

Article

Issues Of Developing Logical Thinking In Pedagogical Activity

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Abstract: Logical thinking is a fundamental skill essential for both educators and learners in the educational process. This article explores the role and importance of logical thinking in pedagogical activity, highlighting its influence on teaching effectiveness and student learning outcomes. The study discusses various approaches to developing logical thinking skills in teachers and students, emphasizing innovative teaching methods, problem-solving activities, and reflective practices. Furthermore, it examines the challenges educators face in fostering logical thinking and proposes strategies for overcoming these obstacles. The findings underscore the necessity of integrating logical thinking development into teacher training programs and educational curricula to enhance pedagogical efficiency and academic achievement.

Keywords: Logical Thinking, Pedagogical Activity, Teacher Training, Problem-Solving, Reflective Practice, Educational Methods, Cognitive Development, Teaching Effectiveness.

1. Introduction

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-

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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.

2. Materials and Methods

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.

At present, given the incomplete research on this issue within the framework of comprehensive fundamental studies and the insufficient methodological development of this direction in scientific activity, we can state, based on pedagogical practice and observations, that future educators must possess key competencies to remain competitive in their profession. We believe that each future elementary school teacher, with a dedicated approach to their profession, should:

- Demonstrate intellectual and creative initiative;
- Have a broad and profound understanding of professional knowledge;
- Possess logical thinking and intellectual abilities;
- Be ideologically and cognitively prepared to address various conflicts creatively;
- Present creative ideas in a logical sequence and evaluate them with critical thinking;
- Be open to innovation;
- Compare their experiences with others, acknowledging their strengths, weaknesses, and successes;
- Recognize their creative potential;
- Be able to showcase their abilities and be ready to implement new ideas in practice;
- Continuously work on themselves with logical reasoning and choose the most appropriate educational strategies for planning the learning process (the choice of strategy depends on the teacher's professional readiness, personal interests, and the life circumstances they encounter).

The implementation of a logic-based competence approach in pedagogical education facilitates the achievement of its primary goal, which is to help elementary school students develop their latent intellectual abilities (quick thinking, fluent speech, and logical reasoning) through pedagogical support.

For this reason, analyzing and evaluating the pedagogical innovations introduced by teachers, creating conditions for their successful development and application, and transitioning general education schools into competitive market environments, including the establishment of non-state educational institutions, have become key directions in the activities of educational institutions' pedagogical teams and methodological services' leaders. Innovation in education can be interpreted as an individual creative process and its result.

According to N. Muslimov and M. Mirsolieva, in socially active education, where individuals strive for high results and pursue a career in teaching, creative competencies are a significant factor in shaping individuals to meet society's needs. Logical thinking is one of the factors that bring creativity to the surface. Indeed, the presence of reasoning and logic allows individuals to make clear and correct decisions within the chain of events and situations.

3. Results

It is worth mentioning that in modern education, the process of developing logical thinking skills in future elementary school teachers based on new methodological approaches is an integral part of the institution's educational and social activities. The logical methodological emphasis embodied in this process represents an open, evolving, and democratic sphere for shaping future educators' professional identity and pedagogical image.

From this perspective, we can assert that the pedagogical opportunities for developing logical thinking skills in future elementary school teachers include the following:

Identifying the scientific and practical foundations for optimizing the content of integration, diversity, and flexibility mechanisms in planning educational activities based on educational conditions, integrating motivational, modern universal education, integrative approaches, and principles of international cooperation;

Developing a modern integrated information-education base in higher education by integrating curricula and calendar plans according to international standards and state requirements;

Determining the effectiveness of educational and methodological resources by applying modern educational programs and innovative technologies to educational processes;

Establishing an innovative assessment system to evaluate the quality and effectiveness of knowledge, skills, and competencies of future elementary school teachers based on the outcomes of their educational activities.

Future teachers need professional support in adapting to their profession. Failure to cope with challenges, excessive fear, and the weight of responsibility can lead to anxiety and even the decision to leave the teaching profession. In such cases, future educators require targeted support and assistance.

