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Research Article

DEVELOPING INDEPENDENT THINKING IN PRIMARY SCHOOL STUDENTS THROUGH LOGICAL PROBLEMS

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ABSTRACT

This article highlights methods for developing independent thinking skills in primary school students through logical problems. It presents several logical problems along with their solutions.

KEYWORDS

Mathematics, primary school, educator, independent thinking, word problems, critical thinking, simple problems, complex problems.

INTRODUCTION

In the early years of our country's independence, fundamental reforms in the field of public education were initiated. Indeed, from then on, "Nurturing spiritually advanced individuals, elevating education and enlightenment, and raising a new generation capable of realizing the idea of national awakening will remain one of the most important tasks of our state."

In primary grades, where a child's consciousness and thinking are just beginning to develop, the teacher's expertise plays a crucial role. Their ability to skillfully integrate modern technologies into the educational process, explore new methods and approaches in teaching, and creatively utilize advanced pedagogical experiences is of utmost importance. Therefore,

using modular teaching technology and preparing to implement modern pedagogical technologies in practice have become important requirements for contemporary primary education. Modern pedagogical technologies, firstly, create opportunities for students to easily and enthusiastically acquire knowledge, skills, and competencies. Secondly, they contribute to the professional growth and spiritual development of teachers.

As our esteemed President Sh. M. Mirziyoyev emphasized: "Mathematics is the foundation of all sciences. A child who excels in this subject grows up intelligent and broad-minded, capable of succeeding in any field." Teaching students to develop their thinking abilities leads to significant transformations in society. This is because our country has a great need for highly qualified specialists who are confident, independent thinkers, and proactive. The role of academic subjects in shaping students' personal qualities is invaluable. In this regard, mathematics education bears significant responsibility. Textbooks are primarily designed to develop students' mathematical knowledge, imagination, reasoning, logical, and independent thinking skills. They are written with consideration of students' abilities, age, individual characteristics, and the need to acquire 21st-century skills. The tasks are structured in a spiraling manner, progressing from simple to complex. As we know, in the field of mathematics, using methods that foster independent thinking and enhance creative thinking is essential for providing students with deep knowledge. This is a key task of primary

education. To accomplish this, new pedagogical technologies have been introduced into the educational process. These new technologies play a vital role in the intellectual development and maturation of primary school students. One of the most widespread forms of pedagogical technologies today is interactive methods.

The content of each subject at every stage of education allows students not only to perceive and memorize information but also to engage in reflection by posing questions that require analysis. Such activities play a decisive role in shaping students' thinking abilities, including recognizing questions, finding ways to clarify them, performing necessary actions, and drawing correct conclusions. This generalized ability to think critically is at the core of the learning process.

The ability to think logically is essential for students. It is impossible to fully grasp material without possessing even the most basic logical thinking skills. Teaching and developing logical thinking should be closely aligned with natural, real-life situations. At the same time, pedagogical tools must take into account the age-related characteristics of a child's development (both psychological and physical). While current school curricula do include exercises for shaping logical universal actions, given the need to foster abstract thinking, it is logically appropriate to develop an additional program aimed at advancing logical thinking, which can be incorporated into any lesson during the educational process.

Currently, there are various methods for shaping logical universal learning actions. In order to incorporate additional exercises to develop logical thinking, each teacher must analyze and consider the physical and psychological characteristics of young students, taking into account the individuality of each child. Such tasks can be implemented not only during the educational process but also in extracurricular activities and virtually any lesson.

Solving mathematical problems is a crucial component of teaching mathematics. It is unimaginable to master mathematics without solving problems. The practical application of the theory of problem-solving in mathematics is an essential method of instruction. Solving problems plays a significant role in helping students grasp theoretical material in primary grades and enhances their thinking abilities. Problems are structured based on a system of practical tasks. This means that each new concept is solidified by solving a problem that requires the application of that concept, helping to explain its importance. Simple problems are used to explore the content of arithmetic operations, reveal the connections between the operations and their components, and familiarize students with relationships between different quantities. Simple problems serve as the foundation for developing the knowledge, skills, and abilities necessary for solving more complex problems.

In primary grades, the study of problems is carried out by forming new concepts and transitioning from solving simple problems to solving more complex ones. This process involves various simple problems related to addition, subtraction, multiplication, and division—such as finding the sum of identical addends, dividing numbers into equal parts, multiplying and dividing numbers, as well as problems related to enlarging and reducing numbers. These problems help students compare numbers and solve other related problems. Additionally, methods and games that aid in solving problems will be explored.

