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Independent Learning and Self - Education Skills Using Artificial Intelligence Tools

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Abstract: This article discusses the pedagogical possibilities of developing students' independent learning and self-education skills based on the use of artificial intelligence tools. The use of artificial intelligence tools in the process of independent learning is based on the fact that the student's ability to form an individual educational trajectory, plan his activities, self - control, identify errors and expand his opportunities for reflection is based on the fact that.

Keywords: Artificial intelligence, student, independent learning, self-education, self - control, reflection, individual learning, digital learning, pedagogical technology.

Introduction: Today, the effective use of digital technologies in the education system serves to expand the opportunities for students not only to acquire knowledge, but also to think independently, manage their own activities, and develop personally. In particular, the introduction of artificial intelligence technologies into the educational process creates new pedagogical opportunities for the student to transform from a subject who readily receives knowledge into an active subject who independently organizes his or her own educational activities.

In traditional education, independent student activity is often organized through extracurricular assignments, books, and additional resources. Artificial intelligence tools allow for individualization of this process, providing instant feedback, explaining complex topics in different ways, adapting assignments to the student's level of preparation, and analyzing the results of learning activities.

The use of artificial intelligence should be considered not only as a means of imparting knowledge, but also as a pedagogical tool that supports the student's independent learning and self - education activities.

Independent learning is the process of a student organizing his own learning activities, setting goals, selecting resources, controlling the process, and analyzing the results. Self - education, on the other hand, means the conscious improvement of the spiritual, moral, volitional, and intellectual qualities of a person. These two processes are inextricably linked, and in modern conditions they have the opportunity to rise to a new qualitative level with the help of artificial intelligence tools: adaptive platforms determine the student's level of knowledge in real time and offer individual tasks that are suitable for him; intelligent chatbots support independent research by providing advice and explanations at any time; and progress monitoring systems serve to form self-control and reflection skills in the student.

In the last decade, artificial intelligence technologies such as machine learning, natural language processing, large language models, and intelligent recommendation systems have been widely used in education. Unlike the traditional "one-size-fits-all" approach, artificial intelligence-based systems allow for the formation of a personalized learning trajectory for each student, taking into account their level of knowledge, learning pace, and interests. This forms the practical basis of the concept of "adaptive learning" in pedagogical science.

Adaptive learning systems create a "knowledge map" of a student based on their test results, task completion speed, and error analysis, and suggest subsequent exercises based on this map. As a result, the student works with materials of a level of difficulty that is appropriate for them, which increases their motivation to learn and prevents the state of "learned helplessness" Regular work with such systems develops in the student the ability to independently identify their knowledge gaps and find ways to eliminate them.

The application of artificial intelligence in education can be conditionally divided into several areas:

- personalization of learning content (adaptive platforms, recommendation systems);
- intelligent assistants that interact directly with the student (chatbots, virtual tutors) ;
- learning process management and monitoring systems (learning management platforms, progress analysis dashboard);
- assessment and feedback systems (automatic checking and analysis programs).

Each of these areas focuses on specific aspects of independent learning skills, including identifying personal needs, asking questions and researching, monitoring one's own activities, and evaluating results.

The table below lists the main structural components of independent learning and the corresponding functions of artificial intelligence tools in their development (Table 1).

Independent learning component	Function of artificial intelligence tool	Developing skill
Goal setting	Identifying the level of knowledge and proposing individual learning goals	Planning ability
Resource selection	Recommend materials of appropriate level and format for the topic	Independent research
Process control	Providing real-time statistics on completed tasks	Self - observation
Get feedback	Automatically detect and explain errors	Self - correction
Result evaluation	Allowing work to be analyzed and compared based on a rubric	Self - assessment
Reflection	Show daily / weekly activity trends	Metacognitive thinking

Independent learning skills consist of several components: goal setting, planning, resource selection, self - monitoring, and outcome evaluation. Artificial intelligence tools can assist students in all of these stages:

- Intelligent tutoring systems provide the student with explanations and examples on any topic at any time, ensuring a continuous learning process even outside of the classroom setting.
- Artificial intelligence-based chatbots use the

Socratic question-and-answer method to guide the learner to a solution through independent thinking rather than a ready-made answer, which develops critical and logical thinking.

– Systems that automatically analyze text and provide feedback allow the student to revise and independently correct their work, which builds self-editing and quality control skills.

In addition, digital assistants that help plan the learning process provide a practical application of the theory of “self - directed learning” by providing students with personal schedules, prioritization, and time management recommendations. According to this theory, developed by Zimmerman, a successful student operates in a three-stage cycle - thinking ahead, doing and self - monitoring, and then self - evaluating. Artificial intelligence tools provide real-time information and recommendations at each stage of this cycle, gradually increasing the level of independence of the student.

Artificial intelligence-based language models allow the reader to explain any topic at different levels of complexity, with different examples, which, unlike the static and uniformly presented text of a traditional textbook, allows it to adapt to the student's personal perception style.

language learning, applications based on artificial intelligence (for example, conversation simulators) allow the learner to communicate in a foreign language in real time, immediately detecting pronunciation and grammatical errors. This forms the habit of independent practice in the language learner outside the classroom. In the exact sciences (mathematics, physics, programming), systems that analyze the problem-solving process step by step show the learner not only the correct answer, but also the way to independently construct the solution logic, which in the long term strengthens the competence of independent problem-solving.

The pedagogical use of artificial intelligence tools creates important opportunities for students to develop independent learning and self-education skills. In particular, artificial intelligence has great potential in the processes of forming an individual learning trajectory, receiving immediate feedback, self-control, reflection, and setting personal development goals.

Independent learning and self-education are inextricably linked processes. As a student learns to acquire knowledge independently, the need to control his own activities, analyze his mistakes, and work on himself increases. From this point of view, the use of artificial intelligence tools serves to turn the student

into an active subject of the educational process. At the same time, the use of artificial intelligence should not negate the pedagogical guidance of the teacher. On the contrary, the teacher should act as a pedagogical moderator who determines the purpose, boundaries, and methods of using artificial intelligence.

CONCLUSION

In conclusion, artificial intelligence should not replace the student, but rather be a reliable companion and development tool on the path of independent research. Only the introduction of these technologies into the education system, focusing on the human factor, pedagogical responsibility and national educational values, will ensure the formation of the future generation as independent, critical-thinking and self-developing individuals.

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