# SUN'IY INTELLEKTNING TA'LIMGA TA'SIRI: KOGNITIV RIVOJLANISH VA TEXNOLOGIK BOG'LIQLIK

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**Annotatsiya:** Ushbu maqolada neyron tarmoq texnologiyalari va sun'iy intellektning zamonaviy ta'lim tizimiga ta'siri o'rganiladi. Tadqiqotda sun'iy intellektni ta'limga integratsiya qilishning ijobiy va salbiy jihatlari tahlil qilinadi, uning o'rganish samaradorligi, bilimlarga kirish imkoniyati va o'quvchilarning kognitiv qobiliyatlarini rivojlantirishga e'tibor qaratiladi. Chat GPT kabi sun'iy intellektga asoslangan platformalarning ta'lim faoliyatidagi roliga alohida e'tibor qaratilgan. Tadqiqotda raqamli texnologiyalarga tobora ortib borayotgan qaramlik ta'kidlanadi va akademik yaxlitlik va mustaqil fikrlash ko'nikmalarining pasayishi haqida savollar tug'iladi. Xulosa shuki, sun'iy intellekt inson intellektual sa'y-harakatlarining o'rnini bosuvchi emas, balki ta'limni qo'llab-quvvatlash vositasi sifatida ishlatilishi kerak.

**Kalit so'zlar:** Sun'iy intellekt, neyron tarmoqlari, ta'lim, Chat GPT, raqamli o'rganish, tanqidiy fikrlash.

# ВЛИЯНИЕ ИСКУССТВЕННОГО ИНТЕЛЛЕКТА НА ОБРАЗОВАНИЕ: КОГНИТИВНОЕ РАЗВИТИЕ И ТЕХНОЛОГИЧЕСКАЯ ЗАВИСИМОСТЬ

**Аннотация:** В данной статье рассматривается влияние технологий нейронных сетей и искусственного интеллекта на современную систему образования. В исследовании анализируются как положительные, так и отрицательные аспекты интеграции ИИ в образование, с акцентом на его влияние на эффективность обучения, доступность знаний и развитие когнитивных способностей учащихся. Особое внимание уделяется роли платформ на основе ИИ, таких как Chat GPT, в учебной деятельности. Исследование подчеркивает растущую зависимость от цифровых технологий и поднимает вопросы академической честности и снижения навыков самостоятельного мышления. В заключение делается вывод, что искусственный интеллект следует использовать в качестве вспомогательного образовательного инструмента, а не замены интеллектуальных усилий человека.

**Ключевые слова:** искусственный интеллект, нейронные сети, образование, Chat GPT, цифровое обучение, критическое мышление.

# THE IMPACT OF ARTIFICIAL INTELLIGENCE ON EDUCATION: COGNITIVE DEVELOPMENT AND TECHNOLOGICAL DEPENDENCE

**Abstract:** This article examines the impact of neural network technologies and artificial intelligence on the modern education system. The study analyzes both the positive and negative aspects of integrating AI into education, focusing on its impact on learning effectiveness, knowledge accessibility, and the development of students' cognitive abilities. Particular attention is given to the role of AI-powered platforms, such as Chat GPT, in educational activities. The study highlights the growing dependence on digital technologies and raises questions about academic integrity and the decline of independent thinking skills. The conclusion is that artificial

intelligence should be used as an educational support tool, not a substitute for human intellectual effort.

**Keywords**: Artificial intelligence, neural networks, education, Chat GPT, digital learning, critical thinking.

Introduction: With the rapid development of digital technologies, artificial intelligence is becoming a key factor in the transformation of modern society. In recent years, neural networks—intelligent systems capable of analyzing large volumes of information, learning from data, and performing tasks traditionally requiring human intervention—have become a key player in innovative technologies. The development of artificial intelligence is having a significant impact on economics, medicine, law, international relations, and especially education, which is gradually adapting to new technological conditions. [1]

The modern education system is undergoing a profound digital transformation. The use of electronic platforms, online learning, virtual libraries, and intelligent services has become an integral part of the educational process. The most notable phenomenon of recent years has been the active implementation of neural network technologies in schools, colleges, and higher education institutions. Students and teachers are increasingly using intelligent platforms such as Open AI and its Chat GPT system, automatic translators, digital assistants and analytical programs for searching information, preparing educational materials, writing texts and completing various academic tasks.

