DEVELOPING SCHOOL STUDENTS' THINKING THROUGH THE USE OF NEW INNOVATIVE TECHNOLOGIES IN LESSONS.

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Annotation

The article analyzes the role of modern innovative technologies in school education in developing students' thinking skills. It examines opportunities to develop logical, creative, critical, and visual thinking skills through interactive lessons, virtual and augmented reality, digital laboratories, and simulations in the educational process. The article also highlights the importance of innovative technologies in fostering students' independent learning abilities, problem-solving skills, creative thinking, and teamwork. It provides a scientific basis for educators to apply innovative technologies to make lessons effective and motivating.

Keywords

innovative technologies, school education, development of thinking, logical thinking, creative thinking, critical thinking, visual perception, virtual reality, augmented reality, interactive lessons, digital laboratory, simulation, students' independent learning, creative solutions, pedagogical innovation.

The modern education system is closely connected with rapidly evolving technologies, significantly enhancing the quality and effectiveness of the learning process. Today, school students acquire knowledge not only through traditional methods but also through innovative pedagogical approaches, digital tools, and interactive technologies, which allow them to develop their thinking. Consequently, the school lesson process is not limited to merely delivering information but also aims to develop students' logical reasoning, creative abilities, critical thinking, and visual perception.

Information and communication technologies, virtual and augmented reality tools, interactive lesson platforms, digital laboratories, and other modern pedagogical technologies comprehensively develop students' thinking. For instance, virtual laboratories allow students to observe and analyze complex scientific processes safely. Meanwhile, augmented and virtual reality technologies enable students to view historical or biological objects in three dimensions and

analyze them spatially and visually. This plays a crucial role in developing students' spatial thinking and visual perception.

Interactive lesson platforms and digital tools enhance students' independent learning skills. For example, students can monitor their mastery in real-time, think quickly while completing tasks, and experiment with different solutions. This develops critical thinking skills and teaches students to make independent decisions in complex situations.

Moreover, modern technologies significantly contribute to creative thinking development. Through digital design, animation creation, interactive visual projects, and virtual compositions, students freely express their imagination. For example, in visual arts lessons, students expand their imagination and develop creative decisions through abstract compositions or themed artwork. Creative thinking complements critical thinking and visual perception, contributing to the development of comprehensive thinking skills.

Innovative technologies make the pedagogical process not only effective but also motivating and engaging. Interactive activities encourage students to actively participate, reinforce knowledge, and express their thoughts freely. Additionally, technology allows students to connect theoretical knowledge with practical examples, promoting deeper understanding and systematic thinking.

Integrating modern technologies into education not only improves the quality of knowledge delivery but also contributes to the comprehensive development of students' intellectual, creative, and visual thinking. Therefore, teachers should actively apply innovative technologies in lesson planning, using them as a crucial tool for students' personal and intellectual growth.

Innovative technologies develop students' thinking in multiple directions. Logical and analytical thinking is fostered through interactive exercises, simulations, and virtual laboratories. Students learn to analyze data, identify cause-and-effect relationships, and solve problems step by step. For instance, in physics and chemistry lessons, virtual laboratories allow students to safely conduct complex experiments, reinforcing logical thinking and experimental skills.

Creative thinking and imagination are developed through digital design, animation creation, and interactive visual materials. Students learn to create new concepts, express their imagination, and develop innovative solutions. For example, in visual arts lessons, interactive scenarios and virtual tools for creating abstract compositions significantly enhance students' creative thinking.

Visual perception and spatial thinking are essential in developing students' thinking within modern education. Virtual and augmented reality technologies play a significant role in this process. They enable students to grasp complex

concepts more easily because information is presented in three-dimensional and interactive forms. For instance, in geography, students can observe regions on maps in 3D and understand the spatial arrangement of mountains and rivers, significantly enhancing their spatial thinking and geographic awareness.

In biology, virtual laboratories and augmented reality tools allow students to observe the structure of organisms, cells, organs, and systems in three dimensions, facilitating the understanding of complex biological processes and improving visual thinking and analytical skills. In history lessons, virtual excursions or interactive models of historical objects help students perceive past events, buildings, and spatial layouts realistically, enhancing visual perception, historical thinking, and systematic reasoning.

Visual thinking allows students to analyze compositions, determine ratios and perspectives, and evaluate color and shape harmony. For example, in visual arts lessons, students create and analyze various artistic compositions on virtual platforms, developing their aesthetic thinking. They learn to identify relationships between objects, observe light and shadow effects, and assess shape and color harmony, all of which enhance visual perception and integrate spatial and logical components of thinking.

Virtual and augmented reality technologies also provide an interactive learning experience. Students do not merely receive information passively but experiment with three-dimensional objects, rotate, measure, and test colors and shapes. This strengthens visual thinking and teaches students to use complex concepts actively for creating creative solutions.

Consequently, visual perception and spatial thinking play a vital role in helping students understand subjects more deeply and develop creative and critical thinking. Therefore, teachers can comprehensively develop students' thinking by extensively using virtual and augmented reality technologies in lessons.

