



INDIVIDUAL METHODS OF TEACHING ELEMENTS OF GEOMETRY IN MODERN PRIMARY CLASSES

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Abstract. *This article highlights the specific features of the methodology for teaching the elements of geometry in modern primary schools. It analyzes effective methods and techniques used in the formation of geometric concepts, taking into account the age and psychological characteristics of primary school students. It also reveals the importance of innovative pedagogical technologies, interactive methods, visual aids and practical exercises in the educational process. The article pays special attention to the development of students' logical thinking, spatial imagination and creative thinking through teaching the elements of geometry.*

Keywords: *primary education, elements of geometry, modern methodology, interactive methods, pedagogical technologies, visual aids, spatial thinking, logical thinking.*

Relevance of the topic. In the current era, the issue of modernizing the education system, developing students' knowledge, skills and competencies is one of the urgent tasks. In particular, the primary education stage serves as an important foundation that determines the success of a person in the subsequent educational process. Therefore, improving the quality of mathematics education in primary grades, in particular, improving the methodology for teaching geometry elements, is considered one of the important problems of modern pedagogy. Geometry elements are an integral part of the primary school mathematics course and are of great importance in developing spatial imagination, logical thinking and analytical skills in students.

Through geometric concepts, students acquire knowledge about the shape,

size and location of objects in the environment, which activates their cognitive activity. At the same time, the age and psychological characteristics of primary school students require special methodological approaches to teaching geometry elements.

Practice shows that the incorrect selection of methods and tools in teaching the elements of geometry can lead to the superficial formation of geometric concepts in students. Therefore, the issue of scientifically based analysis and improvement of the methodology for teaching the elements of geometry in primary grades is of urgent importance.

The issue of teaching the elements of geometry in the primary education system is of particular scientific importance from the point of view of modern pedagogical theory and didactics. Geometry is one of the fundamental branches of mathematics, which includes knowledge about spatial relationships, shapes, their dimensions and mutual arrangement. In primary grades, the elements of geometry are studied not as a separate independent subject, but as a component of the mathematics course. Therefore, its content and didactic tasks are closely related to the characteristics of the psychological development of young students, the level of perception and the stages of thinking formation.

One of the important theoretical aspects of teaching geometry elements at the primary education stage is their integrative nature. Geometric concepts are formed not only in mathematics lessons, but also inextricably linked with fine arts, technology, natural sciences, and even native language classes. For example, describing the shape of objects, using words expressing spatial concepts (up–down, right–left, inside–outside) develop children's general cognitive activity [Van de Walle et al., 2020].

The content of the elements of geometry in primary education is determined by state educational standards and curricula. These documents provide for a gradual increase in complexity of the elements of geometry in accordance with the age

characteristics of students. First, the student learns to recognize and name figures, then moves on to the stage of comparing, grouping, measuring and drawing simple conclusions. This process is based on the principle of a spiral, in which each new knowledge serves to expand and deepen previous ideas [NCTM, 2014].

The importance of studying the elements of geometry in primary grades is explained, first of all, by the development of spatial thinking in students. Spatial thinking is the ability to mentally represent the shape, size, location and mutual relationships of objects. Studies show that children with well-developed spatial thinking achieve high results in mastering mathematics, physics, and engineering at later stages of education. [Sarama, 2011]. Also, the elements of geometry play an important role in the formation of logical thinking in primary school students. By comparing geometric figures, identifying their common and different features, and understanding their properties, the student begins to understand cause-and-effect relationships. This leads to the development of the ability to draw logical conclusions [Skemp, 1987].

Theoretically, teaching the elements of geometry in primary grades is a didactic process aimed not only at imparting knowledge, but also at the comprehensive development of the individual. Geometric material increases the aesthetic taste of students, the culture of perception of the environment, and their interest in practical activities. For example, creating patterns from shapes, representing objects through geometric models activates children's creative thinking [Fosnot, 2013].

