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EDUCATION IN THE ERA OF ARTIFICIAL INTELLIGENCE – NEW QUESTS AND POSSIBILITIES

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Purpose: The article's primary goal is to analyze artificial intelligence's (AI) development in the educational system.
Design/methodology/approach: In the article, deep analysis of the consequences of technological progress For process teaching, identifying challenges and opportunities related to dynamic AI development. Underlined the necessity of facing changes in education appearances the AI and valuable looking at the implications for ways driving lessons, content teaching, and self-education.
Findings: AI is a new way of solving problems, especially during crises. The new technologies determine the way and the speed of problem-solving. The new era of education requires modern methods concerning AI.
Research limitations/implications: The surveys discussed in this article may contribute to further empirical studies, including but not limited to initiating works to improve innovation in artificial intelligence.
Practical implications: Education in the age of AI demands a holistic approach, connecting modern technologies with traditional teaching methods and considering the ethical and social aspects of technological development.
Originality/value: Originality work is about a consistent approach based on research literature, which can be a basis for further empirical research regarding the impact of AI on education and modification of learning methods.

Keywords: educational technology, artificial intelligence, future education, education 4.0.

Category of the paper: General overview, Research paper.

1. Introduction

In today's world dominated by technology, the development of artificial intelligence (AI) brings revolutionary quantitative and qualitative changes, touching critical areas of our lives (Banasik, Kempa, 2023; Czupryna-Nowak, 2023). One area that feels the impact of AI is the education system. It seems reasonable to attempt an in-depth analysis of the consequences of

technological progress for the teaching process, identifying the challenges and opportunities related to this dynamic phenomenon.

In the face of the emergence of AI, education cannot remain in its actual state. The changes must be made promptly. A valuable look at this phenomenon requires a detailed understanding of the implications for teaching methods, content, and self-education. It is necessary to reflect on the current state of education, identify threats, and determine opportunities related to AI development's dynamic nature. The need to introduce innovations in the teaching process, including learning programming and developing technology-related skills, may help personalize the learning process and adapt it to the student's individual needs.

Special attention has been paid to the role of education in the new type of society, construction of knowledge, and shaping of the primary job skills and abilities, semi-learning activities of individuals in lifelong learning processes in public and private education sectors during formal and informal education, and new methods and tools in education (Juszczyk, 2006). It is also worth paying attention to significant challenges related to AI, such as threats related to data privacy and the need to prepare teachers to use modern educational tools effectively. The role of the teacher-appropriate preparation of teaching staff for teaching in the AI era is focused on the need to adapt the teaching system to the new reality, taking into account both existing threats and potential benefits. In this context, reflection on adapting both the methods and content of teaching becomes a critical element of the response to the challenges posed by the era of artificial intelligence. Analysis of the current state of education is necessary to identify strategies that effectively adapt the teaching system to the new, dynamic reality shaped by technological progress.

Education in the age of AI requires a holistic approach, combining modern technologies with traditional teaching methods. The effective use of AI can contribute to developing students' creativity and analytical skills while considering technological development's ethical and social aspects. The success of OpenAI 's ChatGPT is sparking scientific discussions about the potential applications of new technologies, including generative artificial intelligence. During the Conference "Artificial intelligence, cybersecurity, technological innovations. Challenges for the development of competencies", organized by the Sectoral Council for Competences - IT and the Sectoral Council for Competences - Telecommunications and Cybersecurity, the modern education system was debated. as well as the use of artificial intelligence to build personalized learning paths[1].

The text is based on the latest publications in the field of education published in recent years. It presents a summary of important topics regarding the challenges facing the educational system in the context of technological progress. The first of the analyzed issues is the implications of the development of artificial intelligence in education. Then, the concept of

[1]Discussion panel Artificial intelligence supporting the development of digital skills of students and teachers of vocational schools, https://konferencje.radasektorowa.pl/

artificial intelligence as a teaching tool is discussed. The next area focuses on the current state of education, presented based on the latest research using Big Data analysis. The last part of the article also analyzes trends in the currently changing educational reality, emphasizing both the opportunities and threats related to these transformations.

