

Cognitive Activity Formation in Primary School Students through Modern Scientific and Pedagogical Approaches

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Abstract: This article analyzes the process of shaping and developing cognitive activity in primary school students based on modern scientific and pedagogical approaches. The study examines the psychological and pedagogical foundations of cognitive development, as well as educational technologies aimed at improving students' perception, thinking, and logical reasoning skills. Furthermore, the impact of modern concepts such as constructivism, active learning methods, neuro-pedagogy, and differentiated approaches on the cognitive activity of primary school students is scientifically analyzed. The research findings contribute to the development of effective strategies for enhancing cognitive activity and their implementation in primary education practice.

Keywords: cognitive activity, primary education, modern approaches, neuro-pedagogy, constructivism, active learning, differentiated approach, cognitive development, metacognitive abilities, innovative educational technologies, critical thinking.



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Introduction. The development of cognitive activity in primary education plays a crucial role in shaping students' worldview and fostering their interest in learning. Cognitive activity encompasses psychological processes such as perception, thinking, reasoning, and decision-making. These processes define the activity of primary school students in acquiring knowledge and analyzing new information.

Modern scientific-pedagogical approaches are of great importance in implementing innovative methods and technologies in the educational process. Contemporary pedagogical concepts, such as constructivism, active learning methods, neuro-pedagogy, and differentiated approaches, offer effective methods and strategies for developing cognitive activity. These approaches focus on developing students' metacognitive abilities, critical thinking, and logical reasoning skills in primary education. This article analyzes how modern scientific-pedagogical approaches influence the development of cognitive activity in primary school students and examines the role of practical approaches in this process. The aim of the research is to identify effective methods and strategies for supporting cognitive development.

Main Body. The formation of cognitive activity in primary education not only directly influences students' knowledge acquisition but also the development of their unique ways of thinking and

perceiving. In this process, modern scientific-pedagogical approaches, including constructivism, active learning methods, neuro-pedagogy, and differentiated approaches, create a solid foundation for students' cognitive development.

Constructivism is one of the most important approaches in pedagogy. According to this approach, knowledge is actively constructed and updated by students. Constructivist theories, developed by scholars such as Piaget and Vygotsky, are based on students discovering knowledge for themselves. The core principles of constructivist education focus on encouraging students to create their own knowledge and strengthening the interactive relationship between students and teachers during the learning process. In this way, students' perception and thinking abilities develop progressively. Implementing such an approach in primary education teaches students active participation and independent thinking, which helps in the development of cognitive activity.

Active learning methods aim to engage students not only as listeners but also as active participants in the learning process. These methods yield effective results in developing students' cognitive abilities. For instance, problem-based learning and cooperative learning methods enhance skills such as collaborative thinking, critical analysis, and innovative decision-making. Through problem-based learning, students improve their thinking abilities and analytical skills by solving problems.

Methodology

Neuro-pedagogy plays a significant role in developing cognitive activity in modern education. This approach involves studying pedagogical technologies based on students' brain activity. Neuro-pedagogy explores the stages of brain development and how it affects the learning process. For example, knowledge about how to optimize brain learning and memory processes plays a crucial role in shaping cognitive activity. With the help of neuro-pedagogical approaches, students develop more effective learning methods and fully utilize their cognitive potential.

Differentiated approach allows for personalizing education by considering the individual characteristics and needs of each student. Primary school students have different reading and learning methods, so it is essential to develop an approach tailored to each student. Through differentiated education, the cognitive activity of students is developed with the help of materials and tasks that are customized to their needs. This increases students' motivation for learning and elevates their thinking abilities to a higher level.

Primary school students are, to some extent, able to independently develop their activities. They describe their plans and the consistency of their actions verbally. Through planning, students' voluntary attention is formed and developed. Engaging primary school children in cognitive activities requires various mental methods. The learning process plays a crucial role in shaping cognitive activity, enriched by students' conceptualization of the material world.

Experts argue that personal development is connected to the material world, and a person's lifestyle determines their consciousness. In childhood development, learning and cognitive activity hold significant importance. The expansion of cognitive activity in students primarily occurs through their assimilation of scientific phenomena, thoughts, ideas, evidence, and social experiences of the people. In the field of pedagogy, the interrelation between development and education has a distinct historical trajectory. Initially, educators believed that students' development happened naturally. After recognizing the influence of education on development, they emphasized that this influence was unconscious. At the same time, personal perspectives emerged concerning teaching and intellectual development. The essence of this perspective is that well-organized learning processes accelerate students' development. Education is not just built on completed stages. Based on this approach, a theory of active, individual, and differentiated approaches to education emerged in pedagogy. There is no uniformity in the process of personal

development. For primary school students, this is a period of intellectual development based on figurative thinking. This primarily happens in the learning process. During this cognitive process, other aspects of the individual do not develop. We attempt to justify the developmental direction that leads the students. In intellectual development, the foundation of self-respect is formed by students' positive personal experiences, which are manifested during the learning process.

Observations indicate that most students lack such experiences. The inability to be satisfied with the results of their own activities prevents students from building the foundation of self-respect. One of the important principles in this regard is the expansion of cognitive activity in certain learning situations, which involves personal equality and self-respect. This is manifested through students' activities, and the mistakes made during the cognitive process can affect their mood and development. In organizing students' cognitive activity, the teacher must ask how to expand this activity.

Analysis of existing scientific sources and the results of observations suggest that cognitive activity in students consists of the following components:

- ✓ Cognitive interests;
- ✓ Learning goals;
- ✓ Emotions: personal anxiety and emotional stability;
- ✓ The need for achievements and communication;
- ✓ Intellectual ability and willingness to communicate;
- ✓ Personal experiences and skills.

