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PSYCHOLOGICAL AND PEDAGOGICAL ASPECTS OF USING INTERACTIVE METHODS IN TEACHING MATHEMATICS TO PRIMARY SCHOOL STUDENTS UNDERGOING LONG-TERM MEDICAL TREATMENT

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Abstract

This article explores modern interactive methods, digital technologies, and innovative approaches utilized in teaching mathematics within the framework of hospital education for primary grade students. Furthermore, it highlights the significance of these methodologies in developing logical thinking, creativity, and independent decision-making skills among students, as well as providing psychological support and enhancing intrinsic motivation for learning.

Keywords

hospital education, interactive method, digital technology, primary education, logical reasoning, motivation, psychological support, stress, incentive, educational effectiveness.

Introduction

In recent years, extensive reforms have been implemented in Uzbekistan to refine the hospital education system. The resolution of the Cabinet of Ministers dated May 5, 2022, "On the introduction of an educational system for children undergoing treatment at the Center for Children's Hematology, Oncology, and Clinical Immunology," stands as a pivotal document in this direction. This resolution serves not only to guarantee the right to education for children receiving long-term medical care but also to alleviate their psychological state.

"If you make a child love mathematics, they will begin to understand life." (Albert Einstein)

In the context of contemporary socio-economic relations, the role of mathematical knowledge is invaluable. Throughout history, the teaching of mathematics has held profound significance within national expertise and educational traditions. The term "Mathematics" is derived from the Ancient Greek word "mathema," signifying "knowledge" or "learning."

Academic Methodology and Instructional Approaches

The primary objective of mathematics lessons during long-term medical treatment is to provide students with mathematical knowledge while strictly accounting for their psychological

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characteristics. These insights are conveyed through specialized pedagogical methods tailored to the student's clinical environment.

Teaching mathematics within a hospital setting necessitates a unique approach. Due to variations in students' health status, attention spans, and psychological preparedness, the instructional process must be interactive, engaging, and motivational. Interactive education serves as a bridge that restores a child's hope for life, self-confidence, and aspirations for the future.

The renowned mathematician Archimedes stated, "Give me a place to stand, and I will move the world." In this context, the interactive method serves as that "fulcrum" for the educator, revitalizing the lesson and transforming every child into an active participant.

The Nature of Interactive Methods in Hospital Education

An interactive method is defined as a way of organizing the learning process based on active communication, exchange of ideas, and collaboration between the teacher and student. Its most critical aspect is that the student does not receive knowledge in a ready-made form; instead, they seek, analyze, and draw conclusions independently. Consequently, the student transitions from a passive patient to an active learner, while the teacher shifts from a director to a facilitator.

Specific effective methods for primary school students in hospital settings include:

The "Boomerang" Method: The student not only answers questions but also formulates them. For instance, in 1st-grade lessons on "Even and Odd Numbers," students construct their own questions for peers, enhancing communication and analytical skills.

The "Brainstorming" Method: Centers on the rapid collection of student ideas to solve a specific problem. For example, in 2nd-grade topics like "Rectangles and Squares," students identify differences independently, making them feel significant in the learning environment.

The "Role-Play" Method: Students assume roles such as "Accountant" or "Researcher" to apply mathematical concepts in practical scenarios (e.g., "Price, Quantity, and Value"). This helps them perceive themselves as "Active Participants" rather than "Sick Children."

The "Cluster" (Networking) Method: Allows students to understand a topic through conceptual mapping. For 4th-grade "Fractions," students create branches for "Numerator," "Denominator," etc., building logical chains.

"I hear and I forget. I see and I remember. I do and I understand."

The efficacy of interactive pedagogical methodologies is fundamentally rooted in the principle of "learning by doing." Academic achievement, particularly within the framework of **hospital** education, is directly correlated with the student's active engagement and direct participation in the knowledge acquisition process.

The Role of Digital Technologies in Interactive Pedagogy

Currently, digital integration has become a cornerstone of interactive instruction. The following tools facilitate a more profound understanding of complex concepts:

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GeoGebra: Enables the interactive visualization of geometric constructs, algebraic equations, and dynamic graphs, thereby enhancing students' spatial reasoning and conceptual clarity.

Desmos: A robust online platform for the dynamic analysis of complex functions, providing an accessible and intuitive interface for students in diverse learning environments, including hospital-based education**.**

Kahoot, Quizizz, and Mentimeter: Gamified assessment tools that transform the classroom into a competitive and engaging environment, significantly boosting student motivation and cognitive retention.

AR (Augmented Reality) and VR (Virtual Reality): These technologies facilitate the exploration of geometric solids in a three-dimensional (3D) space. For instance, students can virtually manipulate a cuboid to observe its properties and intuitively comprehend its volumetric dimensions.

Shift in Pedagogical Paradigm: From Teacher-Centric to Learner-Centric

The fundamental principle of interactive instruction is the "Active Student – Facilitating Teacher" model. In this paradigm, the educator shifts from being the central source of information to a facilitator and moderator of the learning process. The student becomes the focal point—an active subject of inquiry and communication.

Key Attributes of Interactive Learning:

Divergent Thinking: Questions are structured to elicit diverse perspectives, encouraging students to express independent thought and justify their unique viewpoints.

Heuristic Discovery: Instead of providing pre-determined conclusions, the teacher guides students toward discovering knowledge independently through scaffolded inquiry.

Metacognitive Development: Students learn to identify and rectify their own errors. This process fosters self-regulation, diagnostic skills, and advanced critical thinking.

Methodological Framework for Organizing Interactive Lessons

The implementation of interactive lessons follows a structured three-phase approach:

Anticipatory (Engagement) Phase: Aimed at stimulating cognitive interest and focusing attention at the beginning of the lesson. This is achieved through "ice-breaker" activities, brief educational games, or provocative inquiry.

Active Exploration Phase: In this stage, students engage in collaborative learning through group work or peer-to-peer (pair) interaction.

The Reflection Phase and Psychological Foundations

At the conclusion of the lesson, students participate in the Reflection Phase, where they analyze what they have learned and identify their own errors. Through the "Mathematical Quest" method, the lesson becomes an adventure where each correct answer leads to the next stage, fostering autonomy.

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Interactive methods cultivate the principle of "Educational Cooperation," where students share knowledge, enhancing mutual respect and peer instruction. The primary goal in hospital settings is to provide education while simultaneously offering psychological support.

The psychological foundations include:

Strengthening Motivation: Integrating games like "Yes-No" (using cards for true/false statements) to instill interest and affection for the subject.

Incentive Systems: Awarding titles like "Mathematical Star" to provide psychological encouragement.

Stress Reduction: Using quizzes and competitions to alleviate negative emotions associated with illness.

Creating a Positive Environment: Recognizing even the smallest achievements to foster a receptive attitude.

According to research, the human brain processes information 2–3 times faster when accompanied by positive emotions. In hospital education, every interactive method serves as psychological therapy.

As Alisher Navoiy stated: "Knowledge learned with joy takes deep root in the soul."

Conclusion

Integrating interactive methods and digital technologies in teaching mathematics to primary students in hospital settings is a necessity. These approaches do more than deliver academic content; they serve as a psychological bridge restoring confidence and mental resilience. Modern methodologies ensure that long-term medical treatment does not hinder a child's intellectual development or their fundamental right to quality education. Every educator’s creativity, compassion, and technological literacy determine the success of this process.

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