2. Implications of the development of artificial intelligence in the field of education

This dynamic intersection of technology and education holds promises and challenges that demand our attention and understanding. The development of artificial intelligence is inevitable, and its impact on various areas of life, including education, is becoming more and more noticeable. In today's reflections, we will focus on how these technologies can change the face of our educational system. One of the key benefits of using artificial intelligence in education is the ability to personalize the teaching process. Thanks to data analysis and machine learning algorithms, we can adapt the teaching material to the student's individual needs, allowing him to develop at the pace that suits him.

The introduction of artificial intelligence opens the door to the creation of innovative teaching tools. From virtual assistants to interactive learning programs, these modern solutions have the potential to revolutionize the way we teach and learn.

However, the development of artificial intelligence in education also brings challenges. One of them is the issue of fairness of algorithms. How can we ensure that AI-based systems are free from bias and treat all students fairly?

The introduction of new technologies also requires appropriate preparation of teaching staff. Teachers must be aware of the potential, but also of the limitations, of artificial intelligence. Therefore, it is crucial to invest in the development of teachers' digital competencies.

Another aspect that requires our attention is the role of artificial intelligence in the student assessment process. How can we protect against excessive automation and loss of a human perspective on a student's development? Introducing new technologies must also go hand in hand with attention to accessibility for all students. How can we avoid widening educational inequalities and ensure that the benefits of artificial intelligence are available to all? Ethics in the applications of artificial intelligence in education is an issue that cannot be ignored. How do we protect students' privacy and maintain ethical standards in the use of data? Cross-sector cooperation is necessary to use the potential of artificial intelligence in education effectively. How can we build bridges between academia, business, and government to jointly shape the future of schooling? Introducing artificial intelligence into education is a technological change and a cultural one. The vision for the future of education should include a balanced approach that considers technical benefits, ethical principles, and concern for the development of each student.

Implications of the development of artificial intelligence (AI) in education refer to the various effects, influences, and changes this technology can cause in teaching systems. Research on artificial intelligence (AI) in education has found its central place in the trends of intelligent tutoring systems. This dynamic area of research focuses on using the potential of artificial intelligence to transform educational processes and adapt to students' individual needs. (English: intelligent tutoring systems – ITS), systems supporting the teaching process (Conati et al., 2018). The intelligent tutoring systems that are the subject of this research represent an innovative approach to teaching, using advanced algorithms and technologies to deliver personalized learning experiences. The purpose of these systems is not only to provide information but also to actively adapt to each student's abilities, learning pace, and preferences. Thanks to research on artificial intelligence in education, it has become possible to create interactive educational platforms that enable students to approach learning individually. Intelligent tutoring systems analyze student progress data, identify areas requiring additional attention, and then adapt learning materials to meet the learner's needs better. A personalized approach supports skills development, strengthens students' motivation, and promotes more effective knowledge acquisition. Moreover, they can help teachers diagnose students' difficulties, adapt teaching strategies, and improve the teaching process's quality.

3. Educational possibilities of artificial intelligence

(…) *The time has come for artificial intelligence to appear openly in schools* (Sysło, 2022). The education sector can certainly benefit from the use of artificial intelligence. However, already at a very early stage of implementing innovative solutions, it is necessary to consider the educational environment's specificity, especially considering this system's mission (Fazlagić, 2022). Artificial intelligence (AI) is a key future technology, according to the European Parliament in 2020. In the context of the development of AI in Poland, the Committee of the Council of Ministers for Digitalization (KRMC) adopted the "Artificial Intelligence Development Policy in Poland" in 2020, which sets specific goals and actions for the short, medium and long term. One of the important areas of this policy is education, covering a wide range of activities from primary schools to universities, including training programs for people at risk of losing their jobs due to the ongoing development of technology. It is worth noting that the document mainly focuses on the role of education as a tool for shaping human capital in the context of the economy but does not provide specific guidance on the potential applications of AI in the education system. The IBE report "Artificial Intelligence (AI) as a megatrend shaping education" (2022) focuses on the analysis of the connections between the field of education and the dynamic development of artificial intelligence. The document identifies current and future trends and presents how society can be prepared for the opportunities and challenges related to

technological progress. It emphasizes the key role of digital competencies in developing artificial intelligence. The report provides a comprehensive look at how education can adapt to the changing digital landscape while providing society with the tools to use the potential of artificial intelligence effectively.

Table 1 presents an overview of the possibilities of using artificial intelligence in education. There are several subcategories among the applications:

- artificial intelligence supports the learning process,
- artificial intelligence as teacher support in administrative processes,
- artificial intelligence in managing the education system at its various levels.