Teachers, if they wish to achieve high efficiency in applying their creative teaching methods and strategies (i.e., thinking broadly and organizing the creative thinking process), must instill this approach in the minds of future elementary school teachers, carrying out their tasks diligently and with a logical understanding. Moreover, "only in an environment that has logical content and character will future elementary school teachers be able to understand the connections between the content of the subject being studied and the educational information, allowing them to begin thinking about it."

Research aimed at systematic innovation reveals the innovative activity within the analysis of the personal, managerial-communicative, and outcome-oriented systems of logical paradigms. The innovative potential of an individual depends on their creative ability to develop new ideas and concepts and, most importantly, to project and model them in practical forms. Cultural and aesthetic development and awareness provide the foundation for an individual's readiness to improve their activities, which relies on internal tools and methods that ensure this readiness. This process is linked to key indicators such as the development of innovative consciousness (the value of innovation over tradition, innovative needs, and the motivation for innovative behavior).

Thus, based on the methodological situation of developing logical thinking skills in future educators as profound individuals and the tasks at hand, the principles guiding the development of a teacher's creative potential can be identified as follows:

The principle of recognizing the value of the educator's personality;

The principle of creative self-understanding;

The principle of compensation;

The principle of individualization;

- The principle of contradiction;
- The principle of moral interdependence;
- The principle of creative inspiration;
- The principle of reflection;
- The principle of system selection.

During the implementation of innovative activities with the help of logical thinking, reflection occurs alongside two processes:

1. The teacher revisits the forecasting phase, where they observe individual elements of the concept;
2. The second process is related to reflection on one's activities, specifically concerning the process of achieving goals: an analysis of the interdependence between the teacher's capabilities and external conditions occurs (logical reflection), examining innovations, competencies, pedagogical practices, and content.

4. Discussion

The discussed interactive or innovative opportunities define the processes, actions, and behaviors of the teacher's innovative activities. Logical thinking is based on reasoning and moderate creative behavior, which is the ideal of perfection and its value realized in pedagogical practice conditions. Such behavior manifests in communication, teaching, self-determination, and during logical-reflexive processes, among others. The behavior of a voluntary professional can be analyzed based on their activities.

The exploration of defining the boundaries of logical thinking abilities and the concept of activity is related to studying the structure of pedagogical activity and its distinctive characteristics; changing and distinguishing the components of logical activity; examining the teacher's position in this thinking activity; understanding the individual methods of the teacher's activity; identifying the characteristics of individual pedagogical activity; studying and evaluating the teacher's innovative activities; analyzing the processes of logical reasoning in foreign pedagogical thought; and differentiating types of innovative models. The emergence of logical thinking abilities is characterized by the processes of generating, developing, and implementing several alternative options concerning events and phenomena.

Achieving a higher level of logical thinking is essential for future specialists within the context of managing the lessons of primary school students at educational institutions. This, on one hand, relies on the rationale of the choice or logical solution and its implementation, and on the other hand, it contributes to enhancing the positive coefficients of all components of the educational process, including the interests of teachers, students, parents, and the support of self-management bodies.

In pedagogical labor, the process of logical individualization for the teacher may manifest in the following diverse expressions:

Individual differences appearing as partial or episodic manifestations of non-similarity in professional behavior and activity;

Individual methods, techniques, and tasks in professional activities that are stably maintained over a long period;

The uniqueness of the teacher's personal work, reflecting individualism and a specific professional worldview, often manifesting as an individual variant of the profession.

Logical thinking, on one hand, represents individualism, while on the other hand, it serves as the basis for the authenticity of reality and creative individuality, being an effective form of self-awareness that encompasses the following psychological characteristics:

The awareness of one's uniqueness when compared to others;

The manifestation of creative expression and representations about oneself;

The integrity and harmony of individual intellectual (logical thinking unity) characteristics, inner unity;

The essence of a person's self-development process, its logicity, dynamics, and continuity in shaping as a creative individual;

The emphasis on oneself and the understanding of one's competence;

The creative individual's self-realization and the understanding of their significance in personal and social aspects.

