ПРОБЛЕМЫ ОБУЧЕНИЯ

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APPLICATION OF CONTEXTUAL LEARNING IN EDUCATIONAL PROCESS

Abstract. The article is devoted to the problem of the essence and role of contextual learning in the professional development of a future specialist. The possibility of using contextual learning to prepare students for future professional activities, the importance of the practice-oriented focus of the mathematics course through the formation of motivational-value, cognitive, activity-based and reflective components of the mathematical competence of future specialists are considered.

Keywords: contextual learning, professional competence, practice-oriented tasks, mathematics course, component.

Due to the fact that the Bologna process is used, education today faces such tasks as updating the content of education, improving its quality, creating conditions that would make it possible to provide new educational results [1]. The implementation of the modernization of education takes place on the basis of the developed provisions of the competence-based approach, which assumes an orientation towards the development of students', necessary both for society and for a person, knowledge, skills and personality traits, meaning the general ability and readiness of a specialist for professional activity. The criterion for the quality of training of a modern university graduate is his professional competence. Professional competence can be defined as "an integrative personality quality, manifested in the readiness to realize one's potential (knowledge, skills, experience, personal qualities, etc.) for successful creative, productive activity in the professional and social sphere, in the awareness of its social significance and personal responsibility for the results of this activity, as well as the need for constant self-improvement" [2, p. 94].

It is necessary to form the professional competence of a future specialist not only within the framework of training in special disciplines, but also in the process of teaching disciplines of the general education block. Analysis of research in the field of professional training of specialists allows us to conclude that the content of the mathematics course and its focus on professional activity is the key to the successful development of the professional competence of future specialists.

The mathematical component of vocational education should be considered not only as general education, which forms the basic culture of the individual, but also as a professional one that has applied significance in future professional activities. Therefore,

mathematical competence can be considered as a structural component of the professional competence of a future specialist. The mathematical competence of a specialist is a holistic education of his personality, including motives for the study of mathematics and its application in activities, a value attitude towards the study of mathematical disciplines, an understanding of their role in professional and social activities, knowledge of the fundamental and professionally applied foundations of mathematics and the ability to apply them in situations requiring mathematical training, including the use of applied mathematical and information technologies in professional activities.

In the context of the transition to a competence-based learning model, the development and application of innovative teaching technologies in higher education, focused on a competence-based approach, for specific disciplines becomes especially relevant. One of such technologies is the technology of contextual learning (A.A. Verbitsky, M.M.Bakhtin, N.B. Lavrentjeva), in which the subject and social content of the future professional activity of a specialist is modeled with the help of the entire system of forms, methods and teaching aids. [3]. The essence of the contextual approach to learning lies in the implementation of the educational process in the context of future professional activity by means of recreating real industrial and social relations and relations in educational activity, as well as solving specific professional problems. The contextual approach presupposes mastering the students' holistic professional activities.

From the experience of implementing contextual learning, Professor V.A. Dahlinger emphasizes that the contextual approach allows:

– to form a holistic view of professional activity;

– to form both educational and cognitive, and professional motives;

– to develop professional systemic thinking of a specialist, to form a scientific outlook, which also includes an understanding of oneself, one's place in the field of professional activity [4].

Agreeing with A.N. Kartezhnikova, we note: "the learning process based on the contextual approach provides a natural connection between the acquired knowledge and the future profession, which makes it possible to effectively develop the professionally significant qualities of students" [5, p. four].

M.N. Shvetsova emphasizes that in the process of contextual learning, it is valuable that "trainees not only accumulate knowledge and acquire the necessary skills and abilities, but also harmoniously develop educational and professional competence" [6].