Table 1.
Overview of the possibilities of using artificial intelligence in the field of education

Application	Description
Artificial intelligence supports the learning process	
Artificial intelligence as a teacher's assistant	Artificial intelligence can act as a tutor/tutor. AI is better at teaching the basics of specific knowledge disciplines and cannot develop higher-order skills in students, such as unity of thought and creativity. However, it cannot be ruled out that AI educational programs will also be able to develop higher-level skills in the future. When assessing the reliability of the results of educational experiments, the existence of the confirmation effect must be considered. The researcher tends to subconsciously experiment in such a way as to confirm their expectations. Moreover, in social research, the reliability of results is achieved by repeating the experiment many times. Teachers don't practice this. Artificial intelligence should, in principle, be deprived of the ability to fall into thinking traps typical of humans. Therefore, it should have an advantage over a living teacher.
Artificial intelligence as a teacher's replacement	Solutions already enable intelligent teaching – smart tutoring systems (e.g., Carnegie Learning). These include Amazon's Alexa, Apple Siri, and Microsoft Cortana. Voice assistants allow students to discuss the material they have learned without engaging the teacher. Educational institutions also use voice assistants to provide students with organizational information. For example, Arizona State University's Cognilytica offers students a freshman tutorial using Amazon Alexa software.
Artificial intelligence as a space ensuring emotional safety in the process of suffering educational failures	Learning is inextricably linked to trying and failing in the process. Many social and emotional barriers in a traditional school discourage students from trying. As a result, the learning process is less effective due to fear of public ridicule. Therefore, the opportunity to practice skills in isolation and the intimacy provided by artificial intelligence may be an advantage over the student's work in the classroom or the presence of a teacher.
Application to the individual needs of the student (personalization)	The teaching and upbringing system in a traditional school is, by nature, focused on averaging and standardizing the learning process. Artificial intelligence offers opportunities to personalize the learning process. Personalization should primarily concern detected knowledge deficits, which in a traditional classroom may be neglected by the teacher as a compromise to meet the educational needs of other students. For example, artificial intelligence can increase the intensity of test tasks in areas it considers needing improvement and reduce the number of test tasks in areas the student has already mastered. This way, the total time spent on testing can be equal for many students in a class, but the structure of testing tasks will vary. This approach allowed for a faster transformation of society from an agrarian economy towards an industrial economy. Other countries around the world followed suit.

Cont. table 1.

Giving feedback	Teachers in the classroom often do not have enough time to provide feedback to students about their learning progress and knowledge and skill deficits. Artificial intelligence can solve this problem. Analysis of knowledge deficits combined with a feedback library can allow AI to generate personalized, reliable, and detailed feedback in a given area. An additional advantage of using artificial intelligence may be depriving it of the accusation of subjectivity ("The teacher doesn't like me, that's why he gave me an F"). If the student cooperates with AI, then based on the collected historical data, AI can help the student make decisions regarding the selection of further stages of education. A separate issue is the honesty of feedback. You can expect an AI algorithm to be fair and objective, whereas a "live" teacher is not always able or willing to provide honest feedback. Although he acts unethically, he nevertheless, in passing, prepares the young man for life in a world of injustice and deceit. So, can this function also be simulated using artificial intelligence? Theoretically, yes, you can program the algorithm sometimes to be unfair/racist/biased/ discriminatory towards a given student - but this will cause even more moral problems than teachers' unethical behavior.
Artificial intelligence as teacher support in administrative processes	
Assessing students	Artificial intelligence can reduce the burden on teachers in the grading process. Assessment can be automated entirely (assessment based on tests) or partially automated, e.g., AI can analyze the results of the student's work and provide suggestions to the teacher but leave the final decision to the teacher himself. In the future, we can expect the development of systems for qualitative analysis of students' work. Other related tasks that AI can perform include entering grades at the end of the semester, completing employment-related reports and documentation, preparing study materials, organizing school trips, communicating with parents and solving problems of international students, matters related to sick leave, and others. Teachers spend a significant amount of their time on tasks unrelated to direct work with students. Therefore, relieving them of this type of task may automatically translate into increasing the effectiveness of the education process if the saved time is allocated to teaching or recreation. The burden of administrative tasks also significantly impacts the level of motivation to work and often results in burnout. Artificial intelligence can also suggest who the teacher should meet with and about what.
Checking student attendance and activity	This is one of the simplest tasks that simple software can perform.
Methodological support	The system can support the teacher in the teaching process. For example, suppose AI detects a disproportionately high number of incorrect student responses in a given area. In that case, it can provide the teacher with suggestions for improvement or, for example, content knowledge to impart to students. Currently, the tasks of a methodological advisor are entrusted to teachers by the education superintendent competent for the seat of the public training institution where the advisor is to be employed after consultation with the principal of the school or institution where the teacher is employed. AI may replace the functions of a methodological advisor in the future.
Relationship management	Teachers are obliged to maintain ongoing relationships with parents. AI could replace teachers with related tasks, especially if AI allows for direct feedback about the student to parents without involving the teacher.

