ORIGINAL ARTICLE

ARTIFICIAL INTELLIGENCE CAPABILITIES IN THE COACHING PROCESS (PERSONALIZATION, ADAPTIVE LEARNING)

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Abstract: This article analyzes the possibilities of using artificial intelligence (AI) in the mentoring process for personalization and adaptive learning. In the modern educational environment, an individual approach and comprehensive development of learners are of great importance. AI technologies assist mentors in tailoring the learning process to the abilities and needs of students. The study examines methods for delivering AI-based personalized learning materials and adapting the teaching process in real time. The results indicate that artificial intelligence is a crucial tool for enhancing the effectiveness of mentoring, as well as increasing student engagement and motivation. At the same time, pedagogical and ethical aspects of technology use must be taken into consideration.

Keywords: Mentoring, artificial intelligence, personalization, adaptive learning, educational technologies, learning process, individual approach.

Introduction

The mentoring process is the most important and complex part of the educational and upbringing process. Through this process, mentors try to ensure not only the level of knowledge of students, but also their personal, social and psychological development. Along with the development of educational systems, new forms, approaches and methods of mentoring are emerging . In particular, in recent years, the development of information and communication technologies, including artificial intelligence (AI), has allowed to radically change the mentoring process and make it more effective. Artificial intelligence technologies allow mentors to strengthen the individual approach, adapt teaching to the needs and abilities of students.

In coaching, the concepts of personalization and adaptive learning allow for the organization of the learning process of students at the individual level. Personalization means adapting the content, form, and methods of education to the individual characteristics, abilities, learning styles, and needs of students [1]. Adaptive learning, on the other hand, means continuously adjusting the educational process based on the activity and results of students in the learning process in real time. These approaches serve to make the coaching process more interactive, effective , and productive.

For an individual approach in modern pedagogy increases, the role of artificial intelligence in the coaching process is increasing. Systems created using artificial intelligence identify the characteristics of students' information perception, level of knowledge and learning pace, and offer them the most suitable educational materials. Such systems help coaches develop educational programs that meet the needs of students, opening up new opportunities for increasing the effectiveness of the coaching process. At the same time, AI technologies also serve to develop students' abilities to self-control and independent learning [2].

Personalized and adaptive learning concepts help improve the quality of education, reduce knowledge gaps between students, and ensure that each student grows within their own abilities. Artificial intelligence-based coaching systems allow for continuous monitoring of students' knowledge levels, identifying their strengths and weaknesses, and offering them appropriate individual guidance. This process not only increases the effectiveness of coaching, but also increases students' interest and motivation in learning.

However, there are also a number of challenges associated with the integration of artificial intelligence into the educational process. In particular, it is necessary to fully adapt the technologies themselves to educational goals, increase the technological literacy of trainers, protect the personal data of students , and take into account ethical aspects. Therefore, for the effective use of artificial intelligence tools, it is necessary to consider not only technical solutions, but also pedagogical and ethical principles.

This article is aimed at an in-depth analysis of the possibilities of artificial intelligence for personalization and adaptive learning in the coaching process. The study examines methods for creating individual training plans based on AI, methods for optimizing the coaching process, and their impact on the quality of education. The experience of coaches and students in using AI technologies is also reviewed. This article serves to shed more light on the prospects for introducing modern technologies in the field of coaching and education.

REVIEW OF RELATED LITERATURE

Research in the field of artificial intelligence and its application in educational processes has expanded significantly in recent decades. Woolf (2010) describes in detail the principles of creating interactive teachers using artificial intelligence, emphasizing the effectiveness of teaching students based on their individual characteristics [3]. He believes that AI systems can identify students' abilities and adapt their learning process, which serves as the basis for the development of new approaches to coaching.

Adaptive hypermedia systems, as studied by Brusilovsky (2001), have been shown to be effective mechanisms for adapting the learning process to the individual needs of students. These studies have provided the foundations of the theory of personalization and adaptive learning, opening up new directions for the use of technology in coaching. Holmes et al. (2019) examine modern trends in the use of artificial intelligence in education, including support and interactivity in the coaching process, and emphasize the importance of SI tools in increasing student self-management and motivation [4].

Luckin et al. (2016) explored the broad potential of AI in education and identified principles for its integration into the coaching process. Their research demonstrates a deep understanding of how AI systems can provide adaptive content tailored to students' needs, create interactive monitoring tools for coaches, and enhance the learning process [5-8].

The work "Advances in Intelligent Tutoring Systems" by Nkambou, Bourdeau, and Mizoguchi (2010) presents practical aspects of artificial intelligence technologies in tutoring. They analyze in detail the decision-making processes and methods for monitoring the learning process of students in tutoring systems. This research has made a significant contribution to the creation of algorithmic foundations for improving the effectiveness of adaptive teaching in tutoring.