The widespread use of artificial intelligence in the educational environment is driven by its ability to significantly improve knowledge accessibility and learning efficiency. Neural networks allow students to quickly obtain necessary information, explain complex topics, tailor learning to their individual needs, and save time on assignments. This makes the educational process more flexible, interactive, and technologically advanced. Furthermore, the use of artificial intelligence promotes the development of digital literacy, a crucial element in the professional training of future specialists in the modern world. However, despite its numerous advantages, the widespread adoption of neural networks is generating significant scientific and public debate. [2]. One of the most pressing concerns is the development of technological dependence and the gradual decline in students' independent thinking. The constant use of predetermined answers, automated text generation, and intelligent prompts can negatively impact the development of analytical skills, critical thinking, and independent information retrieval. Questions of academic integrity, accountability for the use of artificial intelligence, and maintaining a balance between technological support and students' intellectual independence are increasingly being raised in the educational environment.

The relevance of this topic stems from the fact that modern education is currently defining the role of artificial intelligence in the future of learning. On the one hand, neural networks offer vast opportunities for modernizing education, improving the quality of learning, and expanding access to knowledge. On the other hand, excessive reliance on digital technologies can lead to a weakening of students' cognitive activity and a decrease in their level of intellectual independence. Therefore, a comprehensive analysis of the impact of neural networks on the education system and the determination of rational limits for their application are necessary.

The purpose of this article is to examine the impact of neural network technologies on modern education, identify their positive and negative aspects, and determine whether neural networks promote intellectual development or reinforce technological dependence. To achieve this goal, it is necessary to examine the main areas of artificial intelligence application in education, analyze the benefits and risks of implementing neural networks, and assess their impact on the quality of knowledge and independent thinking of students. [3]

Materials and methods: In preparing this article, I consulted scientific articles, analytical materials, electronic sources, and research in the field of artificial intelligence and its application in education. The theoretical basis for this work was provided by the work of Russian and international experts in the field of digital education and neural network technologies. Practical examples included modern intelligent platforms, including Chat GPT, online translators, and digital educational services used by students and teachers in the learning process.

The study utilized methods of analysis, comparison, and generalization. The analysis method allowed us to identify the advantages and disadvantages of using neural networks in education, while the comparison method helped us identify the differences between traditional teaching and teaching using artificial intelligence. An interdisciplinary approach was also used, combining elements of pedagogy, information technology, and sociology, which allowed for a comprehensive assessment of the impact of neural networks on the educational process and the intellectual development of students.

Results: The study conducted a comparative analysis of traditional learning systems and systems using artificial intelligence and neural networks. The results revealed significant differences between the two approaches in terms of the organization of the learning process, the speed of information acquisition, and the level of student independent work. It was found that the traditional education system is characterized by a high dependence on the teacher as the primary source of knowledge, whereas the use of artificial intelligence, including the Chat GPT platform, provides students with the ability to independently access information and study educational materials more flexibly. Analysis showed that neural network-based learning allows for faster assimilation and processing of information, significantly reducing the time spent searching for and explaining educational materials. At the same time, the traditional system promotes deeper development of independent analysis and critical thinking skills.

One of the key findings of the study was the high degree of personalization of learning achieved through artificial intelligence. Unlike traditional approaches, where the learning process is standardized, neural network technologies allow for tailoring the material to the individual characteristics and level of each student. [7]. It has also been found that the use of artificial intelligence increases the availability of educational resources, but at the same time increases the risk of reducing student independence and developing dependence on digital tools.