Thus, the structure of the teacher's innovative activity consists of functional components, criteria, levels, and structural components. Therefore, when developing the competence of logical thinking in future educators, it is necessary to consider the modern requirements placed on textbooks and educational resources, making extensive use of the achievements of science and technology and their constructive qualities. The pedagogical character of directed tasks cannot be overlooked. Thus, based on the analysis of scientific and methodological literature, the necessity of assessing the concept of "logical thinking" within a modern context has been established as a social need. Observations indicate that the state of methodological preparedness for improving the logical thinking skills of future educators possesses the following characteristics and is presumed to further develop and improve based on several key criteria:

The ability to identify primary and essential thoughts while comprehending the educational material during lessons provided to future primary school teachers;

Providing fundamental knowledge for teaching analysis, synthesis, analogy, and forecasting;

Fostering qualities such as a thirst for knowledge and preparation for independent living among students.

Developing the intellectual level of their personalities and fostering a culture of debate.

Under the influence of democratic and innovative changes in the field of education, future primary education teachers prefer to have the freedom to choose and the opportunities for independent creativity and exploration when addressing their logical worldview and professional development challenges.

Furthermore, the research problem also necessitates a discussion on the essence of pedagogical modeling from the perspective of developing a model and software for fostering professional-cognitive competence in future educators under the conditions of logical approaches and interactive methodological technologies. Studies in this area have primarily focused on student-centered approaches, dual education, classification of pedagogical technologies, integrative, creative, and cognitive competencies aimed at developing professional competencies among students and pupils, as evidenced by bibliographic research on the subject. In this context, the absence of a clear functional pedagogical algorithm regarding logical thinking and pedagogical thinking indicates the relevance of the scientific and practical aspects of the issue and the need for further study.

Based on the current state and relevance of the topic, it is necessary to create a pedagogical map for the methodological development of logical thinking and to develop a model that supports the dual approach to improving the logical thinking abilities of future primary school teachers. This model should provide practical assistance in deeply shaping the worldview of students and consolidate pedagogical professional thinking competencies.

It is pertinent to note that creatively assimilating advanced experiences and adapting them to the educational practices of our country is a primary object of every subject field and scientific activity during the pedagogical retraining and organization of education process.

Thus, after the future primary school teacher has acquired these skills and knowledge, they will face significant tasks related to developing children's logical thinking abilities, cognitive development, worldview, communicative literacy, and self-awareness

potential according to educational standards. This includes fostering the ability to think critically, understand others' perspectives, and articulate their thoughts fluently in both oral and written forms.

Today, the modern requirements placed on educators are focused on developing education and necessitate the use of new forms that synthesize cognitive, game-based, exploratory, and educational interactive elements. Society needs individuals who can make unconventional decisions without fear, who think independently, and who are intellectually strong and creative.

Logical thinking is a thinking process based on clear rules that allows for drawing conclusions while adhering to logical principles. The theory of logical thinking has been studied in various philosophical and psychological fields, and the main aspects of understanding and developing this process include the following.

Now, let's discuss the scientific-theoretical foundations of logical thinking.

Logical thinking is a form of reasoning that ensures coherence between thoughts, evidence, and conclusions. It is often based on clear rules and principles, such as deduction, induction, and abduction. Through these rules, individuals form new knowledge or analyze existing information based on specific evidence.

Deductive and Inductive Logical Thinking:

Deductive Thinking: This is the process of deriving specific conclusions from general rules. For example, if we know that all humans are mortal, and we know that Ali is a human, we can conclude that Ali is also mortal.

Inductive Thinking: This is the process of deriving general rules from specific observations. For instance, after observing that the sun rises every day, we can come to the general conclusion that "The sun rises every day."

Logical thinking is the ability to analyze various problems, identify cause-and-effect relationships, draw conclusions based on evidence, and solve issues. This type of thinking is closely related to analytical thinking, which helps individuals make correct decisions in complex situations. Logical thinking allows a person to reason objectively and based on facts, identify the real causes of events, test hypotheses, and analyze facts.

Logical thinking plays a crucial role in many areas of human life, including science, technology, law, education, and everyday life. It aids in problem-solving, decision-making, and constructing logical chains. This is particularly important for primary school teachers, as they are key facilitators in teaching children logical thinking.