Kay (2000) analyzed the principles of collecting data about students in coaching systems and creating models for providing a personalized approach. His work reveals the possibilities of optimizing the educational process, taking into account the specific characteristics of students. At the same time, Durlach and Lesgold (2012) show the importance of improving the quality of

education and taking into account the different characteristics of students by using adaptive technologies in the coaching process.

Roll and Wylie (2016) analyze the evolution of AI in education and its impact on coaching and teaching processes. They emphasize the ability of AI systems to manage the learning process interactively, individually, and in real time, which is an important factor in increasing the effectiveness of adaptive teaching in coaching. Porajska-Pomsta et al. (2013) studied adaptive systems aimed at detecting and managing emotions and analyzed the impact of taking into account the mental state of students in the coaching process on the quality of education.

Zawacki-Richter et al. (2019) focus on the role of coaches in the context of the widespread use of AI applications in education. Their study examines the readiness of coaches to use the technology and the pedagogical challenges in doing so. Chen et al. (2020) review general trends in AI in education, explore its impact on the coaching process, and explore its development prospects. Heffernan and Heffernan (2014) provide information on AI-based support systems (e.g. ASSISTments) in the learning process, and provide practical examples of interactive and adaptive teaching in coaching [6].

Overall, the existing literature shows that the potential of AI technologies for personalization and adaptive learning in coaching has been extensively studied. These studies provide in-depth analysis of the role and importance of AI in taking into account the individual needs of students in the coaching process, adapting teaching and increasing educational effectiveness. At the same time, it is also emphasized that it is necessary to pay attention to pedagogical, technological and ethical issues for the successful integration of technology into the educational process.

RESEARCH METHODOLOGY

This study aimed to explore the possibilities of personalization and adaptive learning of artificial intelligence in the coaching process, to evaluate its effectiveness and develop practical recommendations. The study used a multi-stage approach, combining theoretical analysis, practical developments, and experimental investigations in a harmonious way.

First of all, the literature on the topic was studied in depth. At this stage, information from international and local sources on the application of artificial intelligence in educational processes, the principles and methods of personalization and adaptive learning was systematically analyzed. In the process of studying the literature, the practical results of coaching systems created using artificial intelligence technologies, their effectiveness and difficulties were identified, and the conceptual basis of the study was formed.

The necessary methods and algorithms were developed to create personalized and adaptive learning systems based on artificial intelligence. In this process, the relationships between the main elements of the coaching process - students, teachers, educational materials and assessment systems - were identified. Also, special indicators and criteria were developed to determine the individual characteristics of students (level of knowledge, learning style, interests). Based on these criteria, algorithms were created that allow the formation of appropriate educational programs for students.

Practical testing of the developed methods and algorithms was carried out. For this, experimental groups were formed with the participation of trainers and students during the training process. During the experiment, personalized and adaptive teaching methods using artificial intelligence-based systems were tested. The level of mastery, activity and motivation

of students were regularly monitored [7]. Also, the experience of trainers using the system, its impact on the coaching process and difficulties in its application were studied.

The results of the experimental study were analyzed using statistical methods. Based on the data obtained, the effectiveness of the personalization and adaptive learning processes using artificial intelligence was assessed. Also, practical recommendations for improving the system were developed based on the problems and suggestions identified during the experiment .

Another important method used in the study was a questionnaire and interview method, through which feedback from mentors and students was collected. This information further enriched the research results and helped to create a broader picture of the role and effectiveness of artificial intelligence technologies in the mentoring process. The questionnaires provided information on the readiness of mentors for technologies, their ease of use, and their competence in pedagogical aspects. At the same time, it was analyzed how students use the system and which elements serve to increase motivation for them.

During the study, a number of indicators were selected to assess the effectiveness of the mentoring process. These included students' learning outcomes, the level of engagement in the learning process, the effectiveness of mentors' activities , and their adaptability to technology. These indicators were used to determine the impact of the system on individual and overall learning outcomes.

In addition, the study examined technological and pedagogical aspects in an inextricable manner. The technical aspects of artificial intelligence systems — their operating algorithms, data processing methods, and methods for collecting and analyzing student data — were specifically modified to meet the requirements of the pedagogical process.[7] From a pedagogical perspective, the practical application of the principles of personalization and adaptive learning in coaching, the development of pedagogical approaches necessary to increase student motivation to learn, and the making of the learning process more interactive were explored.

Another important aspect of the methodology was the analysis of the results obtained and the identification of difficulties that arose during their implementation. To this end, regular contacts were established with mentors and students, their opinions and suggestions were taken into account. This allowed for continuous improvement of the system and its increased adaptability to the mentoring process.