Thus, the academic discipline, including general education, taught at the university, is studied in the context of the future professional activity of a specialist, and its content depends on the profile of the specialist. Mathematical training is a very important component of the professional competence of a specialist. However, mathematics is not a major discipline for most specialties of the university and is studied by students in the first two years of study at the university. In this regard, a problem arises: on the one hand, undergraduate students perceive mathematics as an abstract discipline that has nothing to do with their future professional activity, and do not pay due attention to it when studying mathematics, and on the other hand, in the future professional activity of a specialist, not only mathematical knowledge, abilities and skills, but also personality traits formed in the process of studying mathematical disciplines are needed. The application of elements of contextual learning to teaching mathematics will solve the problem.

Modern research shows that new approaches should be used to solve the problem of preparing a student for practical activity. Currently, a concept is being developed, the main idea of which is to strengthen the practical aspect of training a student by integrating the processes of forming theoretical knowledge and developing practical skills, which, of course, should increase the effectiveness of the knowledge acquired by students. This concept is reflected in the theory of practice-oriented learning (I.Yu. Kalugina, N.V. Chekaleva, etc.), the essence of which is to ensure the unity of the acquisition of knowledge and the formation of practical experience of their use in solving vital problems.

The main goal of practice-oriented learning is to prepare students to solve problems arising in the practical activity of a person, and to form their readiness to apply knowledge and skills in the process of their life. The conceptual provisions of the theory of practice-oriented learning can be used as the basis for creating a methodology, the implementation of which should ensure the interconnection and interdependence of the processes of knowledge formation and the development of skills in order to acquire practical experience by students.

Learning using practice-oriented tasks leads to a more solid assimilation of information, as associations arise with specific actions and events. The peculiarity of these tasks (unusual formulation, connection with life, interdisciplinary connections) arouse an increased interest of students, contribute to the development of curiosity, creative activity in the process of finding ways to solve problems.

The main means of implementing contextual learning in the basic university mathematics course for non-mathematical specialties is its practice-oriented orientation. The practice-oriented focus of the mathematics course in the subject content of the discipline is carried out using a practice-oriented set of lectures, a complex of professionally oriented tasks. The social content of the student's future professional activity is carried out by solving professionally-oriented problems using modern systems of computer mathematics (Mathcad, Maple, MatLab, Mathematica) and the joint solution by students of practice-oriented tasks with problematic content.

The practice-oriented focus of the mathematics course provides opportunities for the formation of motivational-value, cognitive, active and reflective components of mathematical competence.

The motivational-value component of the mathematical competence of future specialists includes:

– awareness of the importance and value of mathematics in modern society, the need for mathematical training;

– acceptance of the value of self-education in the field of applied mathematical technologies;

– the presence of motives of mathematical education, consisting in the focus on acquiring mathematical knowledge and mastering a specific mathematical approach in solving various, including professional, problems;

– the presence of a stable need for solving problems using mathematical methods in professional activities.

By showing students the possibilities of mathematics in solving problems with professional content, it is possible to form motives for studying mathematical disciplines, a value attitude towards mathematics. Awareness of the possibilities of constructing mathematical models of real processes and phenomena, their study by mathematical

methods leads to an understanding of the role of applications of mathematics in the future profession.

The cognitive component of the mathematical competence of future specialists means:

– students have the necessary knowledge, abilities and skills in the field of fundamental and applied mathematics;

– the presence of developed mathematical thinking;

– knowledge of the features of the use of mathematics in professional activities;

– the ability to independently master the sections of mathematics and its methods, which are necessary in the professional activity of a specialist.

The development of the cognitive component occurs when studying mathematical theory with examples from the professional field of knowledge and students solving professionally oriented problems. Students develop knowledge, abilities and skills in the field of applied mathematics, knowledge of the features of the application of mathematics in professional activities.

The active component of the mathematical competence of future specialists includes:

– experience in the application of mathematical knowledge, skills and abilities into professional activities;

– ability to use technologies of mathematical modeling;

– the formation of the system of skills in the use of applied mathematical technologies for solving professional problems;

– ability to use methods for constructing mathematical models of real processes and solving them by mathematical methods;

– readiness and ability to use independently mathematical tools in professional activities.

