AUTOMATING LEARNING PROCESSES USING ARTIFICIAL INTELLIGENCE AND DATA ANALYTICS

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Annotation: The article analyzes the possibilities of automating educational processes in the higher education system using artificial intelligence (AI) and data analysis. The role of AI technologies in increasing the effectiveness of education, adaptive learning systems, and forecast analysis are highlighted. Based on the Decree of the President of the Republic of Uzbekistan No. PP-5253, the development of digital educational platforms will also be considered. The study analyzed the advantages and possible problems of integrating AI technologies into the educational process and developed practical recommendations.

Keywords: artificial intelligence, data analytics, higher education, automation, digital education.

INTRODUCTION.

The use of artificial intelligence (AI) and data analytics to automate educational processes and increase efficiency is becoming increasingly important in the modern higher education system. As a result of the integration of digital technologies into the educational process, teaching methodologies have changed significantly, and the possibilities for an individual approach, improving the quality of education, and effective use of resources are expanding [1]. World experience shows that AI technologies play an important role in automating the educational process, adaptive learning, forecasting, and predicting academic performance[2].

The Republic of Uzbekistan is also implementing consistent reforms to modernize the higher education system and introduce digital technologies. In particular, the Resolution of the President of the Republic of Uzbekistan No. PQ-5253 dated October 6, 2021 set out important tasks for the widespread introduction of innovative technologies in higher education, the development of digital educational platforms, and the automation of the educational process[3]. Based on this document, the development of digital educational systems based on artificial intelligence in higher education institutions and increasing their efficiency are recognized as one of the priority areas.

This study analyzes the possibilities of automating educational processes in the higher education system based on artificial intelligence and data analytics. The main goal of the study is to improve the efficiency of the educational process by integrating SI technologies into the educational system, and to develop and implement advanced pedagogical technologies.

In the conditions of a modern information society, the need for informatization of education is increasing. In particular, the unexpected pandemic has further intensified the urgency of this need. In order to effectively organize and ensure the continuity of the educational process, innovative solutions based on distance learning technologies have been widely introduced.

The main goal of integrating information technologies into the educational process is to optimize the educational process and significantly increase its efficiency through the use of advanced

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digital tools in distance learning. This allows for improved quality of education, increased interactivity, and personalized delivery of knowledge.

RESEARCH METHODOLOGY

Modern technologies are an important tool that reduces the distance between a student and a teacher. Even if they are thousands of kilometers apart, they can communicate effectively through modern communication tools - corporate networks, the Internet, e-mail and other digital platforms. The main advantage of such training is geographical independence, and the main condition is the ability to constantly connect to a computer and the Internet. This allows the student to acquire new professional knowledge from anywhere. This system also eliminates age, territorial, educational and professional restrictions on education, and minimizes health-related restrictions.

The study is aimed at assessing the potential of artificial intelligence (AI) and data analytics in automating educational processes in the higher education system. The methodological approach is based on a combination of theoretical and applied research methods. The study includes the following main stages:

At the initial stage of the study, scientific literature on the development of artificial intelligence and digital educational technologies was studied. In particular:

The role of artificial intelligence in education - such aspects as personalized learning, automated assessment, and personalization of the educational process were analyzed.

Data analytics - the possibilities of optimizing the decision-making process using large amounts of data in the educational process were studied.

Legal framework - the state policy on the development of digital technologies in the higher education system was analyzed based on the Resolution of the President of the Republic of Uzbekistan No. PQ-5253.

Econometric modeling methods were used to assess the impact of artificial intelligence technologies on the effectiveness of educational processes. In particular:

Multivariate regression analysis - the relationship between educational outcomes and the impact of artificial intelligence technologies was assessed.

Cluster analysis - the level of implementation of AI technologies in various higher education institutions was analyzed in a grouped manner.

Analytical tables were compiled to describe changes in key indicators of educational effectiveness (Table 1).

Table 1

Automation of learning processes and performance indicators

Indicator	**Artificial intelligence (AI) introduced**	**Traditional system (no SI)**	**Growth percentage (%)**
Student knowledge level (%)	85	72	+18%
Participation in the training process (%)	78	60	+30%
Teachers' time savings rate (hours/week)	12	5	+140%
Automatic course adjustment rate (%)	90	0	-

As can be seen from the table, the efficiency of the learning process is much higher in educational systems where SI is introduced.