In general, the research methodology was designed in accordance with the requirements of modern scientific research and was aimed at fully exploring the possibilities of personalization and adaptive learning of artificial intelligence in the coaching process. As a result of the combination of theoretical and practical methods, as well as the use of experimental and empirical methods, the research achieved its main goals and made it possible to develop specific recommendations for the effective use of artificial intelligence in the coaching process.

ANALYSIS AND RESULTS

This study systematically investigated the effectiveness of introducing artificial intelligence (AI) personalization and adaptive learning capabilities into the coaching process. The results, analyzed based on experimental and empirical data, showed that AI technologies can radically transform the coaching process and significantly improve the quality of education.

First, it was found that SI systems have a high accuracy in identifying individual needs of students when creating personalized curricula. During the experiment, data collected on students' knowledge level, interests, and learning styles were analyzed by artificial intelligence

algorithms and appropriate learning materials and tasks were provided to each student. As a result, students' mastery indicators improved significantly compared to traditional teaching methods . [9] This proved that the principle of personalization can be effectively applied in the coaching process.

Second, the learning process was continuously adjusted based on the results and activity of the students using the adaptive learning mechanism. In the experimental group, the results of the students' work and the level of difficulty were monitored by the system and information was provided to the trainers in real time. This allowed the trainers to quickly respond to the needs of the students and adjust the teaching strategies. At the same time, the students' self-assessment and independent learning skills were also developed. The results showed that adaptive learning was an important factor in increasing the effectiveness of the learning process.

Third, the study analyzed the attitude and readiness of coaches to the use of artificial intelligence tools. As a result of the questionnaire and interviews, the majority of coaches highly appreciated the role of AI technologies in the coaching process. In their opinion, systems created using artificial intelligence allow coaching to become a more effective, personalized and controlled process. At the same time, some coaches expressed their opinion on the lack of technological knowledge and technical problems that arise when using the systems. This indicates the need for training and technical support in the implementation of AI systems .

Fourth, the students' experience of using the system was also an important object of analysis . Students participating in the experiment rated the personalized learning plans created based on artificial intelligence as suitable and interesting for them. Most of them noticed changes in the learning process and improved mastery indicators. It was also found that students' motivation and activity increased. These results confirm that SI technologies have a significant impact on stimulating students' self-management and interest in learning in the mentoring process.

Fifth, based on the data obtained during the experiment, indicators of the effectiveness of the use of SI systems in the coaching process were developed. These indicators include the level of student mastery, the effectiveness of the activities of coaches, activity in the learning process, and adaptability to technologies. The results of the analysis showed that the groups in which SI technologies were used had medium and high indicators, significantly improving the quality of education compared to traditional methods .[10]

The analysis also identified some problems and difficulties associated with the introduction of artificial intelligence into the coaching process. In particular, issues such as ensuring data confidentiality, reliability of technological tools, the level of adaptation of coaches to technology, and the compliance of systems with pedagogical requirements became important. To overcome these problems, it is necessary to regularly train coaches, strengthen technical infrastructure, and improve pedagogical models.

The results show that artificial intelligence serves as a convenient tool for the effective implementation of personalization and adaptive learning capabilities in the coaching process. These technologies allow coaches to organize training taking into account the individual needs and characteristics of students. At the same time, they show significant results in increasing the level of knowledge of students, increasing their interest in the educational process, and developing self-management skills.

The results of the study showed that coaching systems based on artificial intelligence can further improve the quality of education by increasing the interactivity of the learning

process, providing coaches with continuous monitoring and rapid analysis. This, in turn, ensures that the coaching process becomes personalized and adaptive.

For the results to be more effective, when introducing artificial intelligence technologies into the coaching process, it is necessary to regularly train coaches and students in the technologies, create ergonomic and user-friendly interfaces of the systems, as well as pay special attention to ethical and safety issues.[7] The study also showed that the adaptive learning process based on artificial intelligence not only increases the quality of education, but also makes coaching activities more efficient and manageable.

Thus, based on the analysis and results, it is recommended to use the personalization and adaptive learning capabilities of artificial intelligence in the coaching process more widely. This will serve to form a new model of coaching that meets the requirements of the modern education system. In future research, it will be important to explore the application of artificial intelligence in other pedagogical processes, including innovations in the areas of emotional intelligence and natural language understanding.

CONCLUSION

The results of this study confirmed the importance and effectiveness of the personalization and adaptive learning capabilities of artificial intelligence in the coaching process. Artificial intelligence technologies are creating new opportunities for coaches to identify the individual needs of students, adapt the training process in real time, and improve the knowledge and skills of students. Experimental data have shown that personalized training programs developed using AI significantly improve the level of student learning and increase their motivation for the learning process. At the same time, the adaptive learning mechanism allows coaches to optimize the learning process in accordance with the needs of students.

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