The famous work *Reflexes of the Brain* (1863) by I. M. Sechenov, a prominent figure in Russian physiology and scientific psychology, presented a significant theory. Sechenov stated, "Psychological and physiological processes in humans are events of the same type, closely related to the real world." Sechenov proposed that the foundation of psychological processes lies in the brain's reflexes. His successor, I. P. Pavlov, further developed this idea in his works on higher nervous activity, revealing the fundamental laws of psychological material substrate activity and the nervous-physiological mechanisms of certain processes.

Our research focuses on identifying effective ways to expand students' cognitive activities in specific learning situations. Self-respect is an analytical characteristic of every individual. By analyzing its structure, it becomes possible to identify students' tendencies, values, and the rules they rely on. Research dedicated to developing cognitive activity in the learning process has categorized students' involvement into three areas, based on their independence:

- ✓ Imitative based on examples;
- ✓ Activity-based on inquiry;
- ✓ Creative cognitive activity.

Imitative activity arises based on ready-made examples of actions. Ideally, it encourages students to be diligent, relying on objectivity. Inquiry-based activity, in comparison to research activities, involves students independently seeking solutions to problems proposed by the teacher in problem-based learning situations. Creative activity, as the highest form of cognitive activity, involves seeking new, unique methods for problem-solving, demonstrating high-level self-management of actions, and comparing this level with personal initiative.

Results and discussion

In traditional education, cognitive activity is understood as the teacher's action to guide students in mastering ready knowledge. Experts have come to realize the need for a gradual transition to

new levels of cognitive activity. Initially, only a portion of knowledge should be transmitted in its ready form, and eventually, all information should not be given to students in its ready form. Instead, part of the information provided by the teacher through communication should serve as the foundation for independent inquiry.

Scientific approaches directed at developing students' cognitive activity encompass two main areas:

1. Didactic approaches: These focus on the teacher's activities and the role of methodological tools aimed at developing students' cognitive activities.
2. Psychological approaches: In this case, students utilize their psychological-pedagogical characteristics while engaging in cognitive activities.

The goal of analyzing all levels of the cognitive process is to identify its types, as these types should manifest as the ways students assimilate information during the educational process. Therefore, identifying the types of cognitive activity and how students approach learning is central to this research. Cognitive activity is carried out through various forms, tools, methods, paths, and techniques. In this context, the following points can be emphasized:

1. Cognitive activity is manifested in various forms in school practice in natural conditions.
2. Students should have the ability to perform cognitive activity through different types, forms, methods, and techniques.
3. There is no single classification of cognitive activity types for teachers.

When designing educational processes aimed at developing cognitive activity, generalized cognitive skills do not emerge on their own. This is because in this process, goal-oriented specific educational situations are implemented. Additionally, a key component of preparing students to acquire generalized skills is the development of specialized learning and cognitive skills. Educational situations play a crucial didactic role in developing a student's cognitive activity. It is through educational activity that a student strives to master the content of the subject matter.

As is known, the teacher creates the condition for managing student activity. This process continues until the student is capable of independently managing their activity. In this process, the teacher's role is to consider the student's inclinations, plan, monitor, and correct their activity. Learning instills confidence in students regarding their actions. This confidence is formed during the early stages of education, primarily by developing their cognitive activity.

However, it is evident that most students today are not striving to expand their knowledge reserves. They are not actively participating in lessons and are more interested in extracurricular activities. Finding and addressing the reasons for this is a key issue in pedagogy. As students attend school, they aim to gain the affection and attention of their teachers and peers.

According to educators, a student's success increases their interest in their educational activities. Interest in learning only arises when students successfully master the material. When a student feels joy in their efforts and takes pride in overcoming challenges, they begin to develop a special interest in the learning process. Therefore, teachers should create situations where students take joy in their academic labor. It is essential to instill a sense of pride and worthiness for success in their hearts. Success is ensured by creating educational situations that provide every student with an opportunity to achieve. Experts emphasize that fulfilling the student's cognitive needs in educational situations plays a significant role in their development. If a student is given the opportunity to achieve success in an educational situation, they will be able to make the right choices in life as well.

Modern pedagogical technologies and approaches provide effective strategies for shaping cognitive activity. Innovative educational technologies, such as interactive whiteboards,

multimedia resources, and online platforms, help make the process of perception and learning more engaging and efficient for students. At the same time, the development of critical thinking and metacognitive abilities enables students to monitor and control their learning processes. This, in turn, creates the opportunity for achieving higher levels of cognitive development.

Thus, modern scientific-pedagogical approaches present effective and versatile methods for developing the cognitive activity of primary school students. Their application not only supports students' cognitive development but also ensures that they remain active and independent in the learning process. This, in turn, contributes to the development of higher-level thinking and intellectual potential.

Conclusion.

In primary education, the formation of cognitive activity serves as the foundational basis for the overall intellectual development of students. Modern scientific-pedagogical approaches, including constructivism, active learning methods, neuro-pedagogy, and differentiated approaches, are crucial in developing cognitive activity. These approaches enable the organization of the educational process in an individual and interactive way, thereby enhancing students' thinking and metacognitive abilities.

The core principles of constructivist education allow students to actively create knowledge, which, in turn, develops their logical thinking and problem-solving skills. Active learning methods and problem-based learning teach students critical thinking and problem-solving. Neuro-pedagogy and differentiated approaches take into account students' individual characteristics, making education more effective and personalized.

The use of innovative educational technologies facilitates the support of cognitive activity and creates opportunities for students to become more actively involved in the learning process. Additionally, developing students' metacognitive abilities expands their capacity to manage and control their own learning process. Thus, applying modern scientific-pedagogical approaches to developing cognitive activity in primary education positively impacts students' intellectual development and helps organize their learning activities more effectively. The formation of thinking, critical thinking, and learning skills lays the foundation for future academic and life success.

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