Cont. table 1.

Artificial intelligence in the area of managing the education system at its various levels	
Teacher evaluation	Education systems in many countries worldwide have implemented various rules for teachers' assessment and professional advancement. They are based on analyzing specific predefined achievements and activities of teachers. As with student assessment, artificial intelligence could also assess or provide information to people evaluating a teacher. By linking - within appropriate algorithms - information on students' learning progress (educational added value) with the results of the analysis of teacher involvement, with the work of the school, cooperation with other teachers and the local environment, the algorithm could issue periodic evaluations to teachers in an objective manner. They could be devoid of substantive or political elements often accompanying a teacher's work. As a result, objectifying teacher evaluations in the education system could lead to a general increase in the quality of teaching if it were possible to eliminate the influence of substantive factors on the professional situation of teachers in the system.
Big data analysis about the education system	Appropriate algorithms with access to data generated based on student behavior can provide information allowing for the proper allocation of funds in the education system, predicting trends, and anticipating threats, for example, during a pandemic and distance learning. With such data, the Ministry of Education and Science could determine the scale of possible losses caused by the decline in the quality of teaching caused by the pandemic. Research on education systems on a macro scale has been conducted for some time, including by the CERI center within the OECD structures. By using artificial intelligence, the quality, scale, and frequency of measurements could increase significantly. As is currently the case, there would also be no need to rely on data from teacher surveys. Artificial intelligence could also answer many questions that are presently the subject of political debate in Poland and worldwide. In the case of Poland, for example, is increasing/lowering the age of compulsory pre-school education beneficial or not for a child's emotional and intellectual development?
Data analysis at the managing body and regional level	Analysis of regional differences at the level of large local governments (e.g., urban communes) could allow for optimizing the use of resources and monitoring the effectiveness of their use. For example, student and teacher activity data could be correlated within an AI algorithm with spending on information technology in education.

Source: Fazlagić (2023).

The educational possibilities of artificial intelligence are also described in the book Big Data in Education. The Digital Future of Learning Policy and Practice (Williamson , 2017). Among its many applications, the following stand out: data collection and processing, control of the learning process, creation of predictions of students' progress by an AI program, introduction of software that adapts to students' activity, analysis of progress in real-time, possibilities of implementing a learning management system) and teaching bots (teacher bot) and cognitive tutors (cognitive tutors).

Artificial intelligence can efficiently collect, analyze, and process large amounts of data, helping to identify patterns, trends, and student needs. Artificial intelligence-based systems can monitor students' progress in real time, identify areas of difficulty, and adapt teaching material individually to the needs of each student.

By analyzing data, AI can predict students' future progress, which allows them to adapt teaching strategies and support students. Individual learning programs generated by artificial intelligence can adapt to each student's preferences, pace, and learning style. Artificial intelligence systems can provide teachers and students with real-time information on learning progress, enabling quick intervention when needed. Artificial intelligence can support advanced

learning management systems, helping to organize teaching materials and lesson schedules and monitor student progress. AI-powered bots can act as teachers by answering students' questions, providing additional explanations, and offering one-on-one support. Artificial intelligence-based systems can serve as cognitive tutors, providing personalized learning assistance, solving problems set by students, and adjusting the difficulty level of tasks. Research on using robots in foreign language teaching confirms their effectiveness by increasing children's vocabulary and stimulating more significant interest in learning (Movellan et al., 2009; Belpaeme et al., 2018). Moreover, research has shown that this technology accelerates solving cognitive problems and positively affects students' perception of tasks (Belpaeme et al., 2018).

