Artificial intelligence as an effective tool for personalized learning in modern education

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Abstract- Artificial Intelligence (AI) plays a pivotal role in the modernization of the educational process, particularly in higher education institutions, by enhancing the quality of professional training for future specialists. The integration of AI fosters personalized learning through adaptive technologies that optimize students' educational trajectories based on their individual needs and knowledge levels. This paper explores critical elements such as the implementation of virtual simulations and laboratories, automated assessment systems, and AI-powered learning tools. These innovations contribute to creating a more efficient, interactive, and engaging educational environment. The primary objective of this study is to substantiate the role of AI in personalized learning and improving the efficiency of the educational process. It also aims to analyze the specific features of AI integration into vocational education and assess the impact of adaptive learning technologies, automated assessment systems, and virtual simulations on the training of future professionals. The research employs both theoretical and empirical methods. The empirical research involved an experimental study with the participation of 45 educators and 120 students. To assess the effectiveness of AI integration in educational settings and professional activities, a customized survey was developed. The questionnaire addressed issues such as familiarity with, application of, and perceived benefits from AI-driven tools, including chatbots, automated grading systems, and adaptive learning platforms. The analysis of survey responses reveals widespread adoption of AI technologies among students. Approximately 70% of the students are familiar with these technologies and actively use AI-powered chatbots, automated assessment systems, and adaptive learning platforms. Virtual simulations and AI-driven learning assistants also contribute to practical skill development, although their full potential remains underutilized due to infrastructure limitations. Among educators, AI adoption is comparatively lower. Only 40% actively use AI in their teaching practices, while 35% apply it on an occasional basis. The main barriers to AI adoption include insufficient technical training (60%), lack of funding (50%), and legal and ethical concerns (40%). Nevertheless, 55% of educators recognize the potential of AI to enhance personalized learning and are willing to integrate AI tools into their teaching methodologies. The study confirms AI's significant potential in improving the educational process. AI-driven adaptive learning environments can accommodate individual learning styles, knowledge levels, and personal preferences. AI-powered assessment tools, such as Google Forms with AI modules, enable efficient and objective evaluation of student knowledge, thereby reducing educators' workload and providing immediate feedback. Virtual assistants, including GPT-based platforms, offer real-time support for learning and task completion, particularly in remote and blended learning environments. The integration of AI in education enhances teaching efficiency, fosters innovative learning methodologies, and prepares students for the evolving demands of the modern job market. The adoption of advanced AI technologies is crucial for developing a competitive educational ecosystem capable of addressing the global challenges of digital transformation. Future research should focus on improving AI accessibility, enhancing educator training, and addressing ethical concerns to fully

harness the benefits of AI in education. Furthermore, the continued development of adaptive algorithms, virtual tutors, and augmented reality will be essential in shaping the future of AI-powered learning environments.

I. INTRODUCTION

Modern society is undergoing significant transformations under the influence of emerging technologies, particularly AI, which has become a crucial factor in various fields, including professional education.

The advancement of communication technologies necessitates a reevaluation of physical structures and spaces where individuals live, learn, and work. Physical presence is no longer a prerequisite, making it essential to explore alternative forms of information dissemination. This shift facilitates database management, real-time interaction, and enhanced mobility while improving access to valuable resources [1].

AI is rapidly reshaping the professional landscape and imposing new skill requirements on the workforce, especially in the context of technological advancements [2].

The relevance of the topic lies in the fact that modern education requires innovative approaches that ensure a personalized learning experience and enhance its effectiveness. The use of artificial intelligence opens new opportunities for adapting the educational process to the individual needs of students, fostering interactivity and motivation for learning. At the same time, the implementation of such technologies is accompanied by certain challenges, including ethical concerns, data privacy protection, and the need for educators to be trained in using new digital tools. Therefore, studying the impact of artificial intelligence on personalized learning is crucial for the development of contemporary educational systems.

The readiness of future professionals to engage with digital technologies in their careers depends on their level of digital competence [3].

Among the key skills necessary for successful AI integration in the workplace are analytical thinking and innovation. The ability to process vast amounts of data efficiently and generate novel ideas is becoming a fundamental requirement for professionals. Additionally, active learning – continuous knowledge acquisition and adaptation to technological advancements – is crucial, as the rapid evolution of technology demands lifelong learning. Moreover, complex problem-solving and critical thinking are essential for evaluating AI-generated outputs and making informed decisions. Working with new technologies also requires creativity, originality, and initiative to develop innovative solutions and approaches.