**Comparison of Traditional Learning and AI-Based Learning**

| Criterion | Traditional Learning | AI-Based Learning (Neural Networks) |
|---|---|---|
| Source of knowledge | Teacher and textbooks | AI systems (e.g., Chat GPT) |
| Speed of information access | Relatively slow | Fast, real-time |
| Learning personalization | Low | High, adaptive |
| Student role | Mostly passive | Active and independent |
| Teacher role | Main knowledge provider | Facilitator and guide |
| Critical thinking development | Strongly developed | May decrease with overuse |
| Academic integrity risk | Low | Higher risk |
| Accessibility | Limited by time/place | High, global access |
| Cognitive development | Strong independence | Risk of dependency |

Thus, the results of the study show that artificial intelligence significantly improves the effectiveness of the educational process, but its excessive use can negatively impact the development of students' independent thinking.

Discussion: The results of this study demonstrate that artificial intelligence in education cannot be viewed solely as positive or negative, as its impact depends on the pedagogical context and how it is integrated into the learning process. Neural network technologies are more than just tools for information retrieval; they represent a structural shift in how knowledge is accessed, processed, and assimilated by students. [4]. One key analytical observation is that AI systems, including platforms like Chat GPT, alter learners' cognitive behavior, reducing the time needed to absorb information. While this improves efficiency, it also modifies the learning process itself, shifting it from deep cognitive effort to rapid external assistance. This shift raises concerns about long-term knowledge retention and the development of independent analytical thinking. [8]

From a pedagogical theory perspective, traditional learning models rely on cognitive challenges, repetition, and gradual skill acquisition, which strengthens memory and reasoning abilities. In contrast, AI-based learning reduces cognitive challenges by providing immediate solutions. While this increases accessibility, it may weaken knowledge retention if students rely on AI as a primary resource rather than as a supplemental tool. [5]. More one important aspect is the transformation of the teacher's role. In AI-integrated environments, teachers cease to be the primary providers of knowledge and become more like learning managers who help students evaluate and interpret AI-generated content. This shift requires a rethinking of pedagogical strategies, with an emphasis on critical thinking, verification skills, and ethical awareness in the digital environment.

Furthermore, the study highlights that the educational impact of artificial intelligence depends largely on user behavior. Students who use AI as an assistive system tend to demonstrate improved academic performance and productivity, while those who rely on it only lightly show decreased engagement in independent thinking. [6]. This suggests that the educational valueI.E.is not congenital, but is determined by conditions. Overall, the analysis suggests that artificial intelligence should be viewed as a cognitive augmentation system, not a replacement for human intellectual activity. Its effectiveness depends on maintaining a structured balance between automation and active mental effort, ensuring that technological assistance enhances, rather than replaces, human learning processes.

Conclusion: The study demonstrates that artificial intelligence and neural network technologies have become an integral part of the modern education system, fundamentally transforming traditional teaching and learning models. The integration of AI-powered tools, including platforms like Chat GPT, has significantly improved access to educational resources, increased the effectiveness of knowledge acquisition, and facilitated the development of flexible and personalized learning environments.

At the same time, research confirms that the impact of artificial intelligence on education is complex and multifaceted. While AI technologies improve productivity and accessibility, their excessive or uncritical use can lead to decreased independent cognitive activity, weakened analytical skills, and increased risks associated with academic integrity. Therefore, the educational value of artificial intelligence is not absolute but depends on the context of its application.

The study emphasizes that artificial intelligence should be understood as a tool for enhancing cognitive capabilities, not as a substitute for human intellectual effort. Its effectiveness is greatest when it complements, rather than replaces, traditional learning processes. In this sense, maintaining a balance between technological assistance and independent intellectual work is essential for preserving the core goals of education. Furthermore, the study's findings highlight the need to rethink the role of educators in AI-integrated learning environments. Teachers should act not only as knowledge transmitters but also as mentors,

developing students' critical thinking, digital literacy, and ethical awareness of the use of new technologies. In conclusion, the future of education will largely depend on the ability of educational systems to integrate artificial intelligence in a responsible and pedagogically sound manner. With proper regulation and informed application, neural network technologies have the potential to facilitate rather than hinder human intellectual development.

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