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METHODOLOGY OF FORMATION OF COMPETENCIES ON TECHNOLOGY OF TEACHING MAIN DIDACTIC UNITS FOR FUTURE MATHEMATICS TEACHERS

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Annotation
This article discusses the methods of developing the competencies of future mathematics teachers in the technology of teaching students the basic didactic units. For the future teacher of mathematics, the problem of the development of intelligence is especially relevant. The success of mastering various methodological systems depends on the structure of intellectual operations in the thinking of a future teacher.

Keywords: mathematics, pedagogy, methodology, new pedagogical technology, competence, didactics.

Introduction

The need for fundamentalization of education is due to a number of economic, environmental, informational, cultural and personal problems. The general rise in the level of education of society changes the nature of the professional activity of a specialist. Orientation towards narrow professionals, characteristic of the 20th century, is gradually leaving the manufacturing sector. In the 21st century, a specialist is required who is able to flexibly restructure the direction and content of his activity in connection with a change in life orientations or market requirements.

The new educational paradigm, which is based on the fundamentalization of education, implies qualitatively new goals of education, new principles for the selection and systematization of knowledge, not so much expanding the volume of professional and general scientific knowledge, but defining their other connection and a different way of formation and functioning in practical activities.

It is the teacher who is largely given the right to determine the intellectual, moral, cultural levels of society. The quality of any other specialist in the future depends on his professional training. First of all, this explains the special attention of society to teacher education and the requirements that it imposes on the level of teaching in any educational institutions. New targets in the education system make the human personality a priority. It becomes the main value. These social guidelines in the education system are manifested in different directions: in building a system of lifelong education, in changing the structure of the system, in the emergence of forms of

alternative education, in the formation of new content, in the development of new approaches to determining learning outcomes. The main goal is to create a variety of opportunities for a person to receive an education of the desired level and character at any period of his life. This idea was reflected in the development not only of the domestic education system, but also abroad, primarily in economically developed countries. A new philosophy of education is being formed, in which universal values, the person himself as the main social value, comes to the fore. The formation of such an education system is impossible without the preparation of a new generation of specialists for it and first of all, teachers who have realized, accepted and are able to implement a new educational philosophy in their practical activities.

The problem of training teachers of mathematics, along with teachers of other academic disciplines, is quite acute for the developing system of general secondary education. Taking into account the share of mathematical education in general secondary education and its role, which is determined by the importance of mathematical knowledge as an element of the culture of a modern person, as well as new targets in teaching mathematics to secondary school students within the framework of the emerging philosophy of education and the objective complexity of mastering mathematical content, the training of a mathematics teacher in a pedagogical university, must be singled out as a separate problem, not only in practical but also in theoretical terms. The profound transformations taking place in the system of secondary and higher (including pedagogical) education make it impossible to implement a practical solution to the problem of preparing a mathematics teacher without serious scientific research. An important component of the professional training of a teacher of mathematics in a pedagogical university is his methodological training.

The methodological training of teachers currently being carried out in pedagogical universities requires qualitative changes that determine the next stage of its development. These changes should take into account the new major trends in education - humanization and humanitarization, differentiation, as well as the fundamentalization of education. Therefore, our study is devoted to the problem of improving the system of methodological training of a mathematics teacher in a pedagogical university in the context of the fundamentalization of education.

Long before the discovery of the asymmetry of the human brain: the right hemisphere operates with visual images, the left - with verbal and logical procedures, the famous mathematician D.Gilbert noted: "In mathematics, as in general in scientific research, there are two trends: the tendency to different material and bring this material into a systematic connection and another tendency, the tendency to visualization, which, in

contrast to this, strives for a living understanding of objects and their internal relations. At the same time, the traditional classification of thinking is connected with its division into visual-effective, visual-figurative and verbal-logical.

These typologies naturally reflected on the principles and methods of teaching mathematics: the principle of visibility in teaching, the modeling method, theoretical generalization, etc. However, the implementation of the principle of visibility is usually associated with the use of various means: technical (including a computer), posters, drawings, models, diagrams, etc., which perform the function of operational impact on the senses (mainly vision). In this regard, the historical the approach to visualization in teaching mathematics as a support for sensory perception gives the maximum effect in elementary school and is clearly insufficient in the study of higher sections of mathematics.