A particular focus should be placed on developing soft skills, such as leadership, social influence, and adaptability. As AI-driven technologies become more prevalent, leaders must manage teams working with new tools and drive organizational changes. Equally important is the ability to quickly adapt to shifting conditions and transformations introduced by AI [2].

The impact of AI highlights the need for versatility. In an unpredictable world, the most effective safeguard is the ability to evolve across four dimensions –knowledge, skills, character, and learning – and four driving forces – motivation, identity, free will, and purpose. Education is not obsolete, but it requires comprehensive adaptation. AI cannot function autonomously; therefore, it is necessary to develop an integrated framework encompassing declarative (core content), procedural (design-based), conceptual (fundamental principles), and epistemological (meta-level) knowledge. Traditional disciplines must be modernized accordingly. Moreover, attention should be given to contemporary fields such as technology, engineering, social sciences, and entrepreneurship while promoting interdisciplinarity and cross-cutting themes [4].

Despite the numerous benefits of AI adoption, it is important to recognize the potential negative consequences of technological shifts in the labor market, including the displacement of traditional professions. This reality necessitates continuous workforce adaptation and calls for reforms in education and professional training systems [2].

Substantial ethical, technical, and pedagogical challenges lie ahead, and there is a genuine risk that rapid AI advancements in products and services may outpace the education system's ability to understand, manage, and integrate them effectively [5].

Thus, preparing for future professional challenges associated with AI development is a vital component of training a competitive workforce for the modern labor market. This preparation should focus not only on technical skills but also on soft skills, enabling individuals to work efficiently with emerging technologies and adapt to an ever-changing environment.

The integration of AI in education presents new opportunities for enhancing educational quality, improving learning efficiency, and personalizing curricula to meet individual student needs. In professional education, where both theoretical knowledge and practical skills are essential, AI facilitates an interactive, flexible, and personalized learning experience. AI-powered technologies enable the creation of virtual simulations, intelligent tutoring systems, automated assessment tools, and adaptive learning platforms that cater to individual student proficiency levels. However, the use of AI in professional education introduces new societal challenges. These include institutional technological readiness, the development of educators' competencies, and the ethical considerations surrounding AI integration in education. The growing significance of this topic is driven by the rapid expansion of digital technologies and the necessity of preparing skilled professionals for high-tech environments.

Research on AI's role and potential in professional education will help identify the most effective implementation strategies and contribute to enhancing educational practices.

Scientific publications, monographs, articles, and reports focusing on the opportunities, benefits, and drawbacks of AI in education have been analyzed. Androshchuk & Malyuha [6] emphasize that AI can significantly improve the quality of educational services by automating processes and adapting learning to individual student needs. However, achieving these goals requires governmental support and infrastructure development. Panukhnyk [7] examines the role of artificial intelligence in shaping the modern educational environment, highlighting the importance of responsible technology use in education and research. Zatserkivna & Khalimanenko [8] explore AI's role as a tool for educational modernization, emphasizing its impact on pedagogical approaches. The authors justify the necessity of AI integration into learning processes to enhance their efficiency and competitiveness. Gurevych et al. [9] discuss the complexity and multidimensional nature of AI integration in education, addressing both challenges and opportunities. The authors provide a detailed overview of the current situation and propose concrete steps for the effective implementation of AI in the education system. Topuzov & Alekseeva examine the role of innovative technologies, including AI, in ensuring the continuity of education during crisis situations. They propose new approaches to organizing the educational process that meet contemporary challenges [10]. Kovalchuck & Vorotnikova highlight the value of digital methods for teacher professional development, particularly the significance of e-coaching and e-mentoring in modern education, and suggest promising directions for further research [11]. Koval, Oliinyk, Kryvosheia & Khylia investigate gamification in education and explore the differences between gamification and the use of games in learning processes [12].

Kolomiets & Kushnir [13] discuss the key challenges of using AI in education, particularly issues related to data privacy, financial costs, unequal access, and the risks of technology misuse. They also analyze the impact of AI on scientific research, emphasizing ethical aspects, academic integrity, and providing recommendations for the effective use of technologies in the educational process.

The study by Nazar [14] examines the contemporary influence of AI on education, its advantages in the learning process, the level of awareness in Ukraine, and the prospects for further technological development to improve educational approaches.

