PEDAGOGY AND EDUCATION

Klimova Irina Mikhailovna
Associate Professor, Associate
Professor of the Department of Higher Mathematics
Kharkiv National Automobile and Highway University, Ukraine

THE PROBLEM OF PERSONAL ADAPTATION IN THE SOCIETY OF HIGH SCHOOL. DEEPENING OF MATHEMATICAL PREPARATION FOR TECHNICAL UNIVERSITIES IN THE COUNTRIES OF THE POST-SOVIET SPACE

The transition of the post-Soviet system of higher education to the classical, that is, two-tier, structure seriously raises the level of requirements for independent work of students, which is carried out in the corresponding educational environment of the university and the educational space as a whole. External factors, due to a certain autonomy, constantly affect teachers and, first of all, students, simplifying or complicating their professional and personal development. This determines the need to create a certain educational environment at the university, which would ensure an effective process of mastering general scientific and professional competencies and stimulate students' own activity in their professional and personal development and self-development.

Вопросу так называемой «образовательной среды» сегодня уделено повышенное внимание. Тем не менее, стандартизированного понимания сути и содержания данного понятия не сложилось. Педагоги и психологи отмечают, что отсутствие комплексности подходов к идее образовательной среды как таковой, невозможно реальное решение важнейших проблем образования и создание по-настоящему эффективной образовательной системы.

The new structure has led to the emergence of a number of new tasks that are set for higher educational institutions and relate to the specifics of training specialists with the highest qualifications, capable of solving the most complex

managerial tasks and tasks of professional activity, research activities and independent analytical work, proactive, competitive, ready for positive transformations capable of management at different levels and in different areas.

Within the framework of the classical psychological school, the problem of student psychology as a socio-psychological and age category was singled out. In studies and scientific works, modern scientists are characterized as a special subject of educational activity from a socio-psychological and psychological-pedagogical positions. Some scholars define the student body as "a special social category, a specific community of people, organizationally united by the institution of higher education, and includes people purposefully, systematically mastering knowledge and professional skills, who are supposed to be engaged in hard academic work."

In social Aspect, this group of people is characterized by a professional orientation, the formation of a stable attitude to the future profession as a result of professional choice, adequacy and completeness of the student's understanding of the chosen profession. In the socio-psychological aspect, in comparison with other groups of the population, students are distinguished by a higher educational level, the most active consumption of culture and a high level of cognitive motivation. This stage in the development of a person's life is associated with the formation of relative economic independence, a departure from the parental home and the formation of his own family.

An essential indicator of a student as a subject of educational activity is his ability to perform all types and forms of this activity, when the knowledge, skills, and abilities acquired in teaching are no longer an object of educational activity, but a means of professional activity.

A social group learns certain skills and abilities, on the way to which it is opposed (or helped) by the environment. The meaning of this concept is directly related to understanding the process of personality development according to a certain socially determined model.

Today such terms as "information environment", "educational environment", "learning environment", "information educational environment", " information learning environment ". The concepts of “space” and “environment” must be

separated, since “space” can be spoken of as a set of conditions interconnected in a certain way that affect a person, but space can exist independently of him. The concept of "environment" also reflects the interconnection of conditions that ensure human development, but in this case, its presence, mutual influence, interaction of the environment with the subject is assumed.

"Educational environment" is, in a sense, a given of a high level of organization and difficulties with a certain hierarchy of goals and objectives of state policy and the established traditions of society in the field of education, which is formed from factors, components and parameters implemented in the system of educational institutions.And in a narrower context, it can be defined as a set of a number of components that have developed at a particular point in time in a given educational institution and include: the state of the quality of teaching; the level of requirements for the student in the educational process; the accepted standard of education; established norms of behavior adopted in this educational institution; style of pedagogical communication; regulated positive value orientations, the formation of which the graduate seeks. The educational environment is a combination of certain factors: material; spatially objective, social components; interpersonal relations, which are closely interrelated, complementary, which affect each subject of the educational environment, and the subject, in turn, organize a certain impact on the environment.

