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METHODOLOGICAL FOUNDATIONS OF DEVELOPING LOGICAL THINKING IN PRIMARY EDUCATION

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Abstract. The development of logical thinking in primary school students is one of the important tasks of modern education. Logical thinking helps children analyze information, compare facts, draw conclusions, and solve problems independently. This article examines the methodological foundations of developing logical thinking in primary school students. Particular attention is paid to the role of active learning methods, problem-based learning, didactic games, and interdisciplinary integration in enhancing students' reasoning abilities. The study highlights the importance of creating a supportive learning environment that encourages curiosity, analytical skills, and independent decision-making among young learners. The results indicate that systematic use of logical exercises, interactive tasks, and creative activities significantly improves students' cognitive development and learning outcomes.

Keywords: logical thinking, primary education, cognitive development, teaching methods, problem-based learning, didactic games, analytical skills, critical thinking.

The formation of logical thinking in primary school students is considered a key objective in the modern educational process. At the early stages of schooling, children actively develop their cognitive abilities, and the education system plays a crucial role in guiding this development. Logical thinking enables learners to analyze situations, understand cause-and-effect relationships, make comparisons, and form well-reasoned conclusions. In primary education, this ability is particularly important because it forms the foundation for further intellectual development and academic success in later stages of education.

In pedagogical theory, logical thinking is understood as a form of mental activity that allows individuals to operate with concepts, judgments, and inferences. For young learners, the development of this type of thinking begins with simple operations such as classification, comparison, and sequencing. Gradually, students acquire more complex skills, including analysis, synthesis, and generalization. The methodological foundations of developing logical thinking therefore involve systematic pedagogical approaches aimed at strengthening these cognitive operations through structured learning activities.

Primary school teachers play a significant role in shaping students' thinking abilities. At this stage, children are naturally curious and eager to explore the world around them. Teachers must therefore organize learning activities that stimulate curiosity and encourage independent reasoning. One of the most effective approaches is the use of problem-based learning. When students encounter a problem that requires analysis and reasoning, they are motivated to search for solutions. This process activates their intellectual potential and helps them understand that knowledge is not merely memorized but constructed through thinking and exploration.

Didactic games are also widely recognized as an effective method for developing logical thinking in primary school students. Games create a positive emotional environment and encourage active participation in the learning process. Through puzzles, logical tasks, riddles, and mathematical games, students learn to identify patterns, analyze relationships, and develop strategies for solving problems. Such activities transform the classroom into an interactive learning space where students engage in meaningful cognitive processes rather than passive memorization.

Another important methodological aspect is the integration of logical thinking exercises across different subjects. Logical thinking should not be limited only to mathematics lessons; it can also be developed through language, science, and social studies. For example, in language lessons students may analyze the structure of sentences, identify similarities and differences between words, or interpret the meaning of texts. In science lessons they can observe natural phenomena, formulate hypotheses, and explain causal relationships. Through interdisciplinary integration, logical thinking becomes a natural component of the overall learning experience.

The use of visual aids and interactive technologies also contributes to the development of logical thinking in young learners. Diagrams, charts, concept maps, and visual organizers help students understand abstract relationships and organize information systematically. When students visually represent ideas and relationships, they gain a deeper understanding of logical structures and patterns. In modern classrooms, digital tools and educational technologies further enhance this process by providing interactive simulations and problem-solving environments.

The psychological characteristics of primary school children must also be taken into account when developing logical thinking. At this age, students tend to think concretely and rely heavily on visual and practical experiences. Therefore, teaching methods should combine abstract reasoning with concrete examples and hands-on activities. Teachers can encourage logical reasoning by asking guiding questions, organizing discussions, and allowing students to explain their ideas and arguments. Such strategies help learners gradually transition from intuitive thinking to more structured and analytical reasoning.

Another significant methodological factor is the development of critical thinking skills. Logical thinking and critical thinking are closely interconnected, as both involve the evaluation of information and the formulation of reasoned conclusions. Teachers can promote these skills by encouraging students to question assumptions, evaluate different perspectives, and justify their answers. When students learn to reflect on their reasoning processes, they become more independent and confident learners.

The classroom environment also plays a vital role in fostering logical thinking. A supportive and collaborative atmosphere encourages students to express their ideas freely and participate actively in discussions. Group work and cooperative learning activities allow students to exchange opinions, compare solutions, and learn from one another’s reasoning processes. Such interactions stimulate intellectual engagement and help students develop communication and analytical skills simultaneously.

Assessment methods should also align with the goal of developing logical thinking. Instead of focusing solely on memorization-based tests, teachers should include tasks that require reasoning, problem solving, and creative thinking. Open-ended questions, project-based tasks, and analytical exercises enable teachers to evaluate students’ cognitive development more effectively. Through continuous feedback and reflection, students become aware of their learning progress and gradually improve their thinking abilities.

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The development of logical thinking in primary education has long-term implications for students' academic and personal growth. Children who acquire strong reasoning skills are better prepared to face complex learning challenges in later stages of education. They are more capable of analyzing information, making informed decisions, and solving problems independently. In the rapidly changing world of the twenty-first century, such skills are essential for successful participation in social and professional life.

In conclusion, the methodological foundations of developing logical thinking in primary school students involve a combination of pedagogical strategies, interactive learning methods, and supportive educational environments. The systematic use of problem-based learning, didactic games, interdisciplinary integration, and visual learning tools significantly enhances students' cognitive development. Teachers who consciously design lessons that stimulate reasoning and curiosity contribute not only to students' academic success but also to the formation of independent and critical thinkers. The development of logical thinking should therefore remain a central objective of primary education, ensuring that young learners acquire the intellectual skills necessary for lifelong learning and active participation in modern society.

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