Hrytsenchuk [15] analyzed the use of artificial intelligence systems in the digitalization of education, exploring both international and domestic experiences, theoretical and practical aspects of their application, as well as the effects and prospects of using modern AI technologies, particularly generative AI, to support the learning process, taking into account the regulatory framework and existing challenges.

This study analyzes specific examples of AI applications in education.

Given the existing challenges and issues, this study outlines key directions for the advancement of professional education. Specific measures have been proposed to address urgent concerns and facilitate the reorientation of vocational training programs to improve their quality. These include participation in EU-funded projects, the development of specialized training modules and courses to support continuous professional development for educators, the enhancement of curricula to improve the technical infrastructure of vocational education institutions, and the upskilling of teaching staff [16].

II. MATERIALS AND METHODS

The purpose of this study is to substantiate the role of AI in personalized learning and enhancing the effectiveness of the educational process, analyze the features of its integration into vocational education, and assess the impact of adaptive learning technologies, automated assessment systems, and virtual simulations on the training of future specialists.

The research methodology combines theoretical analysis, experimental research, and data collection through surveys.

To examine the development of AI in education, a detailed review of international and domestic scientific publications, monographs, articles, and studies related to personalized learning through AI technologies was conducted. Special attention was given to modern approaches to using intelligent systems in educational processes, which enable the adaptation of learning materials to the individual needs of students. A comparative analysis of the application of AI tools such as chatbots, intelligent tutors, adaptive learning systems, and other personalization tools was carried out to assess their impact on the learning process. The evaluation was based on student learning outcomes, feedback effectiveness, and student engagement in the process.

To investigate the relevance and practical significance of AI implementation in personalized learning, an experimental study was conducted involving 45 educators and 120 students from Dmytro Motornyi Tavria State Agrotechnological University, Separate Structural Subdivision «Hlukhiv Agrotechnical Professional College of Sumy National Agrarian University» I. Horbachevsky Ternopil National Medical University, and Kryvyi Rih State Pedagogical University. A survey was developed for data collection.

The student survey focuses on studying the use of AI technologies in learning. It assesses students' familiarity with AI, the frequency of using tools such as chatbots and

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adaptive platforms, and their effectiveness in personalized learning. The survey also explores students' attitudes towards the potential of AI replacing teachers and the challenges they face when using these technologies.

The educator survey focuses on the application of AI in teaching. It investigates which AI tools educators use, how they evaluate their impact on personalized learning, and their effectiveness in teaching. Additionally, it identifies the challenges associated with AI implementation, such as technical or financial barriers, and explores the readiness of educators for training and development in this area.

Quantitative data from the surveys and experimental assessments were processed using descriptive statistical methods. Qualitative responses were analyzed thematically to identify key ideas related to the effectiveness and limitations of AI in education.

The combination of theoretical research, empirical experiments, and survey analysis provides a comprehensive understanding of the role of artificial intelligence in modern education.

III. RESULTS AND DISCUSSION

According to the findings of the "Future of Jobs" survey, the most significant transformative trend in the coming years will be the expansion of digital access, which is expected to substantially alter both technological processes and business operations. It is projected that by 2030, 60% of employers will consider this phenomenon critical for the development of their companies. Technological advancements, particularly in artificial intelligence (AI) and data processing (86%), robotics and automation (58%), as well as in energy production, storage, and distribution (41%), are expected to be key drivers of future change. These technologies will influence the structure of workplaces, contributing to the growth of certain occupations while reducing others, thereby increasing the demand for specialists in emerging technologies. Among the most in-demand skills will be expertise in AI, big data, networks, cybersecurity, and technological literacy. Specifically, the demand for big data analysts, fintech engineers, software developers, and machine learning specialists is expected to rise. The most dynamically developing skills include artificial intelligence, big data, networks, cybersecurity, and technological literacy. Additionally, throughout the period from 2025 to 2030, essential personal qualities such as creative thinking, resilience, flexibility, and agility, as well as the ability for continuous learning and development, will remain crucial. Conversely, there is a notable decline in the demand for skills related to physical endurance, manual dexterity, and precision, with 24% of respondents predicting a reduction in the importance of these skills in the coming years [17].