Learning environments (or learning environments) include interrelated learning and teaching processes. The term "learning environment" is considered more specifically than "educational environment", since in the educational environment, which can arise both organized and spontaneously, there can be many learning environments, which are always specially organized. Hence, the learning environment can be considered as the relationship of specific material, communication and social conditions that ensure the processes of teaching and learning with the presence of the student in the environment, mutual influence, interaction of the environment with the subject. That is, the learning environment is a specially organized environment aimed at acquiring certain knowledge, skills and abilities by students, in which the goals, content, methods and organizational forms

of learning become mobile and available for change within a particular educational institution.

Existing in the same information space, an individual can move from one information environment to another within the same information space (when changing profession, occupation, hobbies, transition to a new stage of education) and simultaneously be in different information environments, perceived by him as something unified (in the information environment of the university, in the information environment of virtual reality). The information environment provides an opportunity to obtain information necessary for a person, but the ability to receive and transform it is acquired in the learning process.

The information environment of educational activity is formed by: the teacher (the content of the course program, the choice of educational literature, teaching methods, communication style are determined); the teaching staff of the educational institution (determines the general requirements for students, the traditions of this educational institution, the form of relations between the teaching and student collectives); the state as a public institution (it determines the material support of education as a whole, the social order for the formation of a particular system of knowledge and attitudes).

The processes of modernization of education make the concept of "information and educational environment" more and more relevant - it is a system-organized set of means transmission of data, information resources, interaction protocols, hardware and software, organizational and methodological support, focused on meeting the educational needs of users; these are educational institutions connected in a certain way with each other, which are in the conditions of information exchange, organized by special software. Thus, the information-learning environment includes a set of conditions that ensure learning: the presence of a system of means of "communication" with the common human culture, which serves both for storage, structuring and presentation of information that constitutes the content of accumulated knowledge, and for its transmission, processing and enrichment; availability of a system of independent work to work with information;

the presence of intense ties between the participants in the educational process - both vertical and horizontal.

The educational environment of an educational institution should be based on the attitude towards the student as a socially mature person, the bearer of a scientific worldview with the creation of conditions for him to carry out managerial activities, the ability to defend his views, goals, life positions in the process of studying at the university; when self-government of students (goal-setting, planning, self-organization, regulation, self-control and accounting, correction, self-analysis of the process and the result) should be effective and independent.

Thus, the educational environment should be maximally integrated with the socio-psychological environment, in which is the social community of students, it must take into account the age and socio-psychological characteristics of the student age and the characteristics of the student's personality development.

Creation of a professionally and personally stimulating environment is today one of the priority tasks of the management and scientific-pedagogical staff of higher educational institutions. To solve it, there are the necessary conditions in the form of various author's approaches that reveal theoretical and applied provisions that characterize the essence, content and technology of creating an educational environment with given properties. The conditions for this are determined by the desire and creative potential of the subjects of the educational process of a particular university. Therefore, the theory and practice of a professionally and personally stimulating environment is organically integrated into the paradigm of professionally and personally oriented higher education.

Taking into account all of the above, it is possible to propose some changes in the curriculum of higher education in post-Soviet countries, since these educational systems have rather specific features.

The innovative nature of modern economic activity and new technological processes in production require provision engineering personnel who are able to solve fundamentally new problems that are not typical for old industries. The specified specificity of engineering education determines the requirements for

fundamental disciplines at a technical university, including the disciplines of the mathematical cycle.

Progressive solution of the problems of higher technical education is impossible without modernizing the mathematical education of students, especially students in science-intensive specialties (computer, information, communication, microelectronic, radioelectronic, industrial equipment technologies, energy, laser technologies, etc.).

In the era of transition to an innovative economy, mathematization gains a truly wide scope, acquires fundamentally new features and characteristics, and becomes a necessary means of integrating modern scientific knowledge and the modern production sphere. The most effective way to apply mathematical ideas, theories and methods in applied problems is the construction of mathematical models.