The fact is that, on the one hand, the mathematical language has a natural "formalism", each mathematical sign, symbol, geometric figure, diagram or graph is already a generalization, "avoidance" from real objects and sensations, and the higher branch of mathematics, the more abstract the mathematical language. On the other hand, the student's personality should be enriched with rational and logical thinking (analysis, synthesis, analogy, concretization, etc.), the development of which is one of the most important tasks of mathematical education. And as a result, developed logical thinking allows you to freely operate with a mathematical language that represents a visual operation of mathematical objects.

Therefore, the problem of such an organization of the process of teaching mathematics is relevant, when the ideas that arise in the thinking of students reflect the main, essential, key aspects of objects and phenomena, processes, including through intelligent modeling of mathematical knowledge. It is the formation of these key, supporting qualities object of perception (model) and represents the essence of the visual learning process. This a priori approach involves modeling the object of perception based on the neurophysiological mechanisms of memory and the psychology of perception. At the same time, models that fix the procedure of mathematical actions are of particular importance. Secondly, the modeling process, the search for stable associations, and the verification of the adequacy of perception require a serious penetration into modern studies of neurophysiological mechanisms of perception, the study of the stages of stimulus processing: sensory analysis, comparison with the memory repertoire, decision-making, resuscitation of the developed laws of the psychology of perception, a serious study of the personality of the trainees. Therefore, no less relevant is the problem of giving a psychological, pedagogical and physiological justification for the concept of visual teaching of

mathematics, expanding the psychological components of perception through diagnostic methods activities, isolation from practice, which does not allow to fully use the achievements of psychological and pedagogical science. The activity of the teacher in the process of teaching, due to the abstract nature, complexity and high level of construction of mathematical material, necessarily implies a more detailed specification of the applied teaching principles in the direction of their systemic use. Thus, at present, it is necessary to give a unified interpretation of visual teaching of mathematics, to develop methods of teacher activity in the process of visual learning, to explore the specifics of visualization in teaching mathematics, using the positive experience of advanced teachers and scientists.

Moreover, in the modern period, pedagogical teaching technologies are being actively developed, focused on obtaining guaranteed learning outcomes under optimal conditions for the joint activity of a teacher and a student in achieving the goals of educational activity. This study proposes a didactic system of mathematical education for future teachers of mathematics, a fundamental role in which is played by the technology of visual-model teaching of mathematics, which makes it possible to achieve probabilistically guaranteed learning outcomes of different qualitative levels of assimilation of educational material and the integrity of the representation of basic mathematical structures. A significant role in the design of pedagogical technology is assigned to the algorithm for managing the cognitive and creative activities of students in the process of modeling sign-symbolic activities and means of representing mathematical knowledge.

The ability and readiness of a teacher of the 21st century to give a person the opportunity to receive an education of the required level and depth at any stage of his life is now becoming one of the main trends in the development of modern education. The current stage of development of secondary education puts forward increased requirements for the professional (especially subject) training of a teacher armed with the latest teaching methods and technologies, a creative thinker of the educational process in schools of the 21st century. To a large extent, this trend has affected the content of mathematical education in the middle and higher levels, as well as and theories, concepts and methods of teaching mathematics.

Individualization of learning, a differentiated approach, the use of the latest research in psychology, human physiology and pedagogy to improve the learning process, the search for optimal conditions for mastering complex mathematical content require the teacher not only to be highly competent in the subject area, but also to be sufficiently prepared for self-education, to manifestation of creative activity on the basis of professional identification of the personality of the teacher and profession. Improving

the professional training of a mathematics teacher requires not only new, more effective ways of organizing the educational process in a teacher training university, but also a revision of the structure and content of mathematical training of students, raising it to a technological level.

In modern conditions of intensive application of mathematical methods in natural science, engineering and related sciences, which are certainly reflected in the changing programs of school and university mathematical education, the problem of closer use and development in teaching mathematics of psycho-physiological mechanisms of information perception by individuals is urgent. students, development of their mathematical abilities, thinking and culture.

Therefore, consideration of the pedagogical process of mathematical education of future teachers of mathematics, its tasks, planning, technologies are based on the need to search for new, optimal methods, means and forms of teaching that contribute to the formation of an integral system of scientific knowledge. The relevance of considering these issues is confirmed by the leading position of mathematics both among fundamental and applied sciences (which finds its vivid manifestation in their intensive mathematization); on the other hand, the objective complexity of mastering the mathematical content, due primarily to the multi-stage nature of mathematical abstractions.