The cognitive activity of primary school students is based on specific psychological and pedagogical laws. At this stage, the child perceives the environment mainly through intuition, perception and imagination, while abstract-logical thinking is gradually formed. From this point of view, teaching the elements of geometry appears as an important tool for activating cognitive activity in the process of primary education. Through geometric concepts, the student understands

the shape, size and location of real objects, which ensures the transition from the sensory-cognitive stage of the cognitive process to the thinking stage [Vygotsky, 1978]. In scientific and pedagogical research, the elements of geometry are evaluated as one of the factors that directly affect the cognitive development of the child. In particular, the role of geometric activity is emphasized in theories about the development of thinking in school-age children. According to J. Piaget's theory, primary school students are at the stage of concrete practical operations, for which the most effective way to acquire knowledge is through visual and practical activities [Piaget, 1970]. Elements of geometry meet this need, since working with geometric figures is based on demonstration and practical actions.

Geometric concepts systematically develop the cognitive process of students. Perception is the process of understanding objects and phenomena as a whole, and the accuracy and stability of perception increases through observing, comparing and distinguishing geometric figures. For example, in the process of distinguishing between a square and a rectangle, the child perceives their common and different features, which develops analytical perception [Goldstone & Barsalou, 1998].

Imagination plays an important role in teaching the elements of geometry. Imagination is a mental process associated with the student's ability to recreate a real object in his mind or create new images. By drawing, cutting, combining and modeling geometric figures, children develop spatial imagination. Research shows that the development of spatial imagination is an important factor not only for mathematics, but also for general intellectual development [Uttal et al., 2013].

The formation of thinking in the cognitive process of primary school students is inextricably linked with the elements of geometry. Geometric activity activates logical operations - analysis, synthesis, comparison, generalization and classification. For example, tasks on grouping figures according to their properties

form classification skills in students. This creates the logical basis necessary for further mastering mathematical concepts [Skemp, 1987].

In the scientific literature, the influence of geometric elements on the cognitive process is interpreted based on constructivist and socioconstructivist approaches. According to the constructivist approach, knowledge is formed in the process of active participation of the learner. When working with geometric elements, the learner does not just accept ready-made knowledge, but discovers it through practical activity. For example, by independently determining the properties of figures and comparing them, the learner actively constructs knowledge [Bruner, 1966].

In the process of primary education, the elements of geometry have a systematic impact on the development of spatial thinking. For example, spatial concepts such as “up–down”, “right–left”, “in front–behind” are consciously mastered in the process of working with geometric figures. These concepts also facilitate students' orientation in everyday life and increase their level of perception of the environment [Van de Walle et al., 2020].

Geometric elements are of great theoretical importance in the development of logical thinking, as well as spatial thinking. Logical thinking is understood as the ability to determine the relationships between concepts, draw conclusions, and understand cause-and-effect relationships. Geometric material encourages students to think analytically and synthetically in this process. For example, determining the properties of figures and comparing them according to their general and specific features activates logical operations [Skemp, 1987].

In scientific and pedagogical literature, elements of geometry are considered an effective tool for developing logical thinking. Because geometric concepts are clear and visual, it is easier to explain logical relationships through them. For example, statements such as “if a figure has four sides and all sides are equal, then it is a square” form the initial manifestations of deductive thinking in students

[Polya, 1957]. Another important aspect of developing logical thinking in teaching the elements of geometry is the activity of classification and generalization. By grouping figures according to certain characteristics, the student forms general concepts. This process serves to develop the ability to abstract. Research shows that the development of classification skills in the primary grades plays an important role in the transition to algebraic thinking later [Mulligan & Mitchelmore, 2009].

Spatial thinking and logical thinking are inextricably linked, and the elements of geometry strengthen this connection. Understanding spatial relationships is the basis for drawing logical conclusions, while logical thinking systematizes spatial representations. Therefore, the elements of geometry are considered in primary education not only as a separate set of knowledge, but also as a complex cognitive development tool [Clements & Sarama, 2011]. Theoretically, the development of spatial and logical thinking through the elements of geometry is one of the main tasks of primary education. This process forms students' independent thinking, the ability to find solutions to problem situations, and the skills to justify their own opinions. In particular, in the process of solving geometric problems, the student learns to maintain logical consistency and justify his opinion [Polya, 1957].

