IMPROVING THE METHODOLOGICAL TRAINING OF FUTURE PRIMARY SCHOOL TEACHERS USING THE EXAMPLE OF GEOMETRY

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ABSTRACT

The modernization of education in Uzbekistan actualizes the problem of training a teacher who knows the methodology of an integral pedagogical process, its laws and contradictions. This presupposes the development of a teacher, in particular of an elementary school teacher, of a methodological culture (MC) in the process of geometric preparation for professional activity.

KEYWORDS: *Methodological Culture, Geometric Transformation, Geometric Information, Polyhedral, Geometric Content, Visual Geometric*

INTRODUCTION

In the conducted theoretical and experimental research, an effective technology of geometric training of a future primary school teacher, focused on the development of his MC, was revealed and tested. The conceptual basis of this technology consists in disclosing the methods used to study the geometric properties of figures, highlighting the affine, metric and topological properties of figures, disclosing the main elements, creating conditions for the development of MC in a future elementary school mathematics teacher.

The methodological basis of the technology is formed by the systemic, integrative, personal and functional-activity approaches.

The content of the technology includes an educational and professional program in geometry. The program includes the following sections: movements, similarities and affine transformations of space and plane; polyhedra; convex polyhedra and their properties; regular, semi-regular and star-shaped polyhedra, modeling of polyhedra; symmetry of polyhedra; crystals are natural polyhedrons.

The fixing manifestations of MC components in relation to geometric transformations (GT) in future teachers are: the ability to operate with a generalized approach to studying specific types of movements, similarities, affine transformations; possession of generalized techniques for solving geometric problems by the GT method; possession of the technology of teaching elementary school students to the practical use of GT; understanding of the methodology for constructing technologies for teaching students to solve problems of practical content using GT.

The peculiarity of the program is that the GT planes are studied in connection with the GT space.

The pedagogical experiment showed that the developed technology is focused on the development of MC in the subjects of the educational process.

Geometric preparation of students should be aimed at mastering geometric material in such a way that the acquired knowledge is effective and personally significant. The first is connected with the possibilities of their use in various, including educational, situations, the second - with their meaningfulness.

The means of such assimilation of knowledge is the work of understanding. The essence of understanding lies in the cognitive interaction of the system of our knowledge, experience and incoming information, the assessment of its significance for the subject.

This interaction can be carried out in the process of solving geometric problems by students. In this case, the tasks should perform the following functions:

• be a means of assimilation of different levels of activity - practical and theoretical - at the stages of analysis of the condition, search for a solution, justification, research;

• be a means of forming the ability to translate from one language describing reality to another (in the process of working on a task, texts describing geometric figures are reformulated or converted into texts describing real objects, and vice versa; translation into different "languages", the role of which is played by methods - analytical, vector, etc.);

• be a means of realizing the relationship of subject and methodological training (work on the task includes consideration of objects and situations described in the task from the point of view of their use in teaching younger students, in particular, reformulation or transformation of the conditions of tasks with the aim of using them in elementary course in mathematics).

The implementation of the named functions of geometric problems in the process of teaching students is aimed at creating an understanding of geometric objects by students, and therefore can improve the quality of professional training of future primary school teachers [7].

The emergence of a unified geometry course based on set theory in the mathematical specialties of pedagogical universities in the early 1970s was undoubtedly a progressive phenomenon. Substantial generalizations on a set-theoretical basis and the formalization of expressive means caused by them made it possible to create a new generation of university geometry textbooks. One of the distinguishing characteristics of these textbooks is the combination of geometric content that is largely traditional for pedagogical universities and new forms of its presentation. The past thirty years have convincingly shown which of the methodological findings and acquisitions really turned out to be valuable, which look dubious. The time has long come for

rethinking and reassessing values, universities have long been waiting for the next generation of textbooks. I would like to hope that in them we will meet with the "denial of negation"[8].

