THE THEORY OF LOGICAL THINKING AND LOGICAL REASONING

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Annotation: This article explores the importance of logical thinking in the pedagogical activities of primary school teachers. Logical thinking is a crucial tool for teachers to deliver knowledge clearly and systematically to students, allowing them to grasp complex concepts in a simple and understandable way. The article examines the psychological, pedagogical, philosophical, didactic, and scientific-methodological foundations of logical thinking. It also highlights the need for developing creative and critical thinking skills, the application of methodological approaches, and the importance of continuous professional development. The research outlines strategies for enhancing logical thinking abilities through effective teaching methods, making it an essential component of the educational process.

Keywords: Logical thinking, primary school teachers, cognitive skills, pedagogical approaches, creative thinking, critical thinking, didactic principles, educational methodology, dialectical thinking, teacher development.

The issue of improving the quality of education and preparing highly qualified, competitive specialists is of particular importance for higher education institutions worldwide. In UNESCO's international education concept for 2030, education is recognized as “the primary driving force for development and a critical activity leading to sustainable development goals.” It emphasizes the importance of “creating opportunities for quality lifelong learning,” setting this as a pressing task. Achieving these goals involves raising well-rounded, independent thinkers who appreciate their national heritage, are creative, intelligent, and capable of logical reasoning, while also being able to confidently step into a bright future. This, in turn, demands that today's teachers engage in continuous creative inquiry and self-improvement.

In Uzbekistan, the implementation of information technology-based teaching methods is helping future educators develop logical thinking skills, thereby preparing qualified and competitive specialists for the real sectors of the economy. The use of innovative methods in the digitization of the educational process necessitates that educators pre-plan their teaching activities. In the "Action Strategy for Further Development of Uzbekistan," one of the priorities is to “study important and in-demand subjects such as mathematics, chemistry, biology, and computer science in greater depth.” In this context, fostering creative approaches that enhance logical thinking in future

educators, designing lessons, and improving teaching based on advanced educational technologies (relational pedagogy, comprehensive education, project-based learning, creative activity-oriented tasks, bifunctional problems) are of great importance.

Therefore, in the learning process, teachers must not only impart a certain amount of knowledge but also teach students to independently seek new information and process it creatively. The use of logic elements is crucial in the digital learning environment for enhancing the logical thinking abilities of future elementary school teachers. Here, the state of methodological preparedness plays an important role in finding concrete solutions to this issue. By improving the content of logical and methodological education elements, it is possible to provide future elementary school teachers with high-level knowledge and enhance teaching methodologies through subject integration.

Today, this process is carried out with a special approach in the higher education system, with a focus on the following key areas for modernizing education: The development of non-formal (teaching – based on the "Cooperation Strategy," introducing innovations into the educational process, online teaching, emphasizing tutor-based education) and informal (individualized and personal) teaching content, developing effective forms and methods for fostering logical and creative thinking in future elementary school teachers, and creating various models and technologies that ensure the integration of lessons. The “Action Strategy for Further Development of Uzbekistan” outlines tasks for “further improving the education system and expanding opportunities for quality educational services.” This requires increasing the creativity of educators, creating favorable conditions for improving educational content, and achieving the expected outcomes through the provision of pedagogical deontology (from Greek “deontos” – obligation, fitting, necessary, appropriate, and “logos” – knowledge, teaching).

The above explanations are primarily mentioned as a terminological interpretation of general educational approaches. The concept of logical thinking, which we are analyzing, can be considered as the foundational locomotive and indicator of these components (creativity, cognition, innovative worldview). Humanity has always operated within certain laws. Not only humans but the entire universe, whether natural phenomena or mysterious realms beyond human comprehension, has always possessed its own unique logic. At the very least, humans have always tried to find a logical explanation for the development of these phenomena.

The sociological aspect of research on thinking is characterized by analyzing the historical development of thought in relation to the social structure of various societies. Physiology studies the mental mechanisms that clarify the phenomenon of thinking. Cybernetics views human thinking as an informational process imprinted in activity. Psychology studies thinking as a cognitive activity and differentiates its types depending on the character and degree of generalization of the tools used, as well as how new they are to the subject. In Abu Ali ibn Sina's work "Daneshnameh," one can find ideas related to thought and the thinking process. He examines reflections as a mental phenomenon and, in his works such as "Aristotle's Metaphysics Commentary" and "Commentary on Logic," he views it as a logical form. The philosopher highlights that a judgment consists of a logical subject, a logical predicate, and a logical connector. He analyzes concepts as parts of a judgment, paying special attention to the relationship between general and individual concepts.

Analyzing scientific pedagogical literature proves that the issue of teachers' intellectual thinking, especially in general formal education processes and lessons involving future elementary education specialists, has not yet been specifically analyzed on a scientific basis. However, at a time when significant changes are taking place in our country, particularly in the public education system, the need for scientifically grounded recommendations on this issue is growing among professors and teachers.

When considering the issue of logical thinking from theoretical and historical perspectives, it is necessary first to provide a terminological explanation of this word and field of study. In this regard, it is appropriate to acknowledge that V. I. Kirillov, one of the scholars who has long promoted the science of logic in his textbooks and educational manuals, correctly distinguished the objective and subjective logic in the interrelations between nature, society, and human relations. Indeed, we constantly feel that the events occurring around us, as well as the processes taking place in our thoughts, possess a certain logic.

