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THE ROLE OF ARTIFICIAL INTELLIGENCE PROGRAMS IN ANALYZING THE ACQUISITION OF INFORMATION TECHNOLOGY IN AN ELECTRONIC LEARNING ENVIRONMENT

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Abstract. This scientific article deeply studies the role, capabilities and effectiveness of artificial intelligence (AI) programs in analyzing the process of mastering information technology in an e-learning environment. The issues of determining the level of knowledge of students through AI-based systems in the educational process, organizing individualized education, monitoring educational activities and improving the quality of education are covered. The article also analyzes the algorithms used in modern e-learning platforms, their principles of operation and practical results.

Keywords: e-learning, artificial intelligence, information technology, adaptive learning, data analysis, learning process, knowledge assessment.

In a modern information society, the education system is entering a phase of digital transformation. This process requires updating teaching methods, teaching aids, and especially the assessment system. The electronic learning environment allows for the organization of the educational process remotely, the wide use of educational resources, and the implementation of an individual approach.

The process of checking assignments in the field of information technology is inherently complex, as this discipline requires the assessment of not only theoretical knowledge, but also practical skills, in particular, programming, algorithmic thinking, and problem-solving skills [1].

Therefore, traditional assessment methods often do not provide sufficient efficiency. Artificial intelligence technologies are considered an important tool for automating, optimizing and improving the quality of this process. The rapid development of information technologies is also having a significant impact on the education system . In particular, obtaining knowledge through electronic learning environments (e-learning) has become an integral part of modern education. In such an environment, the use of advanced technologies, including artificial intelligence programs, is of great importance to ensure the effective assimilation of knowledge by students.

Artificial intelligence allows for the automation of the educational process, taking into account the individual characteristics of students and analyzing them in real time. Especially in the teaching of information technology, SI systems serve as an important tool for developing students' practical skills [2].

The essence and characteristics of the electronic learning environment. An electronic learning environment is an educational process organized on the basis of information and communication technologies , in which educational materials are presented in digital form. This environment has the following characteristics:

- ✓ Distance learning opportunities
- ✓ Interactive learning materials
- ✓ Automate the learning process
- ✓ Monitoring student activity

not be effective enough . Therefore, it is important to introduce artificial intelligence into this process [3].

The role of artificial intelligence programs in education. Artificial intelligence is the ability of computer systems to perform tasks that are characteristic of human intelligence. AI is used in education in the following areas:

1. Adaptive learning systems

Adaptive systems based on SI adapt learning materials to the students' knowledge level, creating an individual learning path for each student.

2. Automatic assessment systems

It saves teacher time and reduces subjectivity in grading by automatically grading tests, assignments, and projects.

3. Analysis of learning activities

SI systems analyze students' actions on the platform (clicks, time spent, results) and identify their learning styles.

4. Chatbots and virtual assistants

allows students to quickly answer their questions and guide them through the learning process [4].

Pedagogical foundations of electronic learning environments. An electronic learning environment is a learning system based on information and communication technologies , which is based on the following didactic principles:

Individualization. Taking into account the unique characteristics of each student

Interactivity. Active communication between the reader and the system

Adaptability. Adaptation of educational materials to the level of the student

Continuity. The continuation of the educational process at any time

These principles, when combined with artificial intelligence, produce more effective results[5].

The role of SI in mastering the science of information technology. Information technology requires practical skills. SI programs provide the following opportunities in this process:

1. Develop programming skills

and provide recommendations during the coding process (such as code analyzers) help the student learn faster.

2. Simulation and virtual laboratories. The opportunity to test complex systems in a virtual environment will be created.

3. Determining the level of knowledge of students. Using SI algorithms, it is possible to determine which topic a student has mastered well or where he is having difficulty[6].

Methods for analyzing the learning process based on AI. The following methods are used to analyze the learning process using artificial intelligence:

1. Data Mining. Large amounts of data about student activity are analyzed.
2. Machine Learning. Allows you to predict future student outcomes.
3. Neural networks. Used in modeling and analyzing complex learning processes.
4. Predictive analytics. Allows you to predict the likelihood of students failing.

