

Developing logical thinking in primary school students

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Abstract

This article provides information about the most important tasks of providing education in primary education.

Keywords: development, significance, integration, technology, idea, thinking, logic.

Introduction

In the initial stages of education, one of the most important tasks of providing education is to shape and develop the intellectual, physical, moral, and aesthetic aspects of early grade students simultaneously. It involves forming and enhancing the elements of thinking skills necessary for understanding and responding to various situations in life, acquiring specific life skills and competencies, and developing an attitude towards societal events and incidents. This is one of the requirements set by our state today in order to improve the quality and content of education, and the preparation for this practice is crucial. As emphasized by Sh. Mirziyoyev, "It is necessary to foster independent and creative thinking, the ability to work and communicate in a team among students."

According to the concept of primary education, the main goal of primary education is to teach reading, writing, and arithmetic to students in primary school, acquaint them with the environment and nature, develop creative and logical thinking skills, communication and moral culture, shape personal hygiene and healthy lifestyle habits, and bring out their personal potential.

Currently, the development of the national innovation system and the enhancement of innovation potential are considered crucial factors for the economic growth of the country. Investigating these factors is of great importance for many countries and international organizations. In this regard, the existence of evaluation systems aimed at rapid and reliable analysis of innovative development is significant. International evaluation systems created by influential international organizations are being used as such evaluation systems. The Programme for International Student Assessment (PISA) conducted under the auspices of the Organisation for Economic Cooperation and Development (OECD) is essential for assessing the literacy and competencies of 15-year-old students in practice. The PISA international survey is currently being conducted in three main areas: reading, mathematics, and science literacy. In addition, the International Association for the Evaluation of Educational Achievement (IEA) organizes the Trends in International Mathematics and Science Study (TIMSS) to assess the quality of school mathematics and science education. Based on the requirements of the STEAM era, international evaluation programs such as PISA and TIMSS focus on creating activities that are compatible with the standards of teaching various subjects to students, aimed at developing their critical and logical thinking skills and practical competencies. These surveys also help to compare the level and quality of students' knowledge in mathematics and science across different countries and identify differences in national education systems.

The integration of our country into the global community, the development of science, technology, and technology, and the need for the younger generation to be competitive in a changing world necessitate the full mastery of subjects, particularly mathematics, through the implementation of international standards in the education system.

In the early grades, teachers are required to provide education in primary subjects using various didactic

possibilities, such as empirical (imparting knowledge through sensory organs), cognitive (organizing the knowledge about the surrounding world into broader categories, i.e., teaching by dividing into logical parts), heuristics (teaching through guiding questions, which contributes to engagement and the development of learning and thinking skills), creative (research-oriented, fosters students' goal-directed creative thinking), inversion (reorganizing and transforming information from various perspectives, enhancing the thinking system), integrative (based on the interconnectedness, coherence, and integrity of various small units of information, helps identify a single correct conclusion) pedagogical technologies.

The primary education stage in general education involves assisting the teacher in bringing out the abilities of each student and creating conditions for the individual development of students. Shaping and developing the logical thinking skills of the younger generation is one of the critical issues in the global education system, as it is essential for their future employment, especially in becoming analytical specialists. Currently, experts with logical thinking skills are highly demanded in the labor market.

According to recent data, by the year 2030, over 57 professions will disappear, and 186 new professions will emerge. In the digital world, what knowledge, skills, and abilities are needed to become an expert? The solution to this question can be found in the field and professions almanac for the near future, around 15-20 years ahead. Based on this information, it is evident that 60% of the future professions require knowledge and skills related to software development. Therefore, it is crucial for children to acquire knowledge and skills in programming, particularly in algorithmic thinking, to respond to the demands of the digital world and to succeed in future professions related to digital technologies. The development of such knowledge and skills for cultivating young people capable of developing the digital economy in our country is a significant challenge for experts and researchers.

Although the educational environment in primary education varies, it is more effective to create conditions for the individual development of the learner by first revealing their individuality, considering their activities and identified interests. The primary school age is characterized by psychological studies that show the increasing importance of fostering thinking. During this period, there is a transition from visual thinking, which is crucial for children in their early education, to verbal-logical and conceptual thinking. Therefore, fostering theoretical thinking in early education plays a vital role for young learners. The Russian innovator pedagogue V. Sukhomlinsky considered the teaching of logical problems to young learners as an important issue in his works. The essence of his observations lies in studying and analyzing the process of solving logical problems in students, and he identifies unique features of their thinking through experimental methods. In his book "Beloved Children," he writes about the work in this direction: "In the world around us, there are thousands of tasks. They live as magical stories in the creativity of the people."

So, the intellectual development of a child at the beginning of primary school is quite significant. All cognitive processes, including perception, memory, thinking, imagination, and speech, have already undergone considerable development. Psychological activity, cognitive processes, which provide various types of activities for the child's development, do not work separately but rather form a complex system interconnected with each other. This interconnected psychological activity is not static during childhood; different stages of development involve different active processes and play a crucial role in overall cognitive development.

Psychological research shows that in this period, the activity of thinking significantly influences the development of all cognitive processes. Based on the basis of whether it is based on understanding, imagining, or comprehending, thinking can be classified into three main types:

1. Thematic-active (observational-activity-based)
2. Visual-spatial.
3. Abstract (verbal-logical)

The modern stage of pedagogical practice, the transition from information and communication technology to activity, contributes to the development and formation of a child's personal qualities. It is not just about mastering knowledge but also about internalizing and reworking learning materials, developing students' curiosity and creative abilities. The essential outcome of a child receiving education at school is the formation of their intellectual abilities necessary for successful learning today and in the future, shaping their personal qualities.

Experiences in schools demonstrate that the development of logical thinking in primary school students requires creating favorable pedagogical conditions. In the process of primary education, critical thinking,

analysis, separating essential elements, generalizing, and drawing conclusions enhance the learner's ability to achieve positive results in any type of activity. Experiences indicate that the majority of primary school students have a significant desire to learn, but unfortunately, this desire does not always align with the pedagogical and psychological capabilities.

In primary school, subjects are organized in an integrative manner according to pedagogical characteristics. Research shows that in primary school education, the development of logical thinking in students is addressed through various approaches, including an integrative approach. For example, in the process of teaching natural sciences, the integration of interdisciplinary knowledge helps students understand the possibilities and challenges of modern scientific and technological progress, the nature of ecological issues, ways of sustainable resource use, health and economic competence principles, and the formation of practical skills for daily life. In the context of STEAM education, beyond regular classroom lessons, activities such as conducting research, experiments, project-based learning, and fostering curiosity are emphasized to develop students' logical thinking and practical skills in line with the requirements of international assessment programs (PISA, TIMSS). Working on assignments that correspond to the tasks of international assessments, focusing on practical activities with assignments that encourage independent work, creative thinking, laboratory work, and creative problem-solving are essential tasks for teachers in guiding the younger generation. Teaching natural sciences not only involves the integration of internal subjects but also emphasizes the integration of external subjects, i.e., subjects that form a companion block-module structure.

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