As the practice of organizing independent work of students with educational literature shows, one of the dubious acquisitions is the abundance of analytical definitions found in it. We will give only one example - the presentation of the theory of curves in the textbook by L.S. Atanasyan and V.T. Bazyleva. The fundamental concepts of the theory "curvature" and "torsion" are defined as follows. "The vector $n = d\tau / ds$ is called the curvature vector of the line γ at the point M, and its length $\mathbb{N} | = k$ is the curvature of the line γ at this point". "The number ν in the formula $d\beta / ds = -\nu\nu$ is called the torsion of the line γ at point M ". Despite the fact that in the future the geometric meaning of the introduced concepts is revealed, this does not give the effect that the use of genetic definitions of the named concepts gives. There is no description in the textbook of where the names of the coordinate planes of the Freinet frame came from. The fact that such an approach makes it possible to significantly "squeeze" the presentation cannot be a serious justification. We must not forget that genetic definitions clearly indicate the way of formation (or the way of origin) of the concept being defined, and this is undoubtedly more valuable for a future teacher. With this approach, geometry breaks away from its visual geometric fundamental principle[9].

At the same time, the experience of teaching a unified geometry course convincingly shows that the new level of formalization can be perfectly combined with the original content depth of the material being studied[10].

For a long time, geometry was considered synonymous with mathematics. Recently, geometry in school teaching has been losing ground. It is more and more difficult for the teacher to introduce students to geometry, to arouse interest in it, to teach them to perceive the space in which the student lives, to explore it[11].

In order for students to form clear geometric ideas, it is necessary to begin the study of geometry as early as possible. In elementary grades, students get an idea of some geometric objects (point, segment, line, polygon, etc.). Gradually clarifying and expanding ideas about them, improving the skills and abilities of working with geometric material, during the first four years, students receive a stock of geometric representations, which allows them to start studying a systematic geometry course from the 5th grade[12].

Geometers and methodologists of the Department of Algebra and Geometry of the Kolomna Pedagogical Institute, with the active participation of teachers from some schools in the city, have created a geometry program for grades 5-6. The unifying principle here is the formation of the initial and at the same time fundamental ideas about geometric transformations. The figure is represented as a set of points, although this is not explicitly stated. In the learning process, geometric abstractions are developed, and students receive geometric knowledge based on logical conclusions, and not only through specific observations.

Geometric information is repeated from class to class with some changes, meaningful enrichment occurs, an increase in the volume of geometric information. This gives the teaching of geometry an educational character. The formation of skills and abilities in operating with geometric objects depends on the content of the material provided for assimilation and the tools that students should use.

One of the main goals of modern education is the formation of a comprehensively developed personality. Geometry, connecting logical and imaginative thinking, plays an important role in this. However, for example, the reduction of hours for subjects in the physics and mathematics cycle is the reason for insufficient attention to geometry in the mathematics course for 5-6 grades. Teaching individual courses in planimetry and stereometric sometimes causes problems in the formation of spatial representations among students. One of the possible ways to correct these shortcomings is to use the opportunities of additional education.

For example, to organize a mathematical circle for the study of geometric material in grades 5-6. In the classroom of such a circle, students: get acquainted with the basic geometric shapes, including stereometric ones; solve geometric problems "for cutting" and folding; learn to use geometric instruments (ruler, protractor, compass), perform constructions with their help. Tasks and theoretical material should be entertaining, contribute to the development of certain qualities of thinking. This age is very favorable for the development of "smart hands". The development of not only individual thought processes, but also the entire intellect of a developing personality depends on the characteristics of manual labor. The use of modeling in circle classes contributes to the formation and development of abilities: to perform logical operations of analysis and synthesis, predict the result, make its assessment and check its correctness.

Thus, in the circle classes, solid knowledge of the simplest geometric shapes, some of their properties (for example, symmetry), visual and graphic skills, methods of constructive activity are formed; develop: spatial imagination, geometric intuition and creativity.

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