Artificial intelligence is emerging as a key factor in the transformation of workplaces, altering skill requirements for employees. Education plays a vital role in preparing specialists for the changes brought about by AI

development. As demand for new technological skills – such as artificial intelligence, big data, cybersecurity, and programming – continues to grow, education systems must adapt their curricula to equip students for these transformations. This involves not only studying the technical aspects of AI but also fostering soft skills such as critical thinking, creativity, and the ability for lifelong learning. Educational institutions must ensure the flexibility of their programs so that students can effectively adapt to the rapidly evolving technological environment and be prepared for the challenges of the future labor market.The application of AI in education is gaining increasing attention as it has the potential to transform traditional learning approaches. AI can facilitate personalized learning methods, automate assessment processes, and enhance overall educational efficiency. Research on AI in vocational education is based on an analysis of the latest theoretical approaches, practical applications of AI, and evaluations of its impact on learning effectiveness. To ensure a comprehensive study of the topic, a range of research methods has been employed.

A literature review on the use of artificial intelligence in education highlights the significant potential of this technology to enhance the learning process, ensuring personalized learning, increasing efficiency, and improving accessibility.

Adaptive learning systems can be utilized to create educational trajectories that best align with each student's knowledge level and learning style. Adaptive learning is both a scientific and technical achievement. Rapid feedback, correction, metacognition, and mastery-based learning are just some of the many educational benefits of this system [18].

The implementation of AI in Ukraine's educational system is regulated by several legal documents and supported by scientific research, which define strategies, opportunities, and challenges of this process.

In December 2020, the Cabinet of Ministers of Ukraine approved the Concept of AI Development in Ukraine, which identifies education as one of the priority areas for AI implementation. This document emphasizes the need to improve digital literacy, develop legal mechanisms for AI regulation, and integrate relevant technologies into educational programs [19].

The Ministry of Education and Science of Ukraine, in collaboration with the Ministry of Digital Transformation, has developed instructional and methodological recommendations for the use of AI technologies in general secondary education institutions. These recommendations aim to ensure responsible AI use, adhere to ethical standards, and increase educators' awareness of potential risks [20].

Researchers are exploring the potential of AI in personalized learning, automated assessment, and the creation of adaptive educational environments. For instance, Hrytsenchuk analyzes Ukraine's and other

countries' experiences in integrating AI into the educational process, as well as examining modern technologies such as expert systems, chatbots, and intelligent tutors [15].

Iliichuk substantiates the relevance of AI implementation in education, defines its role in improving learning quality, and outlines potential risks associated with its use [21].

Despite AI's significant potential in education, challenges remain regarding ethics, data privacy, and the need for teacher training in new technologies. It is crucial to maintain a balance between innovation and respecting the rights of educational process participants.

Thus, legal documents and scientific research provide the foundation for responsible and effective AI implementation in Ukraine's educational system, contributing to improved learning quality and student preparedness for contemporary challenges.

Various AI tools are applied in education to enhance the learning process and improve teaching efficiency. The choice of specific technologies depends on the field of study, specialization, and educational goals. This publication examines the most widely used AI tools actively utilized in the educational environment.

Adaptive learning systems such as Coursera and Khan Academy enable the creation of individualized learning paths for each student. Data analysis shows that students using adaptive platforms demonstrate higher knowledge retention levels compared to traditional methods.

AI-based virtual laboratories and simulations can significantly improve students' practical training. For example, in engineering, students can simulate equipment operation, conduct experiments, and analyze results without endangering equipment or the environment.

One such tool is Labster, a web-based platform offering virtual laboratory simulations in STEM subjects. Currently, over 168 simulations for high schools and 248 simulations for higher education institutions in biology, chemistry, physics, and related sciences have been developed. Labster requires a compatible device and stable internet connectivity. Each simulation provides an immersive first-person experience with realistic movements, voice guidance, and accessibility settings explaining each element on the screen [22].

The use of AI-powered chatbots and virtual assistants, such as ChatGPT, has become widespread for student consultations, answering course-related questions, and assisting with assignments. This facilitates prompt assistance and increases student satisfaction.

Nedashkivska [23] emphasizes the role of intelligent systems, including virtual assistants. Task-oriented bots simplify complex tasks, such as @topdf_bot, which converts documents and files (doc, docx, odt, txt, jpg, etc.)

into PDF format. Informational bots provide regular updates on specific topics.

A team of authors, including Vizniuk [24], highlights AI's role in knowledge assessment. Tools like Google Forms, AutoTutor, and other interactive platforms enable quick and objective student evaluations. Automated assessments reduce teachers' workload and provide detailed feedback.