Introducing these solutions may contribute to a departure from the traditional model in which educational institutions dominate the teaching and learning process. Artificial intelligence can increase individualization and adaptation to students' needs and enable more effective use of educational resources. However, at the same time, there are challenges related to ethics, the fairness of algorithms, and the need to ensure access to new technologies for all students. The PARP report Artificial Intelligence in Education – Prospects and Threats (2023) presents an up-to-date look at artificial intelligence (AI) use in education. In the face of the digital revolution, AI is becoming an essential element of many sectors, including science, with huge potential for use in education. The report emphasizes that AI can significantly facilitate and improve the learning process at every level, from students to entire educational systems. Teachers can use AI to monitor student progress in real-time, identify learning difficulties, and adapt teaching methods to meet individual student needs. Introducing new tools, such as text, voice, video generators, and Learning Experience Platforms (LXP), significantly improves the efficiency and accessibility of education while introducing elements of gamification and improved online discussion forums, increasing student engagement. The report also points to the growing popularity of AI in education due to new tools such as ChatGPT introduced by Open AI and Bing by Microsoft. Research shows that teachers use these technologies more actively than students, and most recognize that AI introduces changes to the traditional teaching model.

The report also raises issues regarding Poland's role in the global context of AI, forecasting the potential automation of up to 49% of working time by 2030. The challenges of adapting employee skills to the requirements of the changing labor market are mainly targeted in the education sector. Cross-sector collaboration is critical to the effective implementation and use of AI in education. The report suggests that developers, teachers, and students should work together to create AI tools tailored to real learning needs. In addition, ethical, security, and privacy issues must be constantly monitored and regulated. However, the report also identifies barriers such as concerns about losing natural human relationships, privacy and data security issues, and technology addiction. There is also a need to transform the skills of workers in the education sector to meet the new demands of the labor market.

Artificial intelligence (AI) is currently an up-and-coming tool supporting the teaching process at many levels. AI allows you to adapt the teaching process to students' individual needs. Algorithms analyzing data on student progress will enable you to create personalized teaching plans, taking into account differences in learning pace and learning style. Modern education faces the imperative of individualizing the education process, an important research issue and an essential element of educational practice. Delving deeper into the problem, it turns out that it is becoming an inevitable requirement of educational reality while at the same time constituting an opportunity to improve the quality of education. One of the central authors dealing with this issue is Hłobije (2015), who emphasizes that the individualization of the education process is not just a luxury but a necessity to meet the growing demands of civilization. The author points out that this form of teaching is a tool that improves the quality of education and promotes students' creative and comprehensive development. He also points out that attempts at various treatments to individualize work with students in terms of adapting the content, methods, forms, and means of teaching to the psychophysical abilities of students have not yet brought the expected results.

In the context of research on the individualization of the education process, the question arises about effective strategies for achieving this goal. These considerations include adapting teaching content to the individual needs of students but also issues related to various learning styles. Research on this issue also focuses on using modern technologies, such as artificial intelligence, to adapt educational materials to each student's skill level and learning pace. The practical aspects of individualizing the education process have decisive consequences for the role of the teacher. In the new teaching paradigm, the teacher becomes not only a guide in acquiring knowledge but also a mentor who adapts his approach to the individual characteristics of each student. Supporting students in developing their strengths while focusing on eliminating difficulties is becoming a vital element of a modern approach to education.

Individualization of the education process is not only a theoretical postulate but a practical tool introducing a revolution in education. It is an opportunity to create a more adaptive and flexible teaching system that better responds to the changing needs of students while preparing them for the challenges posed by modern civilization. Open Learner concept Modeling develops based on research on educational technology and systems supporting the learning process. In this research, various researchers, research teams, and educational institutions contribute to developing the OLM idea, exploring multiple aspects of its implementation and potential benefits for the teaching process. Open Learner Modeling (OLM) is one of the leading trends in research on using artificial intelligence algorithms in the context of individualizing teaching. OLM is an approach that focuses on creating and sharing an open learner model that can be accessed by students, teachers, and other stakeholders alike.