For students in the study of mathematics, especially at the initial stages of assimilation of educational material, the structure of the studied mathematical objects and their significant connections do not always stand for signs expressed in alphanumeric and graphic form. Even with a developed fixed alphabet, rules for handling it, translation and operation, the process of teaching mathematics objectively can lead to formalism in the possession of knowledge. Overcoming formalism in mastering the content of mathematical objects is a serious and far from solved problem.

The initial, starting point of the study was the analysis of the effectiveness of the existing system of methodological training of a teacher of mathematics in a pedagogical university, which was carried out for many years on the example of the Penza State Pedagogical University named after V.G. Belinsky and a number of other pedagogical universities in Russia. In particular, it was found that the methodological training of teachers of mathematics in a teacher training university causes increasing dissatisfaction both on the part of workers in the education system and on the part of academic teachers involved in the problems of this training.

Although the assessments of these categories of experts differ, recently there has been a convergence of their positions in understanding the fact that the general guidelines that are implemented in the system of methodological training of a mathematics

teacher do not correspond to the new guidelines of the developing system of secondary mathematical education. Because of this, many graduates are unable to implement various methods in relation to the diverse situations of learning in a modern school, related, in particular, to the implementation of level and profile differentiation of students, humanitarization, humanization and fundamentalization of education. At the same time, future teachers do not have sufficient knowledge of mathematical content (to design educational material in order to achieve specific educational goals), they are poorly trained in the implementation of innovative technologies in the process of teaching students mathematics. And the students themselves are not completely satisfied with the nature and quality of methodological training. Their greatest concern is the lack of knowledge of the mechanisms and features of the assimilation of mathematical content by students, which are necessary for building the process of teaching mathematics in a modern school.

The study of the practice of preparing a future teacher in a pedagogical university, the empirical data we obtained on the effectiveness of the system of methodological training of a pedagogical university, as well as a theoretical analysis of various scientific and pedagogical sources (monographs, articles, documents, etc.) made it possible to identify a number of rather sharp contradictions. Some of them affect the goals and content of the system of methodological training of a mathematics teacher:

- the contradiction between the system of methodological training in a teacher training university, aimed at studying a certain averaged methodology for teaching mathematics, and a teaching methodology that is essentially variable, which a mathematics teacher should use in school practice;
- the contradiction between the existing and long-established in the experience of methodological training at the university, the orientation towards building the learning process, based on the characteristics of the content, and different approaches to the implementation of the process of teaching mathematics in secondary school, based on the characteristics of the cognitive activity of students and the prospects for their development .

Other contradictions are related to the peculiarities of the functioning of the system of methodological training and the organization of students' activities in it. Changes in the student's position in this system are associated with the creation in the system of higher pedagogical education of conditions for the personal development of the future teacher. This circle of contradictions is revealed on the basis of studying the practice of vocational education and methodological training in teacher training universities and analyzing the scientific and pedagogical literature on the problems of developing the system of higher pedagogical education. The most important of them are

summarized as follows: a) the contradiction between the leading professional (technological) orientation of the system of methodological training and its inclusion in a pedagogical university in a general system with a pronounced fundamental general educational orientation; b) the contradiction between the level of content of the curriculum of the theory and methodology of teaching mathematics in pedagogical universities with the level of the state of the corresponding scientific field; c) the contradiction between the use of traditional university forms of organizing the educational process in the implementation of methodological training in a teacher training university and the need to use forms that are more adequate for the formation of the subjective position of students in the process of mastering the professional activity of a mathematics teacher.

It is the above contradictions that are the main reason for conducting a study to identify various approaches to improving the methodological training of a teacher of mathematics in a teacher training university in the context of the fundamentalization of education.

The source of the study is scientific works in the field of pedagogy, psychology, philosophy, mathematics, theory and methods of teaching mathematics, devoted to the problems of the fundamental foundations of mathematics, methodological training of a teacher of mathematics, fundamentalization of education. The works of scientific methodologists-mathematicians were widely used, revealing the methodological foundations of teaching mathematics, the problems of the development of methodological science.

The sustainable development of our country in the 21st century, its innovative economy and defense capability depend on the level of mathematical education a student has received since school. It is from the teacher of mathematics, who at school for the student is not only a source of new subject knowledge, but also a conductor of modern ideas, methods, technologies that ensure the formation and development of competencies in students, orienting them to more effective ways of working in solving various classes of problems, in Ultimately, it depends on the training of qualified personnel for modern society. In this regard, the mathematical education of the future mathematics teacher currently requires qualitative changes.

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