The most straightforward applications of AI include knowledge assessment, automatic task monitoring, error detection and correction, and support for teachers in determining task completion independence when grading. Additionally, AI can mitigate academic dishonesty by analyzing video footage and user behavior in browsers. AI-based exam monitoring systems verify the independence of task completion. AI also aids in knowledge acquisition and skills development by recognizing text and speech, analyzing natural language, and facilitating understanding [24].

The Google Forms™ ChatGPT Quiz Generator offers a convenient way to create quiz questions. Using the latest GPT-4 model, the process is simple: input an article's text and click «Generate Questions.» GPT OpenAI will generate questions based on the provided text. Users can specify the number of questions, correct answers, and question types (multiple-choice, checkbox, or list) for the quiz. The GPT Test Generator for Forms™ allows users to edit generated questions before integrating them into Google Forms™, streamlining the quiz creation process for online courses, student testing, or knowledge assessment in specific disciplines [25].

Digital technologies are transforming resource management in all elements of the agricultural system, enabling management based on optimization, individual approach, justification, and predictability. One aspect of «smart» agriculture is the use of unmanned aerial vehicles for tasks such as creating electronic field maps, monitoring crops, evaluating performance, protecting agricultural lands, and applying pesticides to control harmful organisms [3].

AI technologies are also utilized to develop «soft» skills, such as time management, teamwork, and decision-making. For example, simulation games model real-life scenarios, teaching students to make informed decisions. For agricultural engineers, the game Farming Simulator 23 Mobile is a suitable tool [26].

This is the mobile version of a popular farming simulator that immerses users in modern farm management. Offering a realistic farming experience with a variety of machines, agricultural crops, livestock, and production processes, the game includes over 100 licensed machines from well-known brands such as John Deere, CLAAS, Case IH, and New Holland. Players can cultivate grain and vegetable crops or take care of cows, chickens, and sheep. They can participate in the full cycle of

agricultural production, from sowing seeds to selling finished products. Participants in the game can work together to achieve common goals. The game simulates weather dynamics, soil impact, and machine movement. It is adapted for mobile devices, available for iOS and Android, and features an intuitive interface for convenient management of all aspects of the farm.

Farming Simulator 23 Mobile enhances understanding of agricultural processes by familiarizing users with the full cycle of agricultural production, including planning sowing campaigns, crop care, and harvesting. Virtual operation of various agricultural machines provides insights into their functions and principles of operation. The game fosters analytical skills regarding the economic feasibility of crop cultivation and livestock farming. It also develops teamwork, collaboration, and task distribution skills. Additionally, it encourages independent decision-making, particularly in evaluating factors such as weather, sowing timing, and plowing. The visualization of theoretical knowledge enables students to observe realistic models of agricultural operations. Gamification makes the learning process more engaging and motivating for students. The game allows students to conduct virtual experiments without exposing themselves or real farms to risk. Integrating Farming Simulator 23 Mobile into educational programs enables the simulation of production processes, training in machinery operation, and assessment of the economic aspects of the agricultural business.

Research has demonstrated that the implementation of AI in vocational education is a promising direction that can enhance the quality of education and the preparation of qualified specialists. However, the effective use of these technologies requires appropriate technical support, teacher training, and the development of ethical guidelines for AI utilization. Future research prospects include improving AI technologies for vocational education, developing accessible tools for mass use, and studying their impact on training quality.

We conducted a survey among 45 teachers and 120 students regarding the use of AI in education and work. According to the results, the majority of students (approximately 70%) are already familiar with AI technologies, although their level of awareness varies. Students actively use tools such as chatbots, automated assessment systems, and adaptive learning platforms. Although less popular, virtual simulations are also used; however, their broader implementation requires infrastructure improvements.

Regarding the effectiveness of AI for personalized learning, most students (approximately 60%) consider these technologies highly effective. They emphasize that adaptive algorithms and assessment systems allow for a more individualized learning approach, which is particularly important in blended and distance learning environments. Students also have a positive attitude toward the use of AI in education, supporting its widespread adoption. However, some students express concerns about

the potential complete replacement of teachers by AI in the future. This indicates that while students recognize the importance of human factors in education and are willing to collaborate with technology, they are not ready for full automation.

