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THE ROLE OF ARTIFICIAL INTELLIGENCE TECHNOLOGIES IN OPTIMIZING PEDAGOGICAL ACTIVITY IN A TRANSFORMATIONAL EDUCATIONAL ENVIRONMENT

Nurmatov Bekzod Kholmurodovich
Lecturer, Department of Digital Education Technologies
Namangan State University, Namangan, Uzbekistan.
Email: bekzod18226@gmail.com
ORCID: 0009-0000-6804-0787

Abstract: This article analyzes the pedagogical opportunities and effectiveness of artificial intelligence technologies in optimizing pedagogical activities within a transformational educational environment. The study highlights that the use of artificial intelligence–based digital tools plays a significant role in individualizing the learning process, improving the quality of education, and organizing pedagogical activities more efficiently. During the research, pedagogical experimental work was conducted, and the results of experimental and control groups were compared. The obtained results demonstrate that the use of artificial intelligence technologies serves as an effective tool for optimizing pedagogical activities, monitoring the educational process, and developing individual learning strategies. The findings contribute to improving the methodological foundations for developing a transformational educational environment and integrating artificial intelligence technologies into the educational process.

Keywords: transformational education, artificial intelligence, digital learning environment, pedagogical activity, optimization of the educational process, adaptive learning, innovative pedagogy.

Аннотация: В данной статье анализируются педагогические возможности и эффективность технологий искусственного интеллекта в процессе оптимизации педагогической деятельности в трансформационной образовательной среде. В исследовании показано, что использование цифровых инструментов на основе искусственного интеллекта играет важную роль в индивидуализации образовательного процесса, повышении качества образования и более эффективной организации педагогической деятельности. В ходе исследования были проведены педагогические экспериментальные работы, а также сравнительный анализ результатов экспериментальной и контрольной групп. Полученные результаты показали, что использование технологий искусственного интеллекта является эффективным инструментом для оптимизации педагогической деятельности, мониторинга образовательного процесса и разработки индивидуальных образовательных стратегий. Результаты исследования способствуют совершенствованию методических основ развития трансформационной образовательной среды и интеграции технологий искусственного интеллекта в образовательный процесс.

Ключевые слова: трансформационное образование, искусственный интеллект, цифровая образовательная среда, педагогическая деятельность, оптимизация образовательного процесса, адаптивное обучение, инновационная педагогика.

Introduction. In recent years, the process of digital transformation in the education system has been rapidly developing, shaping new pedagogical and technological approaches to organizing the learning process. The rapid development of digital technologies, particularly artificial intelligence technologies, expands the opportunities for modernizing the teaching process at all levels of education, optimizing the educational process, and effectively organizing teachers' pedagogical activities.

A transformational educational environment is a modern educational model that integrates digital technologies, innovative pedagogical methods, and individualized learning trajectories. In

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such an environment, the teacher acts not only as a provider of knowledge but also as a manager, facilitator, and analyst of the learning process.

Artificial intelligence technologies play an important role in automating the educational process, analyzing students' knowledge levels, developing individualized learning strategies, and optimizing pedagogical decision-making processes.

Therefore, the scientific analysis of the role and pedagogical capabilities of artificial intelligence technologies in effectively organizing pedagogical activities within a transformational educational environment is of significant scientific and practical importance.

The purpose of this study is to determine the effectiveness of using artificial intelligence technologies in optimizing pedagogical activities in a transformational educational environment and to analyze their pedagogical capabilities on a scientific basis.

Problem Statement. In the context of the rapid digital transformation of the education system, the effective organization of teachers' pedagogical activities has become one of the most pressing issues. Traditional teaching methods often fail to fully meet students' individual needs and the modern requirements of the educational process.

Therefore, the need arises to use modern digital technologies, particularly artificial intelligence technologies, to optimize the educational process, improve teaching effectiveness, and develop individualized learning trajectories.

However, the methodological foundations for the use of artificial intelligence technologies in optimizing pedagogical activities within a transformational educational environment have not yet been sufficiently developed. Moreover, studying the impact of artificial intelligence tools on the effectiveness of pedagogical activities remains an important scientific problem.

For this reason, this study focuses on identifying the role of artificial intelligence technologies in optimizing pedagogical activities within a transformational educational environment.

Scientific Novelty of the Research

The scientific novelty of this research is as follows:

- the pedagogical opportunities of using artificial intelligence technologies to optimize pedagogical activities in a transformational educational environment were scientifically substantiated;
- methodological approaches for organizing pedagogical activities effectively based on artificial intelligence technologies were developed;
- based on pedagogical experimental work, the positive impact of artificial intelligence technologies on the educational process and their role in improving educational efficiency were scientifically proven.