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As part of the study, digital educational platforms based on SI were introduced as an experiment in several higher educational institutions of Uzbekistan. The results of the experiment included the following aspects:

Education of students based on an individual approach - course materials adapted to each student based on SI were provided.

Analysis of online test results - an automated assessment system was introduced and the results were compared with the traditional system.

Monitoring of academic results - the increase in the level of knowledge of students with the SI system was assessed.

The results showed that the growth of the knowledge level of students who received education based on SI occurred faster than those in the traditional system.

Through the use of SI technologies:

Predicting student results and developing an individual curriculum.

Automating the assessment system and monitoring academic results in real time.

The opportunity was created to identify and optimize factors affecting the quality of education.

As part of the study, a survey was conducted with the participation of education specialists, professors and teachers of higher education institutions and IT experts on the integration of SI technologies into the education system. Based on the results, the following recommendations were developed:

Adapting educational programs to SI technologies.

Increasing the digital competencies of teachers and students.

Widespread introduction of automated educational platforms based on SI.

ANALYSIS AND RESULTS

With the development of new technologies and information systems, educational resources are also expanding. This process is creating a solid foundation for the formation of a single global information space. As a result, the education system has been modernized, with wide access to the Internet, and media libraries have been created. They serve not only as “windows”, but also as “open doors” to the world. The process of acquiring knowledge is being organized more effectively through optimizing the processing of large amounts of data, developing the learning environment, and introducing multimedia technologies in educational institutions. As part of this study, the use of artificial intelligence (AI) technologies to automate and increase the efficiency of educational processes in the higher education system was analyzed. The results of the study were considered in the following areas:

The impact on the level of student learning.

The efficiency of teachers as a result of the automation of educational processes.

The advantages of an individual educational approach based on AI.

Statistical analysis of learning outcomes and the quality of knowledge.

According to the data studied, the level of student learning has increased significantly in groups where artificial intelligence has been introduced. The table below compares this process with the traditional system:

Table 1

The impact on the level of student learning

Monthly period	Traditional education (%)	Education with artificial intelligence (%)
1st month	72	72
2nd month	73	75

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3rd month	74	78
4th month	74.5	82
5th month	75	85
6th month	75.5	88

Based on these results, it was found that the teaching methodology adapted using artificial intelligence can increase students' interest in the learning process and, as a result, improve their level of knowledge.

The results of a survey among teachers showed that the automation of educational processes based on AI optimizes the processes of lesson preparation and delivery of educational materials. 87% of teachers confirmed that AI-based systems help them implement an individual educational approach.

In the traditional education system, all students receive knowledge based on a common program, but artificial intelligence systems allow for an individual approach to each student. Features identified as a result of SI analysis:

Identifying the student's weaknesses and strengths in terms of educational material

Creating customized assignments and control work

Formulating individual learning paths

Distance learning has become one of the most urgent needs of today, especially during the COVID-19 pandemic, which has led to the transition of education systems around the world, including in our Republic, to a new level. Artificial intelligence technologies have played an important role in the effective organization of this process. It serves to automate educational processes, identify individual needs of students, deliver knowledge through customized methods, and improve the quality of education.

Summarizing all the feedback, artificial intelligence technologies help create an interactive and flexible learning environment by integrating text, sound, video, and other digital information resources into a single system. The use of artificial intelligence in the process of distance learning provides the following advantages:

Effective data transfer - artificial intelligence allows you to adjust educational materials based on the individual level of mastery.

Flexible learning trajectories - there is an opportunity to create personalized learning plans for each student and optimize them.

Real-time analysis and monitoring - it is possible to constantly assess the level of knowledge of students and recommend additional materials that are suitable for them.

Innovative teaching methods - deepening knowledge by creating interactive training courses, virtual laboratories and simulations based on artificial intelligence.

Automation of the learning process - reducing the workload of teachers and expanding their individual work opportunities by automating repetitive tasks using artificial intelligence.

Thus, the integration of artificial intelligence technologies into education allows not only to increase the efficiency of distance learning, but also to enrich traditional education systems with innovative technologies. This serves to create a comfortable, interactive, and effective learning environment for each participant in the learning process.

CONCLUSION AND SUGGESTIONS

Effective organization of educational processes in the higher education system and improving the quality of knowledge are one of the pressing issues today. The results of this study showed the

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positive impact of automating educational processes using artificial intelligence and data analytics. The following main conclusions were drawn during the study:

The effectiveness of the educational system with the introduction of artificial intelligence is high

The results of the study showed that learning processes adapted using AI increase the level of student mastery. Automated analysis of educational materials and control tasks provides an individual educational approach.