Among teachers, the results show that only 40% actively use AI technologies in their pedagogical practice. This may be due to a lack of sufficient technical training or limited access to resources such as specialized platforms or software. However, the majority of teachers (approximately 35%) use these tools occasionally, employing automated assessment systems, adaptive platforms, and other innovative technologies to enhance the quality of education. Teachers particularly highlight the significant impact of AI on personalized learning. Most of them (55%) believe that AI can greatly improve the individual approach to students by adapting the learning process to their needs, knowledge level, and learning pace.

However, there are substantial barriers to the implementation of AI in teaching. The main challenges include insufficient technical training for teachers (60%), lack of funding (50%) for upgrading educational platforms, and ethical and legal issues related to student data usage and AI technologies (40%). Despite these challenges, teachers express a willingness to undergo additional training for better AI integration into their teaching, which is a positive sign for the future development of these technologies in education.

Overall, projections indicate that while AI tools are already being used by students and teachers, their implementation faces several significant challenges. Primarily, these are technical barriers, including inadequate teacher training and the lack of necessary software and infrastructure for effective AI use in education. Additionally, the absence of funding often hinders the implementation of innovative technologies in educational institutions. Despite these difficulties, both students and teachers recognize AI's vast potential for improving personalized learning and enhancing the efficiency of the educational process. Students express readiness to adopt new tools, while teachers show a desire to improve their skills in working with technology, which opens up prospects for AI's future integration into education.

The survey results demonstrate a high level of positive perception of AI in education among both students and teachers while also identifying existing challenges related to technical and financial aspects of implementing these technologies. To maximize the benefits of AI use, efforts should focus on improving teacher training, expanding access to resources, and developing ethical standards for AI utilization in education.

IV. CONCLUSIONS

Within the context of our research, the characteristics of AI usage in professional education have been identified. The study has outlined the prospects for further development of AI-based personalized learning and its

impact on the future of education. A survey conducted among educators and students has demonstrated a high level of interest in and usage of AI technologies in the learning process.

Based on the analysis of literature and survey data, it has been established that AI technologies facilitate the adaptation of the educational process to the individual needs of students, enabling the creation of personalized learning trajectories while ensuring interactivity and flexibility. AI-based virtual simulators and laboratories allow students to develop practical skills without causing harm to equipment or the environment. The implementation of automated knowledge assessment systems enables rapid and objective analysis of students' preparedness, reduces the workload on instructors, and enhances feedback, which can be used to improve the quality of education. Additionally, AI-powered chatbots and other systems can provide real-time assistance to both students and educators, promoting better knowledge retention and motivation.

Approximately 60% of students consider AI an effective tool for personalized learning, enhancing the individualization and flexibility of the educational process. At the same time, some students express concerns about the potential complete automation of education, emphasizing the importance of the human factor. Among educators, only 40% actively use AI in their work, indicating certain barriers to the adoption of these technologies. The primary challenges include insufficient technical training, lack of funding, and ethical and legal concerns regarding student data usage. Despite these difficulties, the majority of educators recognize the positive impact of AI on the personalization of learning and express willingness to undergo professional development in this area.

The practical value of the research lies in providing recommendations for the integration of AI systems into the educational process. Special attention should be paid to the ethical and organizational challenges associated with the implementation of AI in education. Insufficient technical training for educators, financial constraints, and data privacy issues remain key barriers to the full implementation of these technologies. However, the willingness of educators to enhance their qualifications and adapt AI tools to the learning process serves as a positive signal for the further development of digital technologies in the education sector.

The results of the surveys indicate that students are using AI tools more actively than educators and generally rate their effectiveness in learning positively. However, concerns regarding the potential automation of the educational process highlight the importance of maintaining a balance between technology and the human factor in teaching.

Prospects for further research include improving adaptive educational platforms, developing accessible tools for the widespread integration of AI into the learning process, and evaluating its impact on the quality of student training. An especially important direction is the integration of AI into curricula to foster soft skills such as time management, decision-making, and teamwork, which will contribute to the development of competent specialists across various fields.

Overall, the study results indicate the significant potential of AI in education, particularly in the domain of personalized learning. However, for the effective implementation of these technologies, it is necessary to address issues related to the technical training of educators, ensure access to innovative educational platforms, and establish clear ethical and legal frameworks for AI usage. Resolving these challenges will contribute to the further integration of artificial intelligence into education and enhance its overall effectiveness.

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