Improving The Methodology Of Teaching Biology Using Artificial Intelligence

Turekeeva Alfiya Jienbekovna

Associate Professor of the Department of Biology, Nukus State Pedagogical Institute, Doctor of Pedagogical Sciences (PhD), Uzbekistan

Mirzamuratova Umida

Nukus State Pedagogical Institute named after Ajiniyaz, 2nd-year Master's student of the specialty 70510105-Methods of Teaching Exact and Natural Sciences (Biology), Uzbekistan

Abstract: This article highlights the issues of improving the methodology of teaching biology through the use of artificial intelligence technologies in the educational process. Teaching tools based on artificial intelligence play an important role in increasing the cognitive activity of students, ensuring an individual approach, and increasing the effectiveness of education.

Keywords: Artificial intelligence, biology education, innovative methods, digital education, individual education.

Introduction: Currently, digital technologies are developing rapidly in the education system. In particular, the use of the capabilities of artificial intelligence (AI) brings the quality of teaching subjects to a new level. Biology is based on natural processes, complex systems, and experiments, and the introduction of modern technologies in its teaching is considered important.

Today, the use of artificial intelligence is encompassing all spheres of our lives. The application of AI in education is also very relevant: the use of artificial intelligence (AI) is becoming widespread in many educational institutions around the world, as it increases the effectiveness of teaching [1].

Problem statement. The complexity and abstract nature of physics as a subject often presents difficulties for pupils and students. To facilitate the process of studying this complexity in science, all specialists around the world are recommending various methodological approaches, and these newly developed methods are contributing to a deeper understanding of fundamental concepts [2].

In our opinion, one way to make the biology teaching process interesting and engaging is to use AI-based technologies, which open up unlimited opportunities in increasing the effectiveness of learning material, making the study of the subject more interactive and accessible. However, it should be noted that despite the great didactic potential of IPs, IPs are still not widely used in teaching physics, the reason for this is the lack of awareness of many people about these intellectual technologies [3].

Artificial intelligence (AI) can significantly improve the quality of education, making the process more interactive and personalized. Based on experiments, the following methods of integrating PI in physics teaching can be demonstrated:

The application of artificial intelligence (AI) in the educational process contributes to making the learning process more interactive, personalized, and highly effective. Several directions for improving physics methodology using artificial intelligence can be identified.

Personalization of instruction

Adaptive education system: PI student achievements and failures, and based on these, can adapt the learning

material to the student. Taking into account each student's level of preparedness and comprehension of the topic, they prepare individual assignments, examples, and explanations for the student.

Immediate tests: PI tests students regularly, immediately establishes feedback, identifies student gaps, and provides additional materials to address them.

Educational trajectories: PI can show the student a personalized learning trajectory, offers topics for additional learning, and presents problems of varying complexity.

Automation of knowledge assessment and testing

Automatic checking of homework: calculations, graphs,

can automatically check homework such as formulas and explanations, significantly reduces the time spent on checking, and increases the teacher's time for individual work with students.

Analysis of errors: PI can not only check assignments but also analyze typical student errors, provide recommendations for improving teaching methodology and making corrections to educational materials.

Virtual laboratories and simulations

Virtual experiments: AI for creating a virtual laboratory, where students can conduct numerical experiments. This is very convenient when conducting an experiment requires the presence of complex, expensive equipment and under normal operating conditions is dangerous.

Modeling physical processes: AI-based systems can model and visualize physical phenomena that are difficult or impossible to observe (for example, quantum processes, processes in the nucleus, or the movement of galaxies, etc.).

Assistance to teachers

Individual Assistant for the Teacher: PI assists the teacher in preparing materials, preparing problems and control works, and preparing additional resources for specific students or groups.

Analyzing the progress of the class or group: The teacher can analyze the progress of the entire class using AI, identify difficult topics, and make adjustments to the curriculum in real time.

Chatbots and training assistants

Educational chatbots: answering students' physics questions

create answering training bots, explain the theory, solve problems, or prepare for exams.

Humanitarian Ambulance: Chatbots can help at any time, making the learning process easy and convenient, especially for students to complete their independent work.

Recognition of words and writing

Automatic text generation and problem creation: AI can create new learning tasks, which can include both simple practice problems and complex problems requiring logic and analytical thinking.

Use AI to predict student progress

Predicting student achievement: Based on accumulated data on student achievement and activity, PI can predict their future progress and provide recommendations for improvement (e.g., additional lessons or materials).

Addressing Potential Problems: The student can analyze their behavior and advise them on preventing problems related to their academic performance or motivation. They can also identify a decline in interest in the subject in the early stages.

Examples of implementing PI in physics teaching:

CogBooks - AI Learning Personalization

Applied platform It analyzes how students work with educational materials and adapts the course according to their achievements.

Newton AI is a platform that helps teachers develop individual learning trajectories for students, using AI algorithms to analyze their knowledge level and determine their aptitude for learning.

Thus, the application of AI in biology teaching opens up new possibilities for further personalization and increasing the effectiveness of teaching. This allows for better analysis of student achievements, adaptation of learning materials, and improvement of teaching methodology, thereby achieving a deeper understanding of the subject.

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