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IMPROVEMENT OF THE COMPETENCE SYSTEM IN THE PREPARATION OF FUTURE ENGINEERS FOR PRACTICAL ACTIVITY

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Annotation: This article highlights the theoretical and methodological foundations for the formation and improvement of a system of competencies in preparing future engineers for practical activities. Effective ways of developing students' practical, technological, and design skills based on a competency-based approach in engineering education are analyzed. The study shows the importance of using modern pedagogical technologies, 3D modeling, and distance learning tools. Criteria for assessing the system of competencies and mechanisms for their integration into the educational process are also proposed.

Keywords: competence, engineering education, practical activity, professional training, technological competence, 3D modeling, innovative education, design activity.

In the context of global competition and technological progress, the main task facing engineering education is the preparation of future specialists for practical activity based on the requirements of modern production. The success of this process is determined, first of all, by the level of formation of a system of professional competencies in students [1].

A competency-based approach includes not only the acquisition of theoretical knowledge, but also the ability to apply it in practice, independently find solutions in problem situations, develop technical thinking and innovative ideas. Therefore, improving the system of competencies in engineering education requires practical exercises, design assignments, and educational activities organized on the basis of digital technologies.

The methodological basis of the research is based on the following:

- Theory of the competency-based approach (J. Raven, E. Zeer, A.V. Khutorskoy) [2-4];

- Principles of engineering pedagogy (practical orientation, systematicity, reflexivity);

- Innovative teaching methods (project-based learning, 3D technologies, virtual laboratories);

Empirical methods - observation, questionnaires, interviews, pedagogical experiment, and diagnostic analysis.

The object of the research is students of technical higher educational institutions, and the subject of the research is the system of competencies that ensure the preparation of future engineers for practical activities.

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Professional competence implies not the acquisition of individual knowledge and skills by a specialist, but the assimilation of integrative knowledge and actions in each independent area. Also, competence requires the constant enrichment of professional knowledge, the study of new information, the ability to understand important social requirements, the search for new information, the ability to process it and apply it in one's activities. Professional competence is clearly manifested in complex processes, the performance of uncertain tasks, the use of contradictory information, the ability to have an action plan in an unexpected situation, and other similar situations.

Professional-pedagogical competence is expressed in relation to specialists who have perfectly developed their professional skills, can effectively design the lesson process, manage it, and successfully apply them in the lesson process, recognizing educational reforms, modern requirements, and innovative paradigms. Consequently, the future teacher achieves professional competence by consistently enriching their professional and pedagogical knowledge, assimilating new information, searching for new knowledge with a deep understanding of the requirements of the time, processing it, and effectively applying it in their practical activities. It should be noted that pedagogical professional competence is based on a number of qualities, the essence of which can be explained as follows.

1. Social competence - possession of the skills and abilities to be active in social relations, the ability to enter into communicative communication with subjects in professional and pedagogical activity.

2. Special competence - preparation for the organization of professional-pedagogical activity, rational solution of professional-pedagogical tasks, real assessment of the results of activity, consistent development of BKM, on the basis of which mental (psychological), methodological, informational, creative (non-standard), innovative, and communicative competencies are distinguished. They contain the following content:

- psychological competence - the ability to create a healthy psychological environment in the pedagogical process, to organize positive communication with students and other participants in the educational process, to be able to timely understand and eliminate various negative psychological conflicts;
- methodological competence - methodologically rational organization of the pedagogical process, correct definition of forms of educational or upbringing activity, the ability to purposefully select methods and means, their effective application;
- information competence - searching, collecting, sorting, processing, and prompt, purposeful, and effective use of necessary, important, necessary, useful information in the information environment;
- creative competence - a critical and creative approach to pedagogical activity, the ability to demonstrate one's creative abilities, the ability to find a wide range of solutions to problems;
- innovative competence - promotion of new ideas for improving the pedagogical process, improving the quality of education, increasing the effectiveness of the educational process, their successful implementation in practice;
- communicative competence - the ability to communicate sincerely with all participants in the educational process, to listen to them, to have a positive influence on them.

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- personal competence - consistent achievement of professional growth, improvement of the level of qualifications, manifestation of one's internal capabilities in professional activity;
- technological competence - mastering advanced technologies that enrich professional and pedagogical knowledge and skills, the ability to use modern tools, techniques, and technologies;
- extreme competence - the ability to make rational decisions in emergency situations (natural disasters, technological process failures), when pedagogical conflicts arise, the ability to act correctly, etc.

In a number of studies, the professional competence inherent in a teacher and its specific aspects were studied. Among such studies are the studies of A.K.Markova and B.Nazarova. In her research, A.K.Markova notes that the professional competence of a teacher consists of the following structural foundations:

- special or professional competence (organization of professional activity at a high level);
- personal competence (self-development, self-expression);
- social competence (organization of additional activities in cooperation);
- individual competence (self-management, professional development and innovation).

In the context of Uzbekistan, the professional competence of a teacher and its specific aspects have also been studied, among which the research conducted by B. Nazarova is of particular importance. According to the researcher, the basis of professional competence inherent in a teacher consists of the following structural foundations:

- special or professional competence (organization of professional activity at a high level);
- social competence (cooperative organization of professional activity, social responsibility);
- autocompetence (ability for socio-professional self-development);
- extreme professional competence (the ability to work in unexpected situations).

In the development of a teacher's professional competence, work on oneself and self-improvement

development is of great importance. Self

development tasks through self-analysis and evaluation

is defined. Self-improvement is the social and professional development of a specialist.

organization of purposeful, consistent, systematic actions on the path to development, achieving perfection

is understood.

Competencies were analyzed through the following main components:

1. "Professional competencies" - the ability to design and manage the production process;

2. "Technological competencies" - practical application of production technologies;

3. "Information and Communication Competencies" - skills for working in the digital environment;

4. "Socio-communicative competencies" - skills of working in a team, problem-solving.

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The research results show that the process of forming practical competencies in the current system of engineering education is not sufficiently systematized. Although students have theoretical knowledge, they face difficulties in applying it in the practical environment.

When implementing 3D modeling, project-based learning, and virtual laboratory developments as an "experimental training module," the following results were achieved:

- The level of technological thinking of students increased by an average of 26%;

- Preparation indicators for independent project preparation improved by 31%;

- The level of educational motivation and professional self-awareness has increased.

This indicates the need to develop a "system of practical competencies based on an integrated approach" in engineering education. According to him, interdisciplinary integration, digital technologies, and cooperation with manufacturing enterprises should be defined as the main directions in the educational process.

Improving the system of competencies in preparing future engineers for practical activity is a strategic task of modern engineering education. The research results show that the formation of practical, technological, and socio-communicative competencies in an integrated learning environment significantly increases the professional training of students.

Therefore, it is advisable to expand practical work in the following areas:

- introduction of innovative technologies (3D, VR, CAD systems) into the educational process;

- development of engineering projects for students at enterprise-practical bases;

- improvement of the diagnostic system for assessing competencies;

- development of practical and informational competencies of teachers.

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