EduVision: Journal of Innovations in Pedagogy and Educational Advancements
Volume 01, Issue 07, July, 2025
brightmindpublishing.com
ISSN (E): 3061-6972

"DEVELOPING STUDENTS' COGNITIVE ABILITIES AND LEARNING COMPETENCIES THROUGH MODERN NEUROGAMES"

Nazirqulova Nodira G'anijanovna
Nordic International University

Abstract
Nowadays, digital technologies are widely used in the educational process. In particular, games based on neuro technologies (neuro games) serve as an effective tool for developing key cognitive functions such as mental activity, attention, memory, and critical thinking in students. This thesis explores the types of modern neuro games, their impact on students' cognitive abilities, and their integration into the learning process. The research justifies the role of neuro games in enhancing students' learning motivation, independent thinking in problem-solving situations, and the ability to make quick and accurate decisions, based on experiments, observations, and surveys.

Keywords: Neuro games, cognitive development, learning competencies, digital education, innovative technologies, critical thinking.

Introduction

Today, digital technologies have deeply penetrated all aspects of our lives. This trend is especially evident in the education system, where the use of modern tools has become increasingly relevant. The effectiveness of the learning process now largely depends on how successfully and to what extent modern technologies, including neurotechnology-based tools, are integrated into education. Traditional learning aids are gradually being replaced by innovative approaches, among which neurogames are gaining prominence. These games aim to enhance cognitive abilities by stimulating various functions of the human brain. They are used not only for entertainment purposes but also serve as effective tools for educational and developmental goals.

Neurogames are designed based on psychological and physiological knowledge, and they focus on training important brain functions such as attention, memory, analytical thinking, decision-making, language, and communication skills. These

EduVision: Journal of Innovations in Pedagogy and Educational Advancements
Volume 01, Issue 07, July, 2025
brightmindpublishing.com
ISSN (E): 3061-6972

games are typically implemented through mobile applications, computer programs, or specialized devices. Particularly, the use of EEG (electroencephalography) devices enables real-time monitoring of brain activity, allowing the complexity of the game to adjust automatically based on brainwave activity. This feature significantly enhances their effectiveness and supports the application of individualized learning approaches in education.

The growing popularity of such games among students is not coincidental. Firstly, they make the learning process more dynamic and interactive, which helps increase students' attention and engagement. Secondly, the cognitive skills developed through neurogames—such as problem analysis, quick decision-making, information filtering, and evaluation—are beneficial not only in academic settings but also in everyday life. Thirdly, these games foster students' ability to independently plan their activities, engage in self-assessment, and strive for continuous improvement, which leads to the development of metacognitive abilities.

As the modern education system is based on a competency-based approach, neurogames can effectively contribute to the development of various key learning competencies. For instance:

- **Information literacy** – the ability to quickly identify and analyze large volumes of information;
- **Problem-solving skills** – the capacity to find solutions in non-standard situations;
- **Communicative competence** – improved communication, teamwork, and idea exchange through multiplayer games;
- **Digital literacy** – the effective use, understanding, and management of technological tools;
- **Self-development competence** – skills such as planning one's activities, analyzing outcomes, working on mistakes, setting goals, and striving toward them.

These competencies, reinforced through neurogames, play a significant role in shaping students into self-directed and capable learners in both academic and real-life contexts.

Another important aspect of neurogames is their contribution to emotional stability and stress resilience. These games can be especially helpful before exams, during the assimilation of complex topics, or simply for mental relaxation. They help

EduVision: Journal of Innovations in Pedagogy and Educational Advancements
Volume 01, Issue 07, July, 2025
brightmindpublishing.com
ISSN (E): 3061-6972

improve concentration, activate logical thinking, and bring emotional balance to the user. As a result, they positively influence overall learning effectiveness.

Experimental studies have demonstrated that the use of neurogames in education yields positive outcomes. Students who regularly engage with neurogames tend to show higher academic performance. According to research, such students learn approximately 20–30% faster, retain information 15–25% better, and exhibit up to 40% greater learning motivation. Furthermore, they are more active in analytical thinking, making well-grounded decisions, and confidently expressing their opinions in challenging or debate-driven situations.

Therefore, it is essential to widely implement neurogames in the education system. This includes developing scientific and methodological guidelines, training pedagogical staff to work with neurotechnologies, establishing the necessary technical infrastructure, and systematically monitoring the effectiveness of these tools. When properly guided, neurogames not only enhance students' cognitive activity but also play a crucial role in shaping them into independent thinkers, digitally literate individuals, and emotionally stable personalities. Hence, expanding the use of neurogames in educational practice should be considered one of the key modern approaches in contemporary pedagogy.

References

1. Хакимов, М. Ҳ., & Қурбонов, А. Қ. (2021). Ta'limda raqamli texnologiyalar va innovatsion yondashuvlar. Toshkent: O‘zbekiston milliy ensiklopediyasi nashriyoti.
2. Исмоилова, Г. А. (2020). Neyropsixologiya asoslari va ta'limdagi ahamiyati. Toshkent: Ilm Ziyo.
3. Anderson, J. R. (2015). Cognitive Psychology and Its Implications (8th ed.). New York: Worth Publishers.
4. Dede, C. (2009). Immersive interfaces for engagement and learning. Science, 323(5910), 66–69. https://doi.org/10.1126/science.1167311
5. Anguera, J. A., et al. (2013). Video game training enhances cognitive control in older adults. Nature, 501(7465), 97–101. https://doi.org/10.1038/nature12486
6. Prensky, M. (2001). Digital Game-Based Learning. New York: McGraw-Hill.

EduVision: Journal of Innovations in Pedagogy and Educational Advancements
Volume 01, Issue 07, July, 2025
brightmindpublishing.com
ISSN (E): 3061-6972

7. Oblinger, D. G., & Oblinger, J. L. (2005). Educating the Net Generation. EDUCAUSE.
8. Салохова, Н. С. (2022). Raqamli o‘yinlarning yoshlar psixologiyasiga ta’siri. Toshkent: Pedagogika nashriyoti.
9. Koçak, O., & Yıldırım, S. (2020). Neuroscience in education: A review on neuroeducation. Journal of Educational Technology & Online Learning, 3(1), 25–36.
10. OECD (2021). 21st Century Skills and Competences for New Millennium Learners in OECD Countries. OECD Publishing. https://www.oecd.org/education
11. Hasanov, D. R., & Mahmudova, M. M. (2023). Zamonaviy ta’limda raqamli vositalarning o‘rni. Ta’lim va innovatsiyalar jurnali, 4(2), 44–50.
12. Sharipov, B. B. (2021). O‘quvchilarning kognitiv salohiyatini rivojlantirishda raqamli texnologiyalarning o‘rni. O‘zbekiston pedagogika jurnali, 3(1), 18–23.