THE IMPACT OF DIGITAL EDUCATIONAL TECHNOLOGIES ON THE COGNITIVE DEVELOPMENT OF PRESCHOOL CHILDREN

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Abstract

The rapid development of information and communication technologies is creating the need to develop innovative pedagogical approaches and implement them in practice at all levels of the education system. Especially in preschool education, the use of digital educational technologies is recognized as one of the important pedagogical factors supporting children's cognitive development.

This article investigates the pedagogical effectiveness of digital educational technologies in the cognitive development of preschool children based on theoretical analysis, pedagogical observation, comparative analysis, and pedagogical experiment methods. The research results showed that the use of multimedia and interactive educational technologies has a significant positive impact on the development of children's perception, memory, thinking, and speech. In addition, the digital learning environment increases children's learning motivation and creates opportunities to organize a learner-centered educational process taking into account their individual abilities and developmental levels. The results of the study demonstrate that the scientifically grounded implementation of digital pedagogy elements in preschool education contributes to the effective support of children's intellectual and cognitive development.

Keywords

digital educational technologies, preschool education, cognitive development, multimedia-based learning, interactive pedagogy, digital pedagogy.

I. Introduction

In recent years, the rapid development of information and communication technologies has played an important role in the modernization of the education system. Digital technologies are important tools for enriching the content of the educational process, introducing new pedagogical methods, and organizing education effectively. Modern research shows that the use of digital technologies in the educational process activates students' cognitive activity and increases educational effectiveness [1].

The preschool period is considered one of the most important stages of human development. During this period, children's cognitive processes such as perception, memory, thinking, and speech actively develop. Therefore, improving pedagogical approaches aimed at developing children's cognitive activity in preschool education is considered an important scientific task [4].

In recent years, multimedia technologies, interactive game platforms, and mobile learning applications have become widely used in preschool education. Multimedia educational technologies increase learning efficiency by presenting educational materials in visual and auditory forms [3]. In addition, game-based learning technologies increase children's interest in the learning process and develop their creative thinking. Modern studies show that interactive learning applications are effective tools for developing children's independent thinking skills [2].

Therefore, studying the pedagogical effectiveness of digital educational technologies in preschool education and identifying mechanisms for their integration into the educational process is one of the important scientific tasks of the present time.

II. Methods

This research is aimed at determining the pedagogical effectiveness of digital educational technologies in the cognitive development of preschool children. The research methodology is based on developmental psychology, multimedia learning theory, and modern pedagogical research methods [1].

Research methods

The following scientific methods were used during the research:

theoretical analysis;

- pedagogical observation;
- comparative analysis;
- pedagogical experiment;
- statistical analysis.

During the theoretical analysis, scientific literature related to the impact of digital educational technologies on the educational process and children's cognitive development was studied.

Research participants

The research was conducted in a preschool educational institution. A total of 60 children aged 5–6 participated in the study. The participants were divided into two groups:

- ✔ control group – taught using traditional teaching methods;
- ✔ experimental group – trained using digital educational technologies.

In the experimental group, multimedia educational programs, interactive gaming platforms, and educational mobile applications were used.

Evaluation criteria

The level of children's cognitive development was assessed based on the following indicators:

- development of perception;
- development of memory;
- development of thinking;
- development of speech.

III. Results

The results of the experimental study showed that the use of digital educational technologies has a significant positive impact on children's cognitive development.

Table 1

Cognitive development indicators

Indicator	Control group	Experimental group
Perception development	62%	85%
Memory development	59%	83%
Thinking development	61%	87%
Speech development	64%	86%

The results showed that all indicators in the experimental group were significantly higher. These findings are consistent with scientific views that the use of multimedia educational technologies increases the effectiveness of the educational process [3].

IV. Discussion

The research results confirm that digital educational technologies have a positive impact on the cognitive development of preschool children. Multimedia technologies activate children's perception processes by presenting educational materials in an interactive and visual form [1]. Interactive gaming technologies also help develop children's problem-solving abilities. Game-based learning environments develop children's creative thinking and ensure their active involvement in the learning process [5].

However, pedagogical supervision is important when using digital technologies. Some studies note that excessive use of technology may negatively affect children's social development.

V. Conclusion

The research results showed that digital educational technologies play an important role in the cognitive development of preschool children. Multimedia and interactive learning tools help develop children's perception, memory, and thinking processes.

In addition, effective integration of digital technologies into the educational process increases children's learning motivation and activates their cognitive activity. Future research on the integration of artificial intelligence-based adaptive learning technologies into preschool education is considered an important scientific direction.

REFERENCES

1.   Clark, R. C., & Mayer, R. E. (2016). *E-Learning and the Science of Instruction*. Wiley.
2.   Hirsh-Pasek, K., Zosh, J., Golinkoff, R., Gray, J., Robb, M., & Kaufman, J. (2015). Putting education in educational apps. *Psychological Science in the Public Interest*, 16(1), 3–34.
3.   Mayer, R. E. (2019). *Multimedia Learning*. Cambridge University Press.
4.   Neumann, M. M. (2018). Using tablets and apps to enhance emergent literacy skills in young children. *Early Childhood Research Quarterly*, 42, 239–246.

5.   Zosh, J. M., Hopkins, E., Jensen, H., et al. (2017). *Learning through Play: A Review of the Evidence*. LEGO Foundation.