The main features of Open Learner Modeling are:

- Transparency of Educational Data: OLM collects data from the learning process, such as progress, test results, preferences, and learning style. This data is transparently presented in the form of a model that can be available to the student, teacher, and sometimes other participants in the educational process.
- Customization of Educational Materials: OLM allows you to customize educational materials to meet the individual needs of your students. Based on data analysis, artificial intelligence algorithms identify areas where the student needs additional support and then deliver personalized educational content.
- Self-Development: OLM focuses on developing students' self-regulation skills. By accessing their learner model, each learner can better understand their learning process and identify strengths and areas for improvement.
- Student Engagement: OLM can increase student engagement by making the learning process more transparent and tailored to their preferences and learning styles.
- Teacher Support: Teachers have access to information about student progress, enabling them to adapt their teaching methods more effectively. OLM supports teachers in an individual approach to each student.

As a result, OLM is an attempt to create an open and accessible learning model that supports the individualization of teaching and promotes transparency, student involvement, and adequate teacher support. This approach applies to various educational contexts, including e-learning, online training, and traditional educational settings.

AI-based systems can efficiently handle administrative tasks such as grading, tracking progress, and generating reports. These systems allow teachers to focus more on direct contact with students. SI can provide custom educational materials tailored to students' advancement levels and interests. This approach promotes more effective learning by providing content that matches individual skills.

AI algorithms can identify areas where students are struggling. Thanks to this, teachers can react quickly, adapting teaching methods to the needs of specific students. The use of AI in education can support the development of skills crucial in the digital era, such as programming, data analysis, and understanding the basics of artificial intelligence. AI-based systems can create interactive learning environments that engage students in learning. Educational games, simulations, and virtual lessons are examples of interactive tools. It is worth emphasizing, however, that introducing artificial intelligence into education requires simultaneous consideration of ethical issues, data privacy, and appropriate preparation of teachers for the effective use of these technologies. However, integrating SI as a tool supporting the teaching process opens new perspectives, allowing education to be adapted to the contemporary needs of students and the challenges posed by technology development. AI can enable the teaching process to be tailored to the student's individual needs. AI algorithms can analyze student progress data and adjust learning materials and the pace of learning, fostering a more

personalized approach. The development of AI opens the door to new, innovative teaching methods. Using intelligent systems to create interactive lessons, educational games, or e-learning platforms can make learning more attractive and practical. AI can support the process of student diagnosis and assessment. Advanced algorithms can analyze test results, homework grades, and student interactions with educational content, enabling a better understanding of progress and possible adjustments to teaching methodology. Integrating AI into education can help develop skills essential in the digital age, such as programming, data analysis, and the ability to use modern technologies. This approach can better prepare students for future career challenges. Introducing AI into education also raises ethical issues, such as protecting student privacy, the fairness of algorithms, and the responsible use of student data. It is necessary to define clear moral and legal standards related to the use of AI in education.

The introduction of AI requires appropriate preparation of teaching staff for the effective use of modern educational tools. As scientific researchers rightly emphasize, acquiring new competencies, mainly digital, social, communication, and intercultural competencies, and online access to digital open educational resources is in the context of preparing teachers to develop media culture (Tanaś, Galanciak, 2020). Teachers must formulate technology-related skills to effectively cooperate with intelligent systems in teaching (Education of the future. Report by Wasyluk, Kucner, Pacewicz, 2020).

In summary, the implications of the development of artificial intelligence in education include some opportunities to improve the quality of teaching, personalize the educational process, and develop new skills in students, but also pose challenges related to ethics, data security, and appropriate preparation of teachers to use new technologies.

Considering that modern education is intended to prepare students for the challenges of the contemporary and future world and can be implemented in various ways, it is worth dwelling on the topic of inclusive education, also known as inclusive education. This approach is recommended by the Ministry of Education and Science, which ensures high-quality education for every student. Nowadays, when technology constantly evolves, artificial intelligence (AI) is becoming a key factor supporting educational processes, especially in inclusive education. AI opens up new perspectives, enabling us to create a more adapted and flexible educational environment.

As previously written, one of the main advantages of artificial intelligence in education is the ability to personalize teaching. This process includes adapting teaching materials, pace, and teaching style to students' skills and needs. By analyzing data, AI-based systems can identify each student's strengths, which allows them to focus on developing specific skills.

Adaptive learning is another area where artificial intelligence plays a key role. AI-based technologies adapt to students' progress, providing appropriate challenges as they acquire new skills. Such flexibility helps to maintain students' motivation and increases the effectiveness of the educational process. Speech and text recognition is vital in supporting students with various difficulties, such as dyslexia and reading problems. Advanced natural language processing

algorithms enable speech and text recognition, which allows access to educational content tailored to individual needs. Assistive technologies, such as image recognition programs and special math applications, are vital in eliminating barriers for students with various difficulties. These tools help you fully participate in the educational process.