Critical thinking and problem-solving skills are cultivated through interactive programs and simulations. Students learn to find solutions, compare alternative decisions, and evaluate outcomes in various situations. This process develops their independent thinking, decision-making, and problem-solving abilities in complex situations.

Several pedagogical methods exist to effectively integrate innovative technologies into lessons, each aiming to make students' learning more engaging and efficient.

First, interactive lessons and online tests help teach topics both theoretically and practically. Students perceive topics visually, experiment with different options, and immediately assess their results. Real-time feedback allows teachers to

analyze students' knowledge and provide individual guidance while increasing interest and motivation, encouraging active participation.

Second, digital laboratories and simulations allow students to conduct experiments safely, facilitating a deeper understanding of complex scientific processes. For example, in physics or chemistry, students conduct experiments virtually, observe phenomena, study cause-and-effect relationships, and analyze results, reinforcing theoretical knowledge and developing logical and analytical thinking.

Third, using virtual and augmented reality tools presents complex objects and phenomena in three dimensions, enhancing visual perception and spatial thinking. In history lessons, showing historical sites in 3D helps students visualize the past accurately, while in geography, realistic 3D landscapes strengthen spatial and systematic reasoning. Virtual and augmented reality allows interactive and engaging learning of complex concepts.

Fourth, creating digital projects, animations, and presentations stimulates students' creativity and teaches them to express ideas visually. Students develop projects, interactive presentations, or animations, fostering creative thinking, innovative solutions, and aesthetic perception. They also learn to assess, analyze, and present their work, enhancing communication skills and critical thinking.

Fifth, solving problem-based tasks teaches students to develop innovative solutions and apply unconventional approaches. Interactive games, situational exercises, and simulations expose students to complex situations and encourage solution-finding, developing critical thinking, creative thinking, and independent decision-making skills, preparing them for real-life challenges.

The benefits of using innovative technologies in lessons are significant, making the educational process effective, engaging, and motivating. Most importantly, they ensure comprehensive development of thinking. Students simultaneously develop logical reasoning, creative approaches, visual perception, and critical thinking. For instance, interactive programs allow them to analyze complex problems, find solutions to challenging situations, and test creative ideas, integrating multiple aspects of thinking and fostering adaptive and innovative thinking skills.

Interactive and visual tools make lessons engaging and captivating. Unlike traditional lectures or texts, interactive graphics, animations, digital experiments, and virtual models maintain attention, spark interest, and encourage active participation. For example, a virtual tour in history or 3D landscapes in geography enhances engagement and facilitates deeper learning.

Digital resources and virtual environments enable independent learning. Students can reinforce knowledge, review assignments, and analyze results outside class through interactive programs, cultivating self-regulation, responsibility, discipline, independent thinking, and the ability to justify decisions.

Moreover, innovative technologies teach students to develop unconventional solutions. Through interactive tasks, simulations, and projects, they compare multiple solutions and choose the most effective and creative path, strengthening innovative thinking and problem-solving skills. For example, modeling complex processes in physics via animation or conducting virtual experiments in biology enhances students' innovative thinking and prepares them for practical activities.

Additionally, innovative technologies promote teamwork skills. Through interactive projects and digital platforms, students learn to work collaboratively, exchange ideas, and create joint solutions, enhancing social interaction, cooperation, and communication skills.

In conclusion, new innovative technologies are an effective means of developing students' thinking in school education. They not only reinforce knowledge but also foster logical, creative, visual, and critical thinking skills. Therefore, teachers should actively apply innovative technologies in lessons, using them as tools to encourage students' intellectual and personal development.

REFERENCES:

1. Teplov, *B. M.* The Psychology of Artistic Creativity. Moscow State University Press. (1961).

2. Vygotsky, L. S. The Psychology of Art. MIT Press. (1971).

3. Qodirov, N. Maktab o'quvchilarida badiiy tafakkur va kreativlikni rivojlantirish. Toshkent: Fan va Texnologiya. (2016).

4. Islomova, D. Tasviriy san'at va o'quvchilarning estetik didini shakllantirish. Toshkent: Pedagogika. (2019).

5. Karimov, S. Bolalar tasviriy ijodini rivojlantirish metodikasi. Toshkent: O'qituvchi. (2020).

6. Istamovna, Ibatova Nigora. "Pedagogical approaches to the development of artistic thinking of students." International conference on multidisciplinary science. Vol. 1. No. 5. 2023.

7. Istamovna, Ibatova Nigora. "The role of composition of the educational subject in the process of figurative thinking." Multidisciplinary Journal of Science and Technology 4.3 (2024): 531-535.

8. Ibatova, N. I., and L. R. Zaripova. "In The Works of Uzbek Artists of Xix-Xx Centuries Landscape Genre." EUROPEAN JOURNAL OF INNOVATION IN NONFORMAL EDUCATION 2.4 (2022): 14-17.

9. Kenesbekovich, Baydabekov Ayez, Nadir Djalolovich Yadgarov, and Ibatova Nigora Istamovna. "PROBLEMS OF DETERMINING THE LEVEL OF SPATIAL IMAGINATION OF STUDENTS IN THE PROCESS OF TEACHING THE COURSE OF ENGINEERING GRAPHICS." International Conference on Multidisciplinary Sciences and Educational Practices. 2025.