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### **THE ESSENCE OF THE CONCEPT OF ARTIFICIAL INTELLIGENCE, ITS DIDACTIC CAPABILITIES AND AREAS OF APPLICATION IN EDUCATION**

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#### **Annotatsiya:**

Mazkur tezisda sun'iy intellekt tushunchasining ilmiy mazmuni, uning didaktik imkoniyatlari hamda ta'lim jarayonida qo'llashning asosiy yo'nalishlari yoritilgan. Sun'iy intellekt adaptiv o'qitish, avtomatik baholash, o'quv analitikasi va individual ta'lim trayektoriyasini shakllantirish imkonini beruvchi innovatsion pedagogik vosita sifatida tahlil qilindi. Tadqiqot natijalari sun'iy intellekt texnologiyalarini ta'limga joriy etish o'quvchilarning bilish faolligini, mustaqil fikrlashini va o'quv motivatsiyasini oshirishini ko'rsatdi.

**Kalit so'zlar:** sun'iy intellekt, adaptiv o'qitish, raqamli ta'lim, o'quv analitikasi, avtomatik baholash, individual ta'lim trayektoriyasi, didaktik imkoniyatlar, raqamli kompetensiya, ta'lim sifati, interaktiv texnologiyalar.

#### **Аннотация:**

В тезисе раскрываются научное содержание понятия искусственного интеллекта, его дидактические возможности и основные направления применения в образовательном процессе. Искусственный интеллект



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рассматривается как инновационный педагогический инструмент, обеспечивающий адаптивное обучение, автоматическое оценивание, образовательную аналитику и формирование индивидуальной образовательной траектории. Показано, что внедрение технологий искусственного интеллекта способствует повышению познавательной активности, самостоятельного мышления и учебной мотивации обучающихся.

**Ключевые слова:** искусственный интеллект, адаптивное обучение, цифровое образование, образовательная аналитика, автоматическое оценивание, индивидуальная образовательная траектория, дидактические возможности, цифровая компетентность, качество образования, интерактивные технологии.

### Abstract:

This thesis examines the conceptual essence of artificial intelligence, its didactic potential, and the main directions of its application in education. Artificial intelligence is analyzed as an innovative pedagogical tool that enables adaptive learning, automated assessment, learning analytics, and the formation of individual learning trajectories. The study shows that the integration of AI technologies into education increases students' cognitive activity, independent thinking, and learning motivation.

**Keywords:** artificial intelligence, adaptive learning, digital education, learning analytics, automated assessment, individual learning trajectory, didactic potential, digital competence, education quality, interactive technologies.



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### Introduction:

In the 21st century, the education system is undergoing a process of digital transformation. Along with the development of information and communication technologies, artificial intelligence (AI) technologies are becoming an integral part of the educational process. Artificial intelligence is emerging not only as an important innovative tool in industry, economics, and medicine, but also in the organization of pedagogical activity. In particular, the didactic potential of artificial intelligence is significant in the individualization of education, strengthening a differentiated approach, analytical assessment of learning outcomes, and the implementation of adaptive learning mechanisms.

Modern pedagogical approaches determine the quality of education not only by the volume of knowledge but also by students' independent thinking, their ability to solve problem situations, creativity, and digital competencies. From this perspective, the integration of artificial intelligence technologies into the educational process is considered a relevant scientific and practical issue.

The purpose of this thesis is to reveal the essence of the concept of artificial intelligence, analyze its didactic potential, and identify the main directions of its application in the educational process.

**The essence of the concept of artificial intelligence.** Artificial intelligence is the ability of computer systems to perform functions characteristic of human thinking, such as learning, analysis, decision-making, problem-solving, and logical reasoning. In scientific literature, artificial intelligence is interpreted as a complex technological system consisting of such components as machine learning, neural networks, natural language processing, and expert systems.



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From a pedagogical point of view, artificial intelligence is a digital didactic tool that makes it possible to determine students' level of knowledge, form an individual learning trajectory, adapt tasks, and automate the learning process.

The main functions of artificial intelligence in education include:

- creating an adaptive learning system;
- automatic analysis of students' errors;
- selection of individual tasks;
- providing immediate feedback;
- analytical monitoring of learning outcomes.

These functions make it possible to provide the learner with the necessary pedagogical support step by step in accordance with Vygotsky's theory of the zone of proximal development.

