knowledge but also supporting the emotional development of students. This mentorship is vital in helping students navigate the complexities of using AI in their learning.

Teachers must adapt their methods to create engaging, interactive environments that stimulate student interest. Collaboration among teachers, parents, students, and other educational stakeholders is a key element in shaping a positive approach to learning (Li, 2023).

Furthermore, it is essential to cultivate a growth mindset among students, encouraging them to view challenges as opportunities for growth rather than obstacles. Awareness of potential negative consequences, such as a loss of self-discipline or a reduced role for teachers, is essential. Educators should remain vigilant in promoting active learning and student accountability. Therefore, promoting honesty among students in using technology and maintaining a balance between the benefits and challenges posed by artificial intelligence is crucial. In today's educational environment, there is sometimes a misconception that artificial intelligence *writes* ready-made projects, essays, or other assignments for students (Pannu, 2015, p. 81). To address this, educational institutions should implement guidelines and curricula that clarify the appropriate use of AI tools in academic work. Hence, building awareness among students, teachers, and parents regarding the appropriate use of artificial intelligence in the educational process is essential. Workshops and training sessions can play a significant role in this educational endeavor. Collective reflection and close collaboration among all stakeholders are key to creating a healthy and motivating educational environment in the era of easy accessibility to AI tools. By fostering an ecosystem of shared knowledge and best practices, we can ensure that the integration of AI in education is beneficial, sustainable, and aligns with our educational goals (United Nation, 2019).

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