

The problem and the current state of the formation of professional competence of engineering students

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Abstract. The role of physics in the formation of professional competence of the students of the engineering specialties and the methods for its implementation is discussed in the article.

1 Introduction

Today, improving the quality of engineering education is one of the main priorities of the state policy in the field of education, and the demand in the labor market, which reflects the need to train the highly qualified personnel. It is important to implement this in our country based on the effective training of future engineers for professional activities, ensuring the integration of higher education and production.

The entire process of training future engineers should be focused on the development of its main activity - various software projects.

The main aim of higher education is to train competitive and qualified personnel capable of producing and carrying out qualified, the efficient professional activities in the national economy [1]. Obviously, the quality of professional training of students of the engineering specialties should be considered from the point of view of the social order of professional training in the field of education. In order for the graduates of the technical universities (HEIs) to be in demand in the labor market, it is necessary not only to have highly specialized knowledge, but also to have individual personal qualities that correspond to the field of professional activity. Therefore, there is a need to develop models based on the application of the professional knowledge and skills in the professional activities of production in the technical universities, as well as the successful and effective solution of professional problems, the formation of the necessary personal qualities. Such models have blocks that describe components (indicators), such as purpose, content, process, and diagnostics.

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A modern engineer must adapt to the existing system of training bachelors of the technical sciences in all disciplines, competence, professional flexibility, the ability to replace that is, develop skills in a narrow field of science aimed at performing certain professional activities in their field. To solve this problem and improve skills, it is necessary to harmonize the needs of the labor market with the qualification requirements of the education system, as well as evaluate the results of changing the content of curricula based on the vocational education and intercultural competencies that are in demand on the labor market where the quality of education is compatible. The employers and teachers of higher education institutions generally agree that a future process engineer-technologist (of irrigation and melioration) should have a diploma that includes competence that characterizes his personal and professional qualities.

The results of training, according to the competency-based approach, are not only knowledge, skills and competencies, their generally accepted (traditional) figurative experience, but also the professional competence of a graduate of a technical university to be able to make production decisions in various professional situations, to demonstrate the personal qualities and required skills.

If the professional activity of each person can clearly reflect his requirements for the process of pedagogical education, then the task of the education system is to transform the knowledge, skills, and methods of engineering professional activity that future engineers need in their future work. In the research work of G.E. Karlybayeva, the information and the methodological support of physical education is activated by the integrative and didactic means (integrative resources, multimedia products, virtual laboratories, intellectual games, thinking, adaptation, comprehension, cognition), modularly in preparation for the pedagogical activity in physics, the possibilities of using technology have improved the issues of self-development, control, development which based on the dominant functions (fundamental, rigid, unchanging) of analytical methods [2].

The research work of N.M. Kuziev is devoted to solving the problem of elaborating a methodology for the development of technical thinking in the process of preparing students for professional activities in the technical universities, a model for the development of technical thinking of students of agricultural engineering and effective methods for its implementation [4.]

A.A. Nazarov considered the problems of improving the methodology for preparing students for an innovative engineering career through the integrated teaching of engineering methods and teaching methods in higher education, as well as a model that reflects the aims, content, methods, principles, forms and means of education in developing students' skills of innovative technology, for its solutions were carried out the scientific research [3].

The specifics of the competence-based approach in higher education and its content have been sufficiently studied in their research such scientists as E.F.Zeer, V.V.Pleshev, I.A.Zimnaya, Z.M.Maxmutova, S.A. Tatyanyenko, D.A. Ivanova, A.P. Tryapitsina.

2 Methods

From the analysis of the scientific research conducted by the above scientists-teachers, the following can be distinguished: firstly, the pedagogical research is not a description and the basis of the mechanisms for implementing the competency-based approach, but only the theoretical basis of the developed methodology; secondly, the scientific research in the

pedagogical, psychological-philosophical and scientific literature interprets such terms as competence, competency in different ways, and scientists define them in accordance with the content and aims of the educational process [1].

When analyzing the interpretations of the concepts of "competency" and "competence" in the context of the research, we rely on the following concepts in terms of content:

The competency is the ability or future readiness of future engineers to apply the totality of knowledge, skills, abilities, the methods of professional training necessary for the effective and high-quality use in production professional activities.

The competence is the acquisition of competencies, including the attitude of the individual to the subject of professional activity and its personal qualities and characteristics [5].

The competences are also studied in the scientific works of K.G. Mitrofanov, D.A. Ivanov and O.V. Sokolova, which gives the following definitions: "Competence is the ability of a person to perform any professional activity". "Competence is a sign that determines the professional and personal qualities of a person as a result of assessing the effectiveness of actions taken to solve important and significant professional tasks for society". In our research, we use this definition of competence.

Of course, the development of professional competence of a specialist (bachelor) (in our research, future specialists (bachelors) according to 5450600 -Irrigation systems of hydropower facilities: design engineers, hydro technologists is directly related to the solution of the technical problems and professionally oriented problems.