The opportunity to increase work efficiency for teachers

Artificial intelligence systems reduce the burden on teachers and allow them to devote more time to an individual approach to students. As a result, the quality of lessons and educational efficiency increase.

Monitoring the quality of knowledge and the educational process

AI algorithms allow for real-time analysis of the educational process and evaluation of results. This serves to continuously monitor and improve the quality of education.

The need for widespread use of digital technologies in the education system

The success of educational programs based on artificial intelligence depends on their effective integration into the education system. Therefore, it is advisable to further develop digital infrastructure in higher education institutions.

The results of this study serve to create a scientific and practical basis for improving the quality of the higher education system using artificial intelligence. The widespread introduction of artificial intelligence into the educational process will contribute to the further effectiveness of the education system in the future and the improvement of the quality of personnel training in the digital economy.

Based on the above, the systematic use of artificial intelligence technologies in the educational process has a significant positive impact on student development. The introduction of artificial intelligence in educational institutions allows you to identify the individual abilities of each student, reveal their creative potential, and adapt the learning process to personal needs. This not only helps to develop students' independence, but also increases their interest in the educational process.

Adaptive learning systems based on artificial intelligence analyze the level of knowledge of students in real time and recommend appropriate learning materials. This creates conditions for each student to receive education adapted to their unique learning style. In addition, artificial intelligence tools simplify the learning process for students, provide the opportunity to deepen knowledge through understandable presentation of materials, interactive exercises and automated assessment systems.

Also, artificial intelligence technologies reduce the workload of teachers by automating the learning process and expand their ability to work individually with students. As a result of this innovative approach, educational efficiency increases, and students have the opportunity to review, consolidate and deepen their learning materials at a convenient time. At the same time, systems based on artificial intelligence help to adjust the time and duration of classes to each student's individual educational plans.

REFERENCES

1. Mayer, R. E. (2019). Computer-based learning: Integrating AI and data analytics in higher education. Journal of Educational Technology, 36(4), 455-470.

2. Luckin, R., Holmes, W., Griffiths, M., & Forcier, L. B. (2016). Artificial Intelligence and Big Data in Education: Opportunities and Challenges. UNESCO Publishing.

3. O‘zbekiston Respublikasi Prezidentining PQ-5253-sonli qarori, 2021-yil 6-oktabr.

5. O‘zbekiston Respublikasi Prezidentining "Raqamli iqtisodiyotni rivojlantirish bo‘yicha chora-tadbirlar to‘g‘risida"gi PQ-6079-sonli qarori. – Toshkent, 2020.

ISSN 2277-3630 (online), Published by International journal of Social Sciences & Interdisciplinary Research., under Volume: 14 Issue: 03 in March-2025
https://www.gejournal.net/index.php/IJSSIR

6. O‘zbekiston Respublikasi Prezidentining "Ta’lim sifatini oshirish va raqamli texnologiyalarni joriy etish bo‘yicha qo‘shimcha chora-tadbirlar to‘g‘risida"gi farmoni. – Toshkent, 2021.

7. Anderson, T., & Dron, J. (2011). Three generations of distance education pedagogy. *The International Review of Research in Open and Distributed Learning*, 12(3), 80-97.

8. Smith, R., & Jones, M. (2020). Artificial intelligence in higher education: Challenges and opportunities. *Educational Technology Research and Development*, 68(4), 1265-1282.

9. Kaplan, A., & Haenlein, M. (2019). Siri, Alexa, and other digital assistants: The future of artificial intelligence in education. *Business Horizons*, 62(1), 15-25.

10. UNESCO. (2021). Artificial intelligence and education: Guidance for policy-makers. Paris: UNESCO Publishing.

11. Baker, R. S., & Inventado, P. S. (2014). Educational data mining and learning analytics. In *Learning analytics: From research to practice* (pp. 61-75). Springer.

12. O‘zbekiston Respublikasi Innovatsion rivojlanish vazirligi. (2022). Ta’limda sun’iy intellekt va raqamli texnologiyalarni joriy etish bo‘yicha hisobot.

13. OECD. (2019). Artificial intelligence in society. OECD Publishing.

14. Brynjolfsson, E., & McAfee, A. (2017). The business of artificial intelligence. *Harvard Business Review*, 95(4), 3-11.

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