The construction of mathematical models on the basis of tasks related to future professional activities, the study of the obtained models by means of mathematics and the interpretation of the results obtained allow us to model the forthcoming professional activity of the student. In the study of mathematical models in science, production, the service sector and other economic activities of the company, special applied software is used. Demonstration of the capabilities of computer mathematics systems in solving professional problems allows you to broaden the student's horizons in the field of using information technologies in future professional activities. Mastering the techniques of working with a professional mathematical package in the junior courses in the study of mathematics contributes to better preparation of the student for solving mathematical problems in applications.

The future specialist understands that in solving research problems there is no need to simplify the mathematical model of a process or phenomenon in order to solve it in an accessible way or with the help of fewer calculations, since part of the work can be performed using professional mathematical packages. As a result of teaching mathematics, using mathematical packages, the student will be ready to solve some of the complex professional and applied problems using the intellectual capabilities of computer mathematics systems, without resorting to the help of a specialist mathematician, to have the skills of presenting research results in a visual graphical form, to be able to formulate research results in the form of reports.

The reflexive component of the mathematical competence of future specialists includes self - assessment of the personality, one's capabilities in using the mathematical apparatus in professional activity, the presence of an adequate level of self-esteem, an individual style of work using the mathematical apparatus. The formation of the reflective component of mathematical competence in the context of contextual learning seems to be the most effective when organizing the joint solution by students of practice-oriented problems.

The process of solving problems in mathematics can be controlled by joint solving problems: discussing the conditions of the problem, checking the correctness of building a model, determining methods for solving the problem, checking the solution obtained, finding errors in the solution [7]. This forms the ability to substantiate each stage of the solution using inference rules, to carry out direct and reverse checks of the algorithm for solving the problem. The organization of classes in mathematics and independent work of a student, taking into account the indicated possibilities of using vocationally-directed training, contributes to the formation of such a component of the reflective component as an individual style of professional activity.

Analyzing the possibilities of the technology of contextual learning in teaching mathematics, we note the following tasks of developing the mathematical competence of university students:

– increasing motivation to study mathematics and its application in future professional activities;

– improving knowledge of the applied foundations of mathematics used in professional activities;

– the creation of educational situations related to the future professional activities of students, where it is necessary to use mathematical methods and information technologies.

The use of contextual learning provides great opportunities for the development of the mathematical competence of future specialists.

Forming the mathematical competence of a specialist, we improve the quality of the mathematical and, therefore, professional education of the university graduate.

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ОҚУ ЖҰМЫСЫНДА МӘНМӘТІНДІК ОҚЫТУДЫ ҚОЛДАНУ

Аңдатпа. Мақала жас маманның кәсіби қалыптасуындағы мәнмәтіндік оқытудың мәні мен рөліне арналған. Мәнмәтіндік оқытуды студенттерді болашақ кәсіби қызметіне дайындау үшін қолдану, болашақ мамандардың математикалық құзыреттілігінің уәждік-құндылық, когнитивтік, әрекеттік және рефлексивті компоненттерін қалыптастыру арқылы математика курсының практикалық бағдарлылығының маңыздылығы қарастырылады.

*Түйінді сөздер***:** мәнмәтіндік оқыту, кәсіби құзыреттілік, практикаға бағдарланған есептер, математика курсы, компонент.

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ПРИМЕНЕНИЕ КОНТЕКСТНОГО ОБУЧЕНИЯ В УЧЕБНОЙ ДЕЯТЕЛЬНОСТИ

Аннотация. Статья посвящена проблеме сущности и роли контекстного обучения в профессиональном становлении будущего специалиста. Рассматриваются возможность применения контекстного обучения для подготовки студентов к будущей профессиональной деятельности, важность практико-ориентированной направленности курса математики посредством формирования мотивационно-ценностного, когнитивного, деятельностного и рефлексивного компонентов математической компетентности будущих специалистов.

Ключевые слова: контекстное обучение, профессиональная компетентность, практико-ориентированные задачи, курса математики, компонент.

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