**Didactic potential of artificial intelligence.** Artificial intelligence has a number of important didactic opportunities in the educational process.

First, artificial intelligence enables the individualization of the learning process. Since each student has a different level of mastery, interests, and cognitive style, traditional teaching methods cannot ensure equal effectiveness for all learners. AI analyzes students' individual indicators and provides appropriate tasks accordingly.

Secondly, artificial intelligence implements an adaptive learning mechanism. The adaptive system automatically adjusts the difficulty level of tasks based on the learner's responses. This enables the effective organization of a differentiated approach.



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Thirdly, AI automates formative assessment.

The results of tests and assignments completed by students are analyzed in real time, providing immediate feedback to both the teacher and the learner. This helps to reinforce knowledge.

Fourthly, artificial intelligence supports problem-based learning and project-based education.

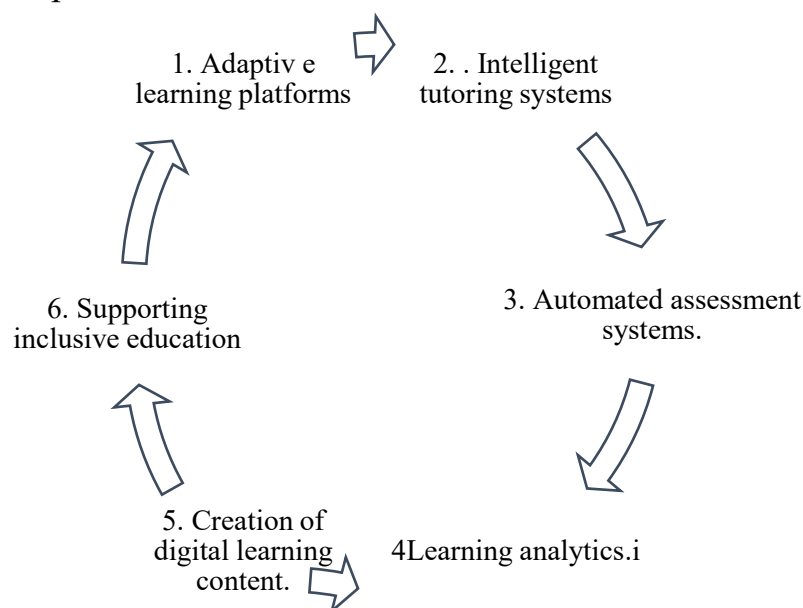
While performing complex tasks, students learn to make independent decisions based on the recommendations provided by the system.

Fifthly, AI optimizes the pedagogical activity of the teacher.

Through analytical reports, the teacher receives precise data on each learner and can develop an individual pedagogical strategy.

Directions for the use of artificial intelligence in education.

There are several main directions for applying artificial intelligence technologies in the educational process.



**1-Figure X. Cyclical management model of the AI-based digital learning process.**



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**1. Adaptive learning platforms.** These platforms analyze learners' knowledge levels and provide individualized tasks. As a result, students are able to learn at their own pace.

**2. Intelligent tutoring systems.** AI-based virtual tutors explain problems step by step and offer additional recommendations to learners.

**3. Automated assessment systems.** Automatic grading of tests and written assignments saves teachers' time and increases the objectivity of assessment.

**4. Learning analytics.** With the help of AI, the dynamics of students' development are monitored and learning difficulties are identified at an early stage.

**5. Creation of digital learning content.** Artificial intelligence is used to develop multimedia materials, interactive tasks, and simulations.

**6. Supporting inclusive education.** It enables the development of individualized learning programs for students with special educational needs.

Pedagogical conditions for the effective use of artificial intelligence To successfully implement artificial intelligence in the educational process, the following pedagogical conditions are required:

- developing teachers' digital competence;
  - creating a bank of didactic materials;
  - improving digital infrastructure;
  - forming students' information culture;
- ensuring compliance with digital safety and ethical standards.

## Conclusion

Artificial intelligence is an innovative didactic tool that enables the individualization of the educational process, strengthens a differentiated approach, provides analytical evaluation of learning outcomes, and introduces



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adaptive learning mechanisms. Its application increases students' cognitive activity, independent thinking, and learning motivation. The integration of artificial intelligence into the education system serves as an important factor in improving the quality of education.

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