On the example of the National Research University "Tashkent Institute of Irrigation and Agricultural Mechanization Engineers", we give an example of the professional competencies that should be formed for graduates of the specialty "Hydropower constructions in the irrigation systems":

1. The formation of new ideas in the field of hydropower in the irrigation systems and the organization of professional activities;
2. The ability to use effectively the acquired knowledge in the professional activities.

Therefore, the content of educational activities should be aimed at the formation of scientific knowledge, professional skills and qualities necessary for a future hydraulic engineer when performing the physical tasks.

The formation of professional competence is determined by the effectiveness of the implementation of skills and abilities in the process of professional activity of a specialist in accordance with the requirements of professional qualifications. The acquisition of knowledge and skills in a competency involves the rejection of the traditional approach and, in addition, specific knowledge, skills and abilities. At the same time, the competent specialist is considered to be a component of behavior, effective performance of work, obtaining new information, analysis, and decision-making.

In our research, the field of irrigation systems is interpreted as the professional competence of a future engineering student, his ability effectively to apply the knowledge, skills, abilities and practices of professional activity or readiness for the professional activity. However, when solving the professional problems, professional activities should be carried out independently and collectively. However, it is important to evaluate the results of your professional activities, to identify and correct errors in a timely manner.

There are also authors who interpret the professional competence as a good knowledge of one or another subject of professional activity. He is quoted in the special science lessons.

The professional communication or communicative competency plays an important role in professional activity. The competence of personal qualities and attributes also plays an important role in professional competence.

The features of the potential and professional activity of the hydraulic engineer (bachelor) specialist can express the main indicators of professional competence. This approach will

help to model the current areas of professional activity of future irrigation systems specialists in the educational process [6].

The competence and the results of teaching are seen as the integration of the graduate "model" as the main aim in the implementation of the SES of higher education. The competent model of a graduate, on the one hand, covers his future professional activity and skills related to the objects of labor, on the other hand, reflects the requirements of interdisciplinary integration to the results of education.

It is important to change the knowledge approach in educational standards from a competence approach and to carry out professional activities in these disciplines. N.N. Tulkibaeva considers the professional competence as an integral part of a specialist, defining it as the ability to effectively carry out the professional activities and readiness for professional activities.

The particular importance is the professional training of bachelors of future technical universities in physics, as well as the formation of their readiness to fulfill their professional duties related to engineering. The professional competence plays an important role in preparing future engineers for the professional activities.

The professional competence, specified in the state educational standard of higher engineering education, should be formed with the help of mathematical and natural sciences, general, specialized and special educational sciences [8]. At the same time, each of the disciplines contributes to the development of professionally significant skills and competencies that contribute to the formation of professional competence.

The irrigation systems have a high potential and great socio-practical importance in physics as a natural science for the development of professional competence of future students of technical specialties; physics as a subject of study carries out a wide range of educational and scientific activities of future engineers; the content of physical education is focused on engineering; knowledge and skills acquired in physics can be widely used in professional activities.

All of the above confirms that the teaching of physics in the technical universities can contribute to the formation of the professional competence of future engineers.

The problem of developing professional competence in the bachelor's degree program "Hydropower construction in the irrigation systems" is fully reflected in the research works of V.A.Bolotov, E.F.Zeer, IA Zimnyaya, A.V.Khutorsky. Based on the analysis of the research work of the above-mentioned scientists, it can be concluded that competencies are mainly formed in the process of teaching and its subsequent competencies necessary for it are developed in the professional activity. In addition, the level of professional training of future engineers largely determines the effectiveness of the competency development process.

3 Conclusion

Analyzing the pedagogical, psychological, philosophical and the scientific literature, dissertation researches, the practice of the technical universities, we can conclude that the problem of forming the professional competence of future engineers in the process of teaching physics is the subject of the research. This allows you to point out the following problems:

- lack of interdisciplinary integrated teaching of physics;
- the needs of the employer are not taken into account when forming the professional competence of engineering students;
- reduction of classroom hours in physics in recent years due to the transition to the credit system of higher education;

- incomplete information and didactic support for interdisciplinary integrated teaching of physics [7].

The success of mastering general educational and special disciplines is determined largely by the quality of the professional training of the future engineer, the maturity of his professional competence. It is through the integration of these disciplines in the teaching of physics that professional competence is formed.

The state educational standards allow higher educational institutions to determine the direction of training for each student in the development of the main educational program and gain the knowledge necessary for postgraduate professional and personal growth.

Summarizing the above, we can conclude that the pedagogical problem of forming the professional competence of graduates of irrigation and drainage specialties, on the one hand, is in determining the composition and content of professional competence with an appropriate bachelor's degree and meeting the requirements of the world market, in the search and implementation of pedagogical technologies.

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