It is well-known that humans possess the ability to think, and they organize, structure, and manage their actions, life activities, and way of life based on this ability. These processes do not occur in a chaotic manner but instead follow certain logical laws. A person develops the skills to understand and adhere to these laws only through the process of studying logic.

Learning logic enhances a person's thinking ability, allowing them to think clearly and consistently, avoid mistakes in their own reasoning and that of their

interlocutor, and, if necessary, point out and correct such errors. This indicates that logic is relevant to all areas of human activity, including its application in pedagogical practices.

Logic as a science emerged in Ancient Greece in the 4th century BC and was referred to as "logica." Initially, "logica" was derived from the Greek word "logos," meaning "word," "thought," "reason," or "law." Some sources emphasize that the concept of "logica" was first introduced as a scientific term by Democritus in his work "On Logic" or "Law." The term "mantiq," however, originates from the Arabic language and means "the science of the forms and laws of thought." In contemporary scientific discourse, the meaning of the term "logic" has expanded significantly, and it is used in various senses. For instance, the term "logic" can refer to the interconnectedness and consistency in the development of things and events or the connection and consistency of concepts arising from thought. When discussing the order, connection, and sequence of things, it is called objective logic. Conversely, when discussing the connection, consistency, and reasoning of thoughts, or the development and laws of thinking, it is referred to as the logic of thinking or subjective logic. Additionally, logic is also understood as the science that studies the laws and forms of thought. In our further analysis, we will focus on this particular meaning of logic.

Aristotle is considered the founder of the science of logic. He was a thinker who systematized all the knowledge on logic that existed before him and enriched it with new teachings, elevating it to a certain system. This science, which studies the forms and laws of thought, is referred to in the history of science as "formal logic," "traditional logic," or "Aristotelian logic."

Logical thinking is the ability of a person to thoroughly reflect on the tasks at hand and, from a pedagogical perspective, to sometimes resolve them quickly and non-standardly, as well as to find effective and appropriate ways to achieve their goals. In other words, logic involves thinking up ideas that are different from those of others, avoiding traditional modes of thinking, and finding quick and effective solutions to problematic situations. Although this is related to the concept of creativity, it also encompasses more consistent and deeply reasoned reflections. Logical thinking is the unity of individual qualities and thinking abilities that create a foundation for the development and enhancement of a person's creativity.

Now, let’s briefly touch upon the concept of logical thinking. In some scientific literature, the concept of logical thinking is explained as follows:

Logical thinking has several meanings, reflecting the stages of development of thought, the ability to analyze, and one's attitude toward reality.

For a teacher, logical thinking depends on the techniques and tools used in the technology of developing logical thinking, which are necessary to stimulate students' intellectual activity. Logical thinking includes concepts such as "evaluation" and "self-evaluation," "logic" and "self-analysis," "proof" and "rejection," as well as "logical analysis." The culture of logical thinking encompasses the methods and techniques for applying reliable evidence in practice. All of this contributes to personal development and helps shape students' worldview. Judi Bruz and David Wood believe that logical thinking is a form of thinking that reflects critical thinking. Thought is formed through the recognition of one's "self," objectivity, the ability to accept other perspectives while considering one's own, and occasionally letting go of one's prejudices. When solving problems, it is necessary to have the ability to propose new ideas and see ways to resolve them.

At this point, the methodological aspect of developing logical thinking abilities in future educators, particularly those expected to work in the primary education branch of the general secondary education system, is one of the pressing issues. It is worth mentioning that globalization and technogenic civilization are undoubtedly influencing the upbringing of the younger generation. Today's students are not easily captivated by "stories of the past," as they are more interested in information based on real events. In many cases, we speak with "joy" about a one-year-old child being able to use mobile communication devices. This means that future primary school teachers must be aware of the modern demands and the ongoing changes in education. They must work continuously on self-improvement and be prepared for practical activities in constantly changing, non-standard conditions, ensuring their readiness for innovation. This situation creates a need to establish additional, unconventional, parallel independent education systems.

As noted by A. Ye. Dmitriev and M. R. Levov, the initial stage of school—primary education—develops a child's personality and abilities, teaches communication, native language skills, reading, and the foundations of moral, aesthetic, and physical culture, and forms the habit of systematic work. Children acquire general concepts about nature, society, humans, and their labor, laying the groundwork for a worldview. In primary school, students develop the necessary skills and competencies in reading and writing, learn to observe the world around them, measure and calculate, grasp methods of logical memory

retention, the elements of theoretical thinking, and gain the foundations of speech and behavior culture, personal hygiene, and a healthy lifestyle. Initial value orientations begin to form, learning motivation develops, and love for knowledge and spiritual values is instilled. Every teacher must be prepared to work in such conditions and to fulfill these tasks. Moreover, they must understand modern children, their needs, and interests, and possess contemporary methods for studying children and the conditions for their development.

In our opinion, among the issues mentioned above, the most significant is the development of logical thinking skills in future elementary school teachers. It is essential to modernize and innovate the process of deepening the educational approach by equipping it with innovative teaching technologies. The process of systematically organizing the development of logical thinking skills in future elementary school teachers based on a neological approach depends on how well the foundational curriculum is mastered, and this is reflected in the methodological support and current state of this educational process.

We are aware that elements of education have undergone significant changes based on the reforms in higher education and the social sphere. Therefore, it is becoming increasingly essential to revisit educational philosophies, principles, and problems from the standpoint of logical and innovative approaches.

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