BG Pulse Journal USA
ISSN:1947-2536 http://www.bgpulseusa.com/index.php/bg

DEVELOPING STUDENTS' INTELLECTUAL POTENTIAL THROUGH THE USE OF ARTIFICIAL INTELLIGENCE TOOLS IN PRIMARY EDUCATION

Asia International University 2nd year student
Majidova Dilnoza Sunnatillayevna

Abstract. This article analyzes the role of artificial intelligence (AI) tools in developing the intellectual potential of primary school students. The study examines the support of AI in primary education for personalized learning, activation of cognitive activity, independent thinking, logical reasoning, and learning motivation. Recent empirical and review studies show that AI, when used under teacher guidance and pedagogical control, can improve reading fluency, problem-solving skills, engagement, and overall learning outcomes. This article evaluates the pedagogical potential and limitations of AI in primary education based on theoretical analysis and comparative discussion. The results of the study show that AI is more effective when it supports the teacher's work rather than replacing it. In conclusion, well-designed SI integration can enhance students' intellectual development, support differentiated learning, and improve the quality of primary education.

Keywords: primary education, artificial intelligence, generative AI, intellectual potential, personalized education

The modern education system is developing on the basis of digital technologies, and artificial intelligence plays an important role in this process. Especially at the primary education stage, AI tools create favorable conditions for identifying the individual capabilities of students and creating an appropriate learning environment for them. At this age, a child's thinking is developing rapidly, so it is extremely important to organize the educational process psychologically and didactically correctly. AI-based tools can be effective in involving the student in the educational process as an active participant. Recent studies have studied the impact of generative artificial intelligence on learning outcomes, and noted the possibility of supporting intellectual development, especially in primary school students. Therefore, this topic is not only relevant, but also of great practical importance. Intellectual potential is understood as a set of student abilities to know, analyze, draw conclusions, solve problems, be creative, and think independently. Since these qualities are just beginning to take shape in primary school students, active methods and technological tools play a crucial role in their development. In this process, artificial intelligence tools guide students not merely toward ready-made answers, but toward inquiry, observation, and comparison. Consequently, the child does not passively receive knowledge but instead processes it and strives to apply it in practical activities. AI enables the provision of personalized assignments, interactive exercises, and analytical questions within primary education. Such an approach accounts for students' individual learning paces and establishes tailored support mechanisms for both high-achieving students and those facing difficulties, thereby fostering the gradual enhancement of intellectual potential.

AI tools perform several didactic functions in primary education: individualizing knowledge, automating exercises and tests, analyzing student responses, identifying errors, and providing feedback. This allows the teacher to manage the learning process more effectively. For example, an AI system can determine if a student is struggling with a topic and offer him simpler or additional explanatory materials. This approach increases the interest of primary school students, as they complete tasks that are appropriate for their level. Personalized education, in turn, increases the

student's sense of achievement, which leads to increased motivation. Where motivation increases, cognitive activity also becomes more active, which is an important factor in intellectual development.

Artificial intelligence tools affect intellectual development through several mechanisms. First, they encourage the student to think independently. Second, they strengthen logical operations through analytical tasks. Third, they encourage creative solutions through exercises based on problem situations. Fourth, they form a culture of recognizing and correcting errors through rapid feedback.

Visual, auditory and interactive elements are very important for primary school children. AI tools combine text, images, sound and animation, making the learning process interesting. Therefore, they not only consolidate knowledge, but also activate various aspects of the student's thinking. No matter how advanced AI tools are, the teacher remains the central figure in primary education. Artificial intelligence does not replace the teacher, but rather assists him. The teacher analyzes the information provided by AI, adapts it to didactic goals and manages the educational process. In this sense, AI serves as an auxiliary tool in pedagogical decision-making. When using AI tools, a primary school teacher must definitely take into account the age characteristics, psychological readiness and moral standards of the student. Otherwise, the technology may not serve its purpose. Therefore, AI should be used in harmony with the pedagogical goal, didactic content and educational task.

It is appropriate to employ methods such as theoretical analysis, comparative analysis, and pedagogical observation when studying this topic. Theoretical analysis allows for the examination of scholarly sources regarding AI and primary education. Comparative analysis enables a comparison between traditional and AI-based teaching methods. Pedagogical observation helps identify changes in students' engagement, motivation, and independent thinking. If practical research is conducted, AI tools could be used in an experimental class, while traditional methods are applied in a control class. It is recommended to evaluate the results using tests, interviews, the quality of task completion, and observation checklists. This approach makes it possible to reliably assess the level of intellectual development in primary education.

While current evidence supports the positive impact of AI in education, its effectiveness depends on proper pedagogical organization. Research shows that AI tools can improve intellectual and socio-emotional outcomes, especially in primary school students. However, if these tools are used incorrectly or excessively, they can weaken a student’s independent thinking. Therefore, AI should always be used under the supervision of a teacher. Another important aspect of using AI in primary education is the possibility of inclusive education. In a setting where students of different levels are studying in the same classroom, AI can help both strong and struggling children through customized exercises. This supports the principle of equality in education.

In conclusion, the use of artificial intelligence tools in primary education can be an effective factor in developing the intellectual potential of students. They enhance children's cognitive activity through personalized learning, instant feedback, problem-solving tasks, and the creation of an interactive learning environment. Especially at an early age, these tools serve to develop thinking, logic, memory, and creativity. At the same time, when using AI tools, the teacher must maintain a leading role, combine technology with pedagogical goals, and take into account the age characteristics of the student. A properly organized AI-based educational process helps to accelerate the intellectual development of a primary school student.

LIST OF REFERENCES:

1. American Psychological Association. (2020). Publication manual of the American Psychological Association (7th ed.).
2. Artificial Intelligence in Primary Education. (2025). ERIC.
3. Exploring the impact of generative artificial intelligence on students' learning outcomes. (2025). ERIC.
4. Evaluating the effects of generative AI on student learning outcomes: Insights from a meta-analysis. (2025). Educational Technology & Society.
5. Meta-analysis of artificial intelligence in education. (2024). ERIC.
6. The evidence base on AI in K-12: A 2026 review. (2026). Stanford SCALE.