Setting the goal of development (reforming, modernization, development, etc.) of the educational content, it is necessary to clearly understand the structure of the process and the main methodological provisions its implementation.

As you know, to reform is to change, transform. The authors of the work note that a goal that requires an answer to the question: "for what?" Serves as a guideline for solving any problem. and determining the reason for the purposefulness of the action. The definitions of the goal are varied - they are the long-term desired result, the model of future results, the desired state of the object. In the mathematical education of students of technical universities, it is necessary to avoid a number of contradictions between the goals of the educational system as a whole and the value orientation of students, between the doctrinal and practical goals of education, between the goals of higher professional education and mathematical education, between the formation of purely performing personality traits and creative abilities, between the established pedagogical mentality of teachers of mathematics and the new content of mathematical education, etc.

The urgency of reforming students' mathematical education is determined, in particular, by the existing problems of the so-called unbalanced dynamics: firstly, the paradigm of professional education has changed, the competence paradigm is emphasized as the leading one; secondly, the higher education system has become

two-tier; thirdly, scientific and technological progress has led to the modernization of the content of special disciplines; fourthly, the principle of continuous education was updated; Fifthly, innovative educational technologies, primarily computer technologies, were introduced into the educational process. Against the background of the changes that have taken place, mathematical education at technical universities has not yet been systematically reformed.

All that has been noted, like many other things, means that the reform of mathematical education of students of technical universities should go in the direction of modernization. According to the dictionaries, to modernize is to change something in accordance with modern requirements, to give the past modern features that are not peculiar to it.

In the conditions of modernization of the educational system in general and mathematical education in particular, it is inevitably necessary to classify phenomena (concepts, methods, etc.) that belong to the categories of tradition and innovation, as well as explore the relationship between them. At the same time, the traditional should not be regarded only as a simple reproduction of the past, and the modern - as a reflection of only new phenomena. “Between the traditional and the modern lies the stage of the new - that which arises objectively as a consequence of the dialectic of life.The category tradition unites three interrelated moments: preservation, continuity and development ... The process of the development of tradition is the transition to the new ... the traditional - in the new. "

Taking this vision of the situation as a starting point, we choose the trajectory as the main path of modern reforming mathematics education: traditional - continuity - development - new - modern. Modernization is development. From a philosophical point of view, development is “such a change of states, which is based on the impossibility, for one reason or another, of preserving the existing forms of functioning. Here the object seems to be forced to go to a different level of functioning, previously inaccessible and impossible for him, and the condition for such an exit is a change in the organization of the object. " In the process of modernizing the mathematical education of students of technical universities, we assume an evolutionary change in the existing content with the coordination of

modes of functioning and development, traditions and innovations, while maintaining the continuity of the transition.

In the methodology of science as the main general approaches in solving research problems and implementing transformations distinguish a systematic approach, an integrated approach, a holistic approach, an integrative approach. At the same time, the approach is interpreted as a point of view, from the standpoint of which the object is considered, as an instrument of cognition and a way of transforming reality. In solving the problem of modernizing the mathematical education of students of technical universities, we use all four of these approaches, as well as the contextual approach that we have developed to concretize the systematic approach.It is based on a chain of investments (we use an analogue of a mathematical term): mathematical education - higher technical education - vocational education - education.

The development of mathematical education for students of technical universities should be based on a certain system of principles. In philosophical dictionaries, the principle is interpreted as a generalization and extension of any provision to all phenomena and processes of a certain area (from Lat. Principium - basis, beginning). The principles contain the assumptions, or basic rules, which must be followed in order to achieve the goals within the framework of a particular approach. We choose the following as strategic principles:

– the principle of context (means the orientation of mathematical education towards the professional context, towards the general goals of higher technical education, means considering the content of mathematical education as a subsystem of the content of vocational education);

– the principle openness (means that mathematical education should be variable, multi-level, that a student can get the level of mathematical education in which he is interested);

– the principle of continuity (means that mathematical education at the university at the bachelor's level is a continuation of mathematical education at school or college is itself the basis, which then allows you to continue your education in the master's degree in accordance with personal needs).