Theoretical model of the evaluation system. Assessment is an integral part of the learning process and performs the following functions:

- ✓ diagnostic (knowledge determination)
- ✓ control (checking the level of mastery)
- ✓ developmental (developing the student)
- ✓ encouraging

Modern assessment systems are based on the following approaches:

- criterion-based assessment
- competency assessment
- adaptive assessment

Artificial intelligence is an important tool in putting these approaches into practice. Task verification mechanisms based on artificial intelligence.

Automated assessment systems automatically check tests and assignments. In this case: closed tests are checked quickly, open questions are semantically analyzed , and results are issued in real time. These systems reduce the human factor in the assessment process.

One of the most important areas in information technology is programming. SI-based systems:

- automatically runs the code
- checks the result through tests
- detects errors

This process: algorithmic analysis, formal verification , and performance evaluation

on the basis of. Adaptive assessment theory. Adaptive assessment adjusts questions based on the student's level of knowledge. This system is based on Item Response Theory (IRT) and Bayesian probability models.

As a result, the accuracy of the assessment increases and the student's real level of knowledge is determined.

Learning analytics. Learning analytics is the analysis of data from the learning process. With the help of SI: student activity is monitored, difficulties are identified, and individual recommendations are given. This process is based on Big Data analysis.

Is based on : comparing texts, identifying semantic similarities , and comparing them with Internet sources. Pedagogical effectiveness of artificial intelligence. Research shows that SI: Increases student motivation, fosters independent learning, and ensures assessment accuracy.

Problems and limitations. The following problems exist in the use of artificial intelligence: lack of technical infrastructure, algorithmic errors, ethical issues (privacy, fairness) , and the reduction of the human factor. To solve these problems, an integrated approach is needed. Theoretical analyses show that : AI accelerates assessment, increases the quality of education, and provides a deep analysis of students' knowledge. However, the most effective model is: human + artificial intelligence cooperation. In an e-learning environment, artificial intelligence automates the assessment process, increases the quality of education, and accurately assesses students' knowledge [7].

The use of artificial intelligence programs in the e-learning environment significantly increases the efficiency of mastering information technology. With the help of AI, it is possible to deeply analyze, individualize and optimize the learning process. In the future, the widespread introduction of these technologies will bring the quality of education to a new level. The use of professional-oriented tasks, virtual practices, project work and automated assessment tools in the electronic learning environment is one of the effective mechanisms for improving the quality of education. The effectiveness of the use of interactive tools directly depends on their pedagogical expediency , methodological basis and integration with the professional context .

References

1. Russell, S., Norvig, P. (2021). Artificial Intelligence: A Modern Approach (4th ed.). Pearson Education Limited.

2. Holmes, W., Bialik, M., Fadel, C. (2019). Artificial Intelligence in Education: Promises and Implications for Teaching and Learning . Center for Curriculum Redesign.

3. Siemens, G., Baker, R. (2012). Learning analytics and educational data mining: Towards communication and collaboration. Proceedings of the 2nd International Conference on Learning Analytics and Knowledge .

4. Luckin, R. (2018). Machine Learning and Human Intelligence: The Future of Education for the 21st Century . UCL Institute of Education Press.

5. Baker, RS, Inventado, PS (2014). Educational data mining and learning analytics. In: Learning Analytics . Springer, New York.

6. Dillenbourg, P. (2016). The evolution of research on digital education. International Journal of Artificial Intelligence in Education , 26(2), 544–560.

7. Decree of the President of the Republic of Uzbekistan No. PF-6079 dated October 6, 2020 on the "Digital Uzbekistan - 2030" strategy.

8. UNESCO. (2023). *Technology in Education: A Tool on Whose Terms?* Paris: UNESCO.

9. Garrison, DR, & Vaughan, ND (2008). *Blended Learning in Higher Education: Framework, Principles, and Guidelines* . San Francisco: Jossey-Bass.

10. Means, B., Toyama, Y., Murphy, R., Bakia, M., & Jones, K. (2010). *Evaluation of Evidence-Based Practices in Online Learning: A Meta-Analysis and Review of Online Learning Studies* . US Department of Education.