The principles of systematicity and coherence occupy a leading place in the formation of the content of primary education. These principles serve to ensure the logical structure of the educational content, its interdisciplinary connection, and its correspondence to the cognitive capabilities of students. Elements of geometry are one of the important components of the content of primary education that require this very systematic approach. They are inextricably linked with other sections of the mathematics course, forming students' knowledge as a holistic system [Tyler, 2013]. From a didactic point of view, the elements of geometry play the role of basic concepts in the elementary mathematics course. Through them, students develop general ideas about space, shape, size, and quantity. These concepts create the cognitive foundation necessary for later mastering arithmetic operations, units of

measurement, and elements of algebra. Therefore, the elements of geometry should be placed systematically, not fragmentarily, in the content of elementary education [Van de Walle et al., 2020].

The systematic role of the elements of geometry in primary education is reflected in their teaching according to the spiral principle. According to the spiral principle, geometric concepts are studied not in a one-time, but in stages, in an increasingly deeper content. Initially, the student learns to recognize and name figures, and in subsequent stages he becomes acquainted with their properties, relationships and practical applications. This approach ensures a stable and conscious assimilation of knowledge [Bruner, 1966].

The general didactic significance of the elements of geometry in the content of primary education is manifested in their direct connection with the principle of demonstrability. Demonstrability is one of the leading didactic principles of primary education, which ensures the assimilation of knowledge through visual images in accordance with the age characteristics of students. Geometric figures, models, drawings and schemes serve the effective implementation of this principle. The systematic role of the elements of geometry is also manifested through interdisciplinary integration. In primary education, mathematics is taught in close connection with other subjects, and the elements of geometry are an important tool that ensures this connection. For example, working with shapes and patterns in fine arts lessons, and using geometric knowledge in the process of making objects in technology lessons, strengthens and expands students' knowledge [Fosnot, 2013].

Another important general didactic value of the elements of geometry in the context of primary education is manifested in their educational potential. The accuracy, orderliness and symmetry of geometric shapes form an aesthetic taste in students, develop such personal qualities as diligence and accuracy. Especially in the process of working with drawings, students learn thoroughness and responsibility [Skemp, 1987].

The need to study the elements of geometry is also related to the educational goals of education. The accuracy, symmetry and logical structure of geometric shapes develop in students such personal qualities as orderliness, accuracy and consistency. These qualities are considered to be competencies that are important not only in educational activities, but also in everyday life [Comenius, 1997].

The issue of teaching the elements of geometry in primary grades is considered an important scientific problem in the theory of pedagogy and mathematics education. Analyses show that the elements of geometry are an integral part of the content of primary education, and their importance is not limited to the formation of geometric knowledge, but also plays an important role in the general cognitive activity of students, intellectual development and personal growth. Therefore, the scientific and theoretical substantiation of the content and significance of the elements of geometry is one of the urgent tasks of primary education methodology.

References:

1. Jabborova, O. (2023). Methodology for Training Primary Education Managers Based on Individual Approach Technology (Monograph). Zebo Prince.
2. Uzbek Pedagogical Anthology. (1993). Tashkent.
3. Orakova, SS (2023, May). Electronic learning resources and requirements for their creation. In International Scientific and Practical Conference on Algorithms and Current Problems of Programming.
4. Norbotayev, XB, & Orakova, SS (2023). Methodology of intellectual development of primary school students through natural sciences. Modern Trends in Biology: Problems and Solutions, 1(5), 733–736.
5. Boynazov, Z. (2023). Current educational process and methods in primary school. Interpretation and Researches, 2(1).
6. Boynazov, Z. (2023). Current educational process and methods in primary school. Interpretation and Researches, 2(1).

7. Butayorova, M. (2023). The importance of positive relationships in the formation of the personality of primary school students. Science and Innovation, 2(B11), 121–125.

8. Boshbekova, Sh. A. (2010). Pedagogical Psychology (Foundations of pedagogy, psychology, and individual approaches). 9.

Toshtemirovna, RG, & Butayorova, M. (2022). Methodological bases for the use of modern teaching technologies in native language lessons in primary grades. International Journal of Pedagogics, 2(11), 88–91.

10. Raupova, S. (2024). Advanced foreign experiences in developing literacy in natural and exact sciences among primary school students. Interpretation and Researches, 1(1).