Stages of Development of Logical Thinking:

1. **Initial Stage:** At this stage, individuals begin to understand and accept simple logical relationships and familiarize themselves with basic concepts.
2. **Developmental Stage:** At this stage, individuals develop their thinking through more complex logical chains and relationships, enhancing their problem-analysis skills.
3. **Achievement of Higher Levels:** At this stage, logical thinking involves complex tasks based on systematic and deep analysis. At this level, individuals independently develop their logical thinking and effectively apply it in pedagogical activities.

The Role of Logical Thinking in the Teacher's Pedagogical Activity

The importance of logical thinking for teachers is significant. Primary school teachers are able to convey knowledge to their students clearly and logically through logical thinking, explaining complex concepts in a simple and understandable manner. Through logical thinking, teachers develop students' thinking abilities, teaching them to think independently, analyze, and draw logical conclusions.

Developing Logical Thinking

The process of developing logical thinking enhances an individual's abilities in abstract thinking, problem-solving, and decision-making. To promote this development, the following methods can be utilized:

Exercises and Games: Logical puzzles, mathematical problems, and strategic games.

Analytical Skills: Deeply analyzing situations and searching for various solutions.

Thinking Techniques: Learning and applying deductive and inductive thinking methods.

The Integrative Structure of Logical Thinking

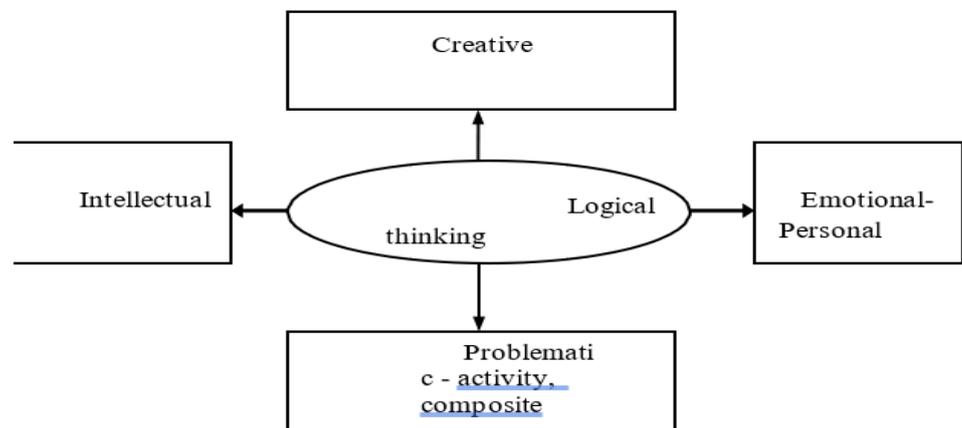
The integrative structure of logical thinking refers to the interconnectedness of various cognitive processes and skills that work together to enable effective reasoning and problem-solving. This structure encompasses several components:

1. **Deductive Reasoning:** The ability to draw specific conclusions from general principles or premises. It involves applying established rules to arrive at a logical outcome.
2. **Inductive Reasoning:** The process of forming generalizations based on specific observations or instances. It allows individuals to infer broader conclusions from limited data.
3. **Analytical Skills:** The capability to break down complex information into smaller, manageable parts for better understanding and evaluation. This includes identifying relationships, patterns, and discrepancies.
4. **Critical Thinking:** The ability to evaluate arguments, evidence, and claims objectively, leading to informed judgments and decisions.
5. **Creative Thinking:** The capacity to think outside the box and generate innovative ideas or solutions. It complements logical thinking by allowing for flexibility and adaptability in reasoning.
6. **Metacognitive Skills:** Awareness and control of one's own thinking processes. This involves self-reflection and self-regulation in one's approach to problem-solving.

Together, these components create a comprehensive framework that enhances logical thinking and facilitates effective reasoning across various contexts, including education, science, and everyday life.