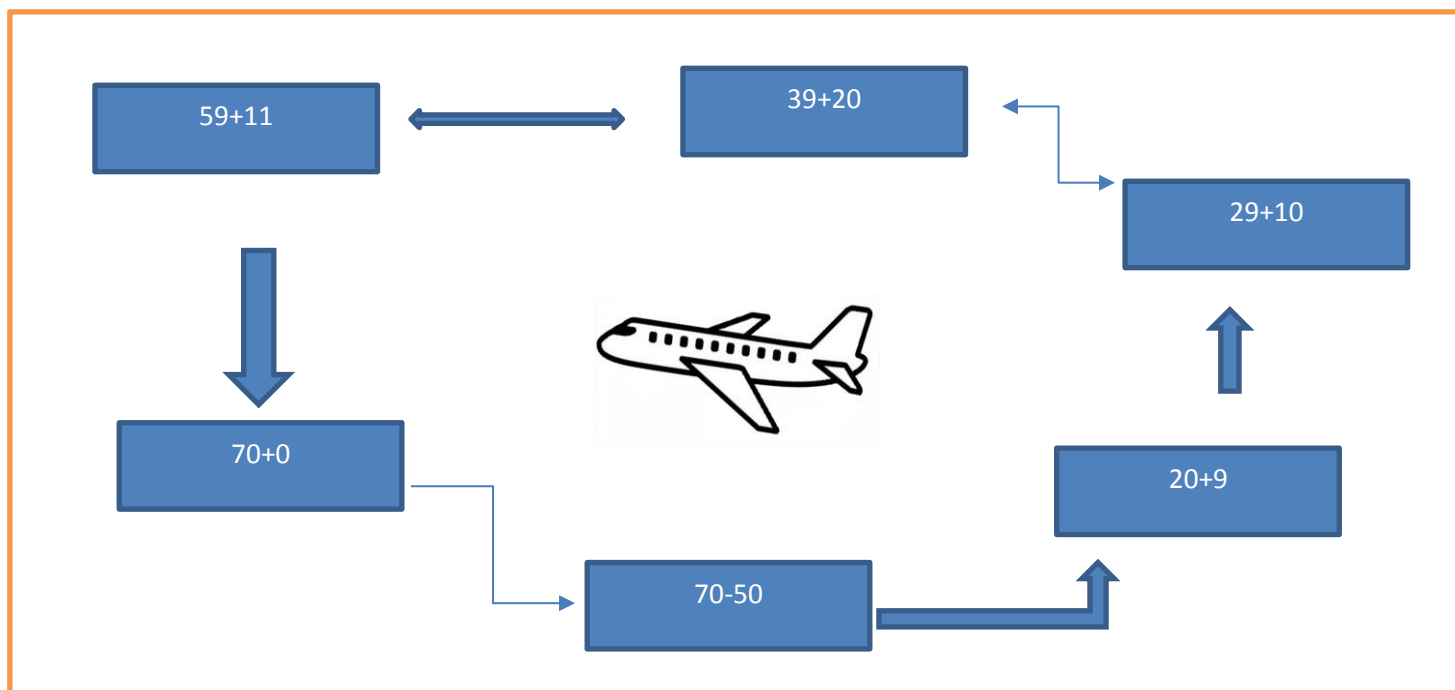
One such game is "Think Up", which can be used to stimulate students' creative and logical thinking.

Didactic Task: Developing students' spatial imagination.

Game Task: Enhancing students' logical thinking abilities through solving circular problems.

Game Description: To play this game, a magnetic board or a chalkboard, a picture of the planet, and cards with written problems are prepared in advance. The game is played as follows: A magnetic plate is glued to the back of each card with a problem written on it. The students themselves must place the cards on the board in the correct order as they progress.

