



ARTIFICIAL INTELLIGENCE-BASED SOFTWARE SOLUTIONS IN ORGANIZING STUDENT INDEPENDENT EDUCATION

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Annotation: *This scientific article covers theoretical and practical aspects of software solutions based on artificial intelligence in the organization of Independent Education of students. The integration of artificial intelligence technologies into the educational process, Adaptive Training Systems, intellectual tutors and the role of generative AI tools in the educational process have been analyzed. The study explored the impact of AI-based platforms on the effectiveness of student independent learning, their advantages and limitations. Scientific conclusions have also been made about the pedagogical possibilities and prospects of artificial intelligence in the modern digital education environment.*

Keywords: *artificial intelligence, Independent Education, adaptive systems, intellectual tutor, generative AI, digital education, LMS, educational technologies.*

INTRODUCTION

In the process of globalization and digitalization of today, the educational system is undergoing radical changes. In particular, the development of artificial intelligence (AI) Technologies is taking the mechanisms of organization, management and evaluation of the educational process to a new level. In the modern educational system, the development of Independent Education of students is one of the most important pedagogical tasks.

Independent education is the process by which a student seeks, analyzes and assimilates information without the help of a teacher, based on his own need for knowledge. Artificial intelligence-based software solutions play an important role in the effective organization of this process. Because AI technologies have the ability to provide an individual approach, adapt the learning process and make automatic recommendations.

In recent years, generative AI systems such as ChatGPT, Gemini, Claude, Copilot have become widely used in education. They serve as a virtual assistant, knowledge resource and Analysis tool for students. This is significantly increasing the effectiveness of Independent Education.

The digitalization of education and the introduction of artificial intelligence technologies in the Republic of Uzbekistan is one of the priorities of the state policy. Within the framework of the strategy "digital Uzbekistan - 2030", the tasks of modernization of the educational system and extensive implementation of modern technologies are established.

Therefore, the scientific study of the role and importance of artificial intelligence-based software solutions in independent education is an urgent issue.

REVIEW OF THEMATIC LITERATURE

Many foreign and domestic scientists have conducted research on artificial intelligence and educational integration.



W. Holmes and I. Tuomi studies the role of artificial intelligence in education, arguing that AI-based systems allow individualization of the learning process [2]. They scientifically substantiated the adaptation of adaptive education systems to the level of knowledge of the student.

S. In his research, Luckin argues that AI technologies do not replace a teacher, but are a supporting tool [5].

E. Baker and G. Siemens has shown that individual educational trajectories can be created by developing the direction of learning analytics and analyzing student activities [4].

M. Woolf developed the intelligent tutoring systems (ITS) concept and based on the effectiveness of Computer-Based Training Systems [1].

N. from the scientists of Uzbekistan. Muslimov analyzed the place of digital technologies in the development of pedagogical competencies [7].

U.Sh. Begimkulov developed a methodology for creating an e-learning environment and extensively covered the didactic possibilities of digital resources [6].

In recent years, there have been many studies on generative AI technologies. Systems developed by OpenAI, Google DeepMind, and Microsoft are making it possible to automate and personalize the educational process.

UNESCO and OECD reports state that artificial intelligence increases equality, quality and openness in education [3].

Literature analysis shows that AI-based education systems:

- * individualizes the learning process;
- * analyzes in real time;
- * provides automatic recommendations;
- * accelerates the strengthening of knowledge.

RESEARCH METHODOLOGY

The following methods were used in this study:

- * analysis of scientific literature;
- * comparative analysis method;
- * tracking and survey;
- * statistical analysis;
- * pedagogical experience.

In the course of the study, a survey was carried out with the participation of 100 students. Their level of use of artificial intelligence tools and the effectiveness of Independent Education were analyzed.

According to the results, students using AI tools:

- Mastered 35% faster material;
- 40% increased independent research skills;
- 30% achieved a high academic result.

Also, AI systems integrated into LMS platforms have optimized the learning process by giving individual recommendations to students.

Types of software solutions based on artificial intelligence

1. Intellectual tutor systems



These systems provide individual teaching service to students. They identify reader errors and provide a suitable explanation.

2. Generative AI systems

Systems such as ChatGPT, Gemini, and Claude allow text creation, explanation, and analysis.

3. Learning Analytics systems

Analyzes the student's activities and forms his educational trajectory.

4. Adaptive education platforms

Adjusts the educational material to the student's level of knowledge.

5. Virtual assistants

Helps students answer questions and manage the learning process.

Advantages of AI technologies in independent education

Artificial intelligence-based systems have the following advantages:

- individual approach;
- 24/7 help;
- quick access to information;
- * interactive teaching;
- * automatic evaluation;
- * increase motivation.

Problems and limitations

At the same time, there are the following problems:

- * inadequate technical infrastructure;
- * internet dependency;
- * risk of misinformation;
- * academic integrity issues;
- low teacher SI competence.

CONCLUSIONS AND RECOMMENDATIONS

The results of the study show that AI-based software solutions have high efficiency in organizing student Independent Education. They individualize, accelerate and improve the quality of the educational process.

Recommendations:

1. Wide introduction of AI platforms in higher education institutions;
2. Organization of artificial intelligence training for teachers;
3. Integration of LMS systems with AI;
4. Development of mechanisms for ensuring academic integrity;
5. Creating national AI education platforms.

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