1-picture

The integrative structure of logical thinking



Pedagogical approaches to the development of logical thinking

The development of logical thinking is necessary for teachers not only for themselves, but also for teaching students. From a pedagogical point of view, this process is carried out through the following methods:

- **Active teaching methods:** questions and tasks that encourage students to think independently.
- **Creating problem situations:** Creating and analyzing problem situations that help students solve problems.
- **Communication and discussion:** Communication and discussion that allow students to justify their own opinions and critically evaluate the opinions of others.

5. Conclusion

Developing the logical thinking of primary school teachers is an important process, and this process is one of the main factors for improving the professional qualification of teachers and improving the quality of education.

REFERENCES

- [1] Jamoldinova, O. R. (2015). Improving the pedagogical mechanisms for the implementation of the principles of continuity and continuity in the development of a culture of healthy living among young people.
- [2] Shagazatova, B. X., Artikova, D. M., Ahmedova, F. S., Mitxaydarova, F. S., & Ahmedova Sh, A. (2023). ENDOKRINOLOGIYA MUTAXASSISLIGI BO'YICHA KLINIK REZIDENTLARNI O'QITISHDA «CASE»-USULI (Doctoral dissertation, Ўзбекистон, Тошкент).
- [3] Ganiyeva, M. (2023). BOSHLANG'ICH SINIF O'QUVCHILARINI MATEMATIK TAFAKKURINI RIVOJLANTIRISHDA MURAKKAB MASALALARNING AHAMIYATI. Scienceweb academic papers collection.
- [4] Ganiyeva, M. (2023). BOSHLANG'ICH SINIF O'QUVCHILARINI MANTIQUIY TAFAKKURINI RIVOJLANTIRISHDA DIDAKTIK O'YINLARDAN FOYDALANISHNING AHAMIYATI. TA'LIM FIDOYILARI.
- [5] Musurmanova, A., Jumaniyozova, M. T., Isaqulova, N. J., & Jumaev, A. (2018). General Pedagogy.
- [6] Мусурмонов, Р., & Мусурмонова, М. (2020). Таълимда инновацион фаолият давр талаби. Science and Education, 1(Special Issue 4), 223-231.
- [7] Мусурманова, О., Палуанова, Х., Рискулова, К., & Курбаниязова, З. (2019). Педагогик атамалар луғати: ўзбек, рус, инглиз тилларида. Т.:“TURON_IQBOL.
- [8] Ganiyeva, M. (2024). PEDAGOGICAL CONDITIONS FOR METHODOLOGICAL PREPARATION OF FUTURE ELEMENTARY SCHOOL TEACHERS FOR LOGICAL THINKING. Science and innovation, 3(B5), 178-182.
- [9] Musurmonova O, Baubekova G. Uzbek folk pedagogy. Tashkent. 2000;320.
- [10] Ganiyeva, M. (2023). INNOVATSION TA'LIM TEXNOLOGIYALARI ASOSIDA, O'QUVCHILARNI MANTIQUIY FIKRLASHGA O'RGATISHNING, SHAKL, METOD VA VOSITALARI. Scienceweb academic papers collection.
- [11] Ganieva, M. (2023). EMPOWERING LOGICAL THINKING IN PRIMARY SCHOOL STUDENTS THROUGH TIPS TECHNOLOGY. In Academic International Conference on Multi-Disciplinary Studies and Education (Vol. 1, No. 12, pp. 62-63).
- [12] Maftuna, G. (2023). SCIENTIFIC AND THEORETICAL FOUNDATIONS OF METHODOLOGICAL TRAINING OF PRIMARY SCHOOL TEACHERS FOR LOGICAL THINKING. Modern Science and Research, 2(10), 91-94.
- [13] Musurmanova, A. (2018). Family reading as a factor of spiritual and moral development of the child The Way of Science. International scientific journal (ISSN 2311-2158), 1(47), 70-72.
- [14] Jamoldinova, O. R. (2015). Improving the pedagogical mechanisms for the implementation of the principles of continuity and continuity in the development of a culture of healthy living among young people.
- [15] FAN, T., & JURNALI, P. O. I. Scientific-Theoretical Foundations of Developing the Logical Thinking Of The Future Primary School Teacher.