For example,

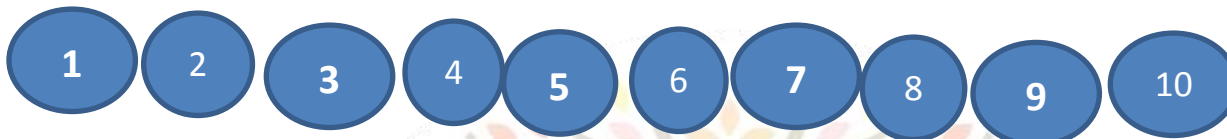


the teacher could prepare a series of arithmetic problems or logical tasks related to the theme of the planet, and students will place the cards in the correct sequence to form a solution path. This exercise helps develop their logical thinking and spatial reasoning. In this game, the teacher explains to the students that as the airplane slowly ascends from the ground, the answers to the problems also progress in an increasing order. The airplane ascends into the sky and gradually descends to land. The teacher must monitor whether the students solve the problems correctly. If the students find the correct answers, the airplane is flying correctly. To make the game even more engaging, it can be referred to as the "Circular Problems" game. This will not only help students develop their logical thinking but also

make the learning process fun and interactive as they visually follow the progression of the airplane.

Game Description: Students are introduced to the rules of the game. Each student in the class is given a numbered card with a number from 1 to 10 written on it. Then, they are given the following task: the students who receive a card must come to the front of the classroom and arrange themselves in the correct order based on their card numbers. The students need to find their correct position in line according to the number on their card. The student with the number 1 stands first, the student with the number 2 stands next to the student with the number 1, and the student with the number 3

stands next to the student with the number 2, and so on. In the end, the students should be standing in the following order:



Teacher's Tasks for the Students:

1st Task: How many numbers smaller than 2? Compare and answer by observing the numbers on your classmates' cards.

2nd Task: How much greater is the number 5 than the number 4? Compare and answer by observing the cards in your classmate's hands.

3rd Task: What is the number that comes directly before the number 9 (its predecessor)? Students should answer that it is 8. What is the number that comes directly after the number 6 (its successor)? Students should answer that it is 7.

4th Task: After which number and before which number does the number 8 come? Students should recognize that 8 comes after 7 and before 9.

In this game, students are taught to count both in ascending and descending order by observing the numbers on their cards. If any students mistakenly take the wrong position in the line, their error is explained, and they are guided to stand in the correct position. For example, the

number 6 cannot be replaced by the number 7; it is explained that the number 7 comes after the number 6. Similarly, the number 10 does not come before the number 9; it is explained that the number 10 comes after the number 9. Through this game, students internalize that each number has a specific position. Solving problems is a crucial component of mathematics education. It is impossible to imagine learning mathematics without solving problems. Problem-solving enables the application of theoretical knowledge to practice. To study the arithmetic of natural numbers effectively, it is essential to use a system of appropriate problems and practical tasks. Understanding the meaning of arithmetic operations, their relationships, and practical applications helps students grasp the connections between results and evaluate various quantities. This fosters critical thinking and deeper comprehension.

Thus, the process of shaping students' thinking is crucially influenced by educational activities, and the gradual complexity of these activities leads to the development of logical abilities. However, to activate and enhance children's mental activity, it

is advisable to introduce engaging and non-standard tasks. Any activity aimed at solving mental challenges that aligns with the child's interest and actions contributes to the development of thinking. Therefore, incorporating logical tasks, puzzles, exercises, didactic games, and visual aids in lessons fosters students' ability to justify their opinions, compare, generalize, clarify, and draw conclusions based on proposed judgments.

Forming logical thinking in mathematics lessons in primary school involves utilizing opportunities to develop arithmetic operations by focusing on the essence and content of each concept, linking them to students' practical experiences, and emphasizing visual aids. Teaching methods should include comparison, conclusion drawing, and concretization, along with analyzing similarities across different operations to derive general patterns. Exercises and problem-solving tasks are fundamental to this process, encouraging students to address errors and use them as learning opportunities. In primary mathematics lessons, teaching arithmetic operations must consider the importance of relationships between the results and components of these operations. Mathematics teachers should use recommended strategies that enhance students' reasoning skills, logical justifications, and problem-solving abilities. These strategies contribute significantly to improving students' overall mathematical preparation, interests, and capabilities.

In conclusion, educational activities play a decisive role in shaping students' thinking processes. The gradual complexity of such activities fosters the development of logical abilities. However, to activate and enhance children's mental activity, it is effective to use engaging, non-standard tasks. Activities that align with a child's interest and actions, aimed at solving mental challenges, contribute to the development of thinking. Logical tasks, puzzles, exercises, didactic games, and visual aids in the lesson help students develop the skills to justify their opinions, compare, generalize, clarify, and draw conclusions based on the judgments presented to them.

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CONCLUSION