Literature review. In recent years, the rapid development of digital technologies, particularly artificial intelligence technologies, has shaped new pedagogical approaches to organizing the educational process. Therefore, many researchers have conducted scientific studies on the impact of artificial intelligence technologies on the educational process, their pedagogical potential, and their role in improving educational effectiveness.

Fundamental research in the field of artificial intelligence was conducted by Stuart Russell and Peter Norvig, who widely described the possibilities of applying artificial intelligence technologies in various fields, including education. Their studies emphasize that artificial intelligence algorithms are effective tools for solving complex problems, analyzing data, and supporting decision-making processes.

The pedagogical capabilities of artificial intelligence technologies in education were extensively studied by Rose Luckin. According to the researcher, artificial intelligence technologies play an important role in personalizing the learning process, analyzing students' knowledge levels, and developing individual learning strategies.

Furthermore, research conducted by Wayne Holmes analyzed the potential of artificial intelligence technologies in optimizing the teaching process, monitoring students' activities, and

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improving educational effectiveness. The results show that adaptive learning systems based on artificial intelligence help organize the learning process more effectively by taking into account the individual characteristics of students.

Issues related to the digitalization of education and the formation of a transformational educational environment were also studied by Neil Selwyn. The researcher emphasizes that the integration of digital technologies into the education system significantly transforms teachers' pedagogical activities and requires the development of new pedagogical competencies.

Local scholars have also studied the digitalization of education, the implementation of innovative pedagogical technologies, and ways to improve educational effectiveness. According to their research, the use of digital technologies and artificial intelligence tools in modern education enables the optimization of the learning process, the development of students' independent learning activities, and the effective management of pedagogical processes.

However, although most existing studies describe the general pedagogical opportunities of artificial intelligence technologies, the issue of optimizing pedagogical activities within a transformational educational environment has not been sufficiently explored. In particular, the development of methodological foundations for using artificial intelligence technologies and determining their impact on pedagogical effectiveness remain important scientific challenges.

Methods. A number of scientific and pedagogical methods were used in this study. The methodological basis of the research included pedagogical observation, experimental research, comparative analysis, statistical analysis, and analytical methods.

The research was conducted at Namangan State University. First-year students participated in the study. A total of 30 students were involved in the experimental work and were divided into two groups: an experimental group and a control group.

In the experimental group, artificial intelligence–based digital tools were used during the teaching process. These included adaptive learning systems, AI-based advisory systems, and automated assessment platforms.

In the control group, the educational process was organized using traditional teaching methods. During the research, students' knowledge levels, learning activity, and the level of mastering educational materials were analyzed.

The obtained results were processed using statistical methods, and the results of the experimental and control groups were compared.

Results. The results of the experimental research showed that the effectiveness of the learning process significantly increased in the experimental group where artificial intelligence technologies were used.

The level of mastering educational materials by students in the experimental group was higher compared to the control group. In addition, the use of artificial intelligence technologies enabled the individualization of students' learning activities, the flexible organization of the educational process, and the simplification of pedagogical monitoring.

The results of the study indicate that the use of artificial intelligence-based digital tools serves as an important instrument for optimizing pedagogical activities, analyzing the learning process, and developing individual learning strategies.

Furthermore, opportunities for teachers to monitor and analyze the educational process were also expanded.

Discussion. The research results show that the use of artificial intelligence technologies in a transformational educational environment is an important factor in optimizing pedagogical activities.

Artificial intelligence technologies play a crucial role in personalizing the educational process, adapting learning materials, and effectively organizing teachers' pedagogical activities.

In addition, AI-based educational systems enable the analysis of the learning process, the assessment of students' knowledge levels, and the improvement of teaching strategies.

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At the same time, the integration of artificial intelligence technologies into the educational process requires teachers to acquire new pedagogical competencies. Therefore, it is important to train educators to effectively use digital technologies and artificial intelligence tools.

Conclusion. The use of artificial intelligence technologies in a transformational educational environment contributes to increasing the effectiveness of pedagogical activities. AI-based digital tools enable the optimization of the educational process, the development of individualized learning trajectories, and the effective management of the learning process.

The results of the study indicate that artificial intelligence technologies facilitate teachers' pedagogical activities, expand opportunities for organizing the educational process effectively, and positively influence students' learning outcomes.

In the future, improving the methodological foundations for integrating artificial intelligence technologies into the educational process and developing new pedagogical models will remain one of the important research directions.

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