Modeling acts as a mechanism for reforming the content of mathematical education. Modeling is the objective deployment of a goal - an ideal (fr. Modele - a model, prototype). This is understood in the sense that the modernization of mathematical education in technical universities does not occur in the abstract, but on the basis of concrete model ideas about the mathematical competence of students in the context of professional education. The model acts as an image of the future system and a way of organizing the correct actions to obtain a result.

I have identified two main approaches to modeling: 1) analysis and reconstruction of existing forms, reconstruction of structural links, determination of their meaning and functions; 2) design of models with elements of innovation. If the reform activity begins and ends with the first approach, then this is an improvement in the mode of functioning. The second approach opens up prospects for development.

With all the advantages of the content of mathematical education in technical universities, which has developed over the past 70 years in the post-Soviet educational space, it cannot be considered perfect and adequate for the modern period. The normatively fixed content of teaching mathematics (higher mathematics) no longer fully meets the needs of special disciplines and the real professional activity of future specialists. During the second half of the twentieth century, the standard curricula for the discipline "Higher Mathematics" used in the Soviet Union were, in fact, unified for all specialties of a technical profile.Their content has passed "by inheritance" into the practice of mathematical education of students of Belarusian technical universities. The implemented content of these programs does not differ even now in the professional education of engineers (bachelors) in technical, "material" fields (construction, mechanical engineering, energy, etc.) and engineers whose activities are related to information and communication "virtual" technologies. Meanwhile, scientific and technological progress has significantly expanded the leading professional competencies of specialists in these areas. In this regard, the content of teaching mathematics should be revised in accordance with the real needs in teaching special disciplines and in future professional activities. This is especially true for science-intensive specialties.

We proceed from the premise that mathematics should be part of the systemic knowledge of a university graduate. For this, it is necessary to strengthen the professional and applied orientation of teaching mathematics.

Achieving the urgent goal of modernizing mathematics education at technical universities is associated with solving a number of methodological challenges. Let us turn to the main ones.

Challenge 1. Systemic and comprehensive reform of the mathematical education of students of technical universities at all five levels of the content of mathematical education (at the levels of standards, curricula, teaching aids, teaching practice, diagnosing the quality of teaching) in accordance with with modern trends in production and education.

Challenge 2. Development of a methodology for the formation of mathematical educational competence of students and mathematical competence as part of the professional competence of graduates of technical universities, the need to strengthen the professional orientation of the content of teaching mathematics, activation of the activity approach in teaching technologies, the formation of appropriate value orientations of students.

Challenge 3. Changing the content of training in accordance with the principles of variability and context, which means the unification of the invariant classical the core of mathematical content (the same for all technical specialties) and its addition with a variable component - professionally significant topics that are selected for teaching in accordance with special training.

Challenge 4.The need to reasonably reflect the modular structure of mathematical content in curricula and teaching aids in order to systematically connect the appropriate educational technologies in the practice of teaching mathematics, the rating system for diagnosing the results of students' mathematical education with the prospect of taking into account the studied content in credits (in accordance with the ideas of the Bologna Process).

Challenge 5. Expansion and contextual (professional) orientation of mathematics education at the master's level, since the transition to a two-level system of obtaining higher technical education, on the one hand, leads to a

"compactness" of the process and content of teaching mathematics at the undergraduate level, on the other hand, it provides additional opportunities for deepening the mathematical education of students studying at the master's level.

Challenge 6. Ensuring the quality of education based on the formation of a holistic, professionally demanded oh, integrative system of knowledge among students, the mathematical component in this system corresponds to modern trends in the scientific and technical sphere and the modern content of technical disciplines.

Challenge 7. Harmonization of fundamentality in the mathematical education of students of technical specialties and applied orientation, support in mathematical the content of a well-grounded balance of the classical fundamental part and the professionally relevant special part of the content of mathematical education.