Another advantage of artificial intelligence is the ability to detect students' weaknesses. Analyzing data from tests or tasks allows AI-based systems to indicate areas requiring additional support, enabling teachers to tailor their approach to each student individually. Developing social, cooperation and communication skills is extremely important in inclusive education. Artificial intelligence supports these areas by providing tools for remote communication, collaboration on projects, and sharing educational resources. In summary, using artificial intelligence in inclusive education creates a more adapted and flexible learning environment. However, it is equally vital that we supervise the development of these technologies and ensure their ethical and safe use, minimizing potential risks. From a science perspective, this is a fascinating period in which modern technology and education meet, creating new horizons for future generations.

4. Conclusions

The impact of AI on education is evident and significant. Ways of learning are changing, and traditional teaching methods are giving way to new, technology-based approaches. The challenge for educational communities and policymakers is creating regulations allowing for AI's controlled development in education. In education, artificial intelligence (AI) is a powerful tool to support various aspects of the teaching and learning process. AI has the ability not only to automate many processes but also to personalize and adapt to the individual needs of students. From the perspective of inclusive education, which aims to create an environment that supports the participation of all students, the use of AI can bring significant benefits. Artificial intelligence enables the personalization of the teaching process, which means adapting teaching materials, pace, and teaching style to students' abilities and needs. Thanks to data analysis, AI can identify each student's strengths, allowing it to focus on developing specific skills. AI-based technologies have the potential to adapt to students' progress, offering them appropriate challenges as they acquire new skills. Adaptive learning allows for dynamic adjustments to curricula, which helps maintain student motivation and increases the effectiveness of the educational process. Thanks to advanced natural language processing algorithms, AI can recognize speech and text, which opens up new opportunities for students with various difficulties, including dyslexia or other reading problems. These tools can support the reading process by enabling access to educational content in a way tailored to individual needs. Artificial intelligence can support students through various assistive

technologies, such as image recognition programs or unique applications that help with math tasks. These tools aim to eliminate barriers, enabling students with multiple difficulties to participate more fully in the educational process. AI can also help identify areas where students are struggling. By analyzing data from tests or tasks, AI-based systems can indicate areas that require additional support, enabling teachers to approach each student individually. In the context of inclusive education, a key element is developing social, cooperation, and communication skills. AI can support these areas by offering tools for remote communication, collaboration on projects, and sharing educational resources. However, at the same time, it is essential to supervise the development of these technologies and ensure their ethical and safe use, minimizing potential risks. When developing the topic of threats related to introducing artificial intelligence (AI) into education, there is a need to focus on two key aspects: the lack of critical thinking and empathy among students and potential addiction to technology. These threats require not only attention but also specific intervention to ensure that the impact of AI on education is positive and sustainable. Introducing artificial intelligence into the educational process may create a situation where students rely too heavily on algorithms and automation, impacting their critical thinking ability. Too much trust in machine-generated content or evaluation algorithms may inhibit the development of analysis, reflection, and independent thinking skills.

Furthermore, there is a risk that students may lose the ability to empathize when interactions replace interactions with teachers or other students with technology. Virtual learning environments, although offering modern tools, may limit the development of social skills that are key to understanding other people's perspectives and building the ability to cooperate and empathize. Including elements in curricula that develop critical thinking, encourage independent thinking, and emphasize social skills is essential. Additionally, monitoring students' interactions with technology, supported by teachers, can help maintain a balance between using digital tools and developing social skills.

The second significant threat is students' potential addiction to technology. Introducing artificial intelligence into teaching creates the risk that students may become too reliant on interacting with computers, which can lead to problems with concentration and the ability to solve problems independently and cope with situations without technology. It is necessary to consciously design educational programs that integrate technology with traditional teaching methods to prevent this. It is also important to develop independence and time management skills early so that students can use technology effectively while maintaining the ability to think independently and solve problems. Ultimately, to effectively manage these threats, it is necessary to constantly monitor the impact of artificial intelligence on students, adapt curricula, and develop appropriate training programs for teachers.

Collaboration between educators, educational technology specialists, and policymakers is crucial to successfully integrating AI into education while minimizing potential risks.

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