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METHODS OF FORMING AND DEVELOPING SKILLS RELATED TO TECHNICAL MECHANICS IN ENGINEERING STUDENTS

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ABSTRACT	KEYWORDS
Modeling is important at the current stage of educational development. As a result of the radical change of educational paradigms, new requirements for modeling innovative pedagogical systems appear.	

Introduction

The importance of "modeling" in the practice of pedagogy describes the meaningful side of educational activity and reflects the innovations in the goals, tools, methods and forms of activity. In this case, modeling serves as a special and unique type of pedagogical activity closely related to scientific research, diagnosis, design, planning, programming, and social management. Pedagogical system modeling includes first of all advanced ideas, that is, in the form of a model, and then the purposeful creation of new pedagogical, didactic, methodological and technological educational systems. In this case, it is necessary not only to study the existing experience, but also to create something that does not yet exist based on theoretical research.

Model:

- a specific type of project;
- some "ideal" model to which other objects of this type are copied;
- it is understood as the material processing of the object, regardless of its purpose.

The model in the educational system performs the following functions:

- practical - when using the practical important features of the reproducible object;
- about knowledge - when the object performs educational functions (for example, layouts, diagrams, tables, pictures), ensuring the success of mastering ready-made knowledge;
- research - the object is modeled in order to obtain new values.

Solving the following pedagogical tasks:

- development of pedagogical theories and concepts, if its direct research is limited due to the current level of knowledge and practice;
- explanation of collected evidence and laws;
- estimate the condition of the object in the future;
- to determine the quantitative and qualitative characteristics of the classification of the object;
- verification of technical or other proposed conditions;

- models are used to construct scientific theories [Markova C.M.].

Based on the qualification requirements of the state educational standard, based on the variety of approaches and principles in pedagogical science, the theoretical and experimental studies conducted by the researcher allowed the future specialist to develop a model of the process of formation and development of practical knowledge in the teaching of technical mechanics in technical specialties.

Creating a model of the process of formation of practical knowledge among students of technical specialties in the teaching of mechanics, in particular, V.I. Andreev, I. Ya. Lerner, M.I. Makhmutov, M.N. Skatkin, A.V. Khutorskoy's research work allows the concept of problem-based heuristic education to determine the integrity of the studied model, to determine the mechanisms that ensure this integrity, to find various connections and to bring them into a single integrated view.

The form of the model was obtained by focusing on some dissertation research works, processed and adapted to this research work [8, 14b]. An active approach to the process of formation and development of practical knowledge among students of higher educational institutions in the teaching of mechanics is directed to the formation of practical knowledge and skills related to technology with active, professional activity in the future, understanding of identity as a subject in new technical and economic conditions.

From the point of view of the active approach, the model considered in this research work is the internal unity of the structures created by the set of goals, the integrated form characterized by the integrated content, forms, methods, educational tools, aimed at the socialization of the individual, aimed at the formation and development of practical knowledge of the students of higher educational institutions in the teaching of mechanics. The structural elements of the model of the process of formation of practical knowledge among students of higher educational institutions in the teaching of mechanics include the following: goals, principles, functions, content, forms, methods, teaching tools and results.

The goal of strengthening the basic model of the process of formation of practical knowledge among students of higher educational institutions in the teaching of mechanics is as follows:

- formation of practical knowledge;
- formation of technical thinking;
- preparation for future professional activities.

The objective component predicts the development of functions of formation of practical knowledge in the educational activities of students (teaching, development, upbringing, professional). The following didactic principles were used in this research work to develop the content of practical skills formation in teaching technical mechanics to future specialists-students:

- scientific research involving the study of basic laws, concepts, and categories based on educational activities;
- systematicity achieved by developing and implementing a comprehensive approach that covers all types of classroom and non-auditory training;
- where each new knowledge is based on the previous one and derives from it;
- sequence, which consists in planning the content of formation of practical knowledge and skills among students, and each new knowledge develops according to the direction based on the previous one and derived from it;
- use of discussions, possible solutions of psychological and pedagogical situations, research tasks, problems, etc. k. provided by activating education through.;

- the theory of the connection between theory and practice, which consists of combining theoretical knowledge with real research activities in laboratory - practical training, extracurricular and independent work;
- depends on the suitability of students' age and their special characteristics.

The component content of the model includes two additional elements: a set of real normative knowledge in accordance with the qualification requirements of the State Education Standard of higher education institutions; includes changes of socially significant standards as a source of future technology formation in the form of self-development.

Systematization of the knowledge and skills acquired in the course of studying mechanics (practical mechanics, technical mechanics) is aimed at mastering the stages of composition and tasks at an understandable level; it is necessary to implement the acquired practical knowledge and skills in the order of professional activity.

The model also includes an organizational and management component, which implies a dialectical correspondence between the self-management functions of the pedagogue and the student, the goals and essence of providing educational material. That is, the main components: the type of management, the type of information process, knowledge - the activity is characterized by the types of information management transfer tools. The organizational and management component requires the introduction of reasonable forms, methods and tools to study and manage the process of formation of practical knowledge in the study of mechanics.

The optimal combination of methods plays an important role in the educational process. Thus, various teaching methods connect all types of sensory perception to the acquisition of knowledge - sight and hearing, which makes perception more effective, ensures active perception of educational material by students with different types of memory and mental activity, activates cognitive activity of students, learning material allows to take into account the specific characteristics of various departments in a positive way, helps to develop students' abilities in the best way [4, 13, 29]. In the introduction to the definitions of the teaching method, it is noted that the teaching method is a system of actions of the pedagogue, which forms the student's practical and knowledge activities, which leads to the steady mastering of the teaching content [9].

Within the optimization of the educational process, the main attention is paid to the problem of choosing the optimal combination of teaching methods [10]. According to it, it is emphasized that it is necessary to perform a number of steps that are intermediate decisions when choosing teaching methods:

- making a decision on a rational combination of oral, demonstrative and practical methods; on the combination of methods of management of pedagogues and independent work of students; on the combination of methods of promotion and promotion of education; control and self-management methods;
- to determine the dominant combination of methods for this stage of training;
- to come up with backup options for combining methods.

Optimal implementation of the educational process includes the collective use of methods and educational tools through their rational combination. In the educational process of formation and development of practical knowledge among students of technical specialties in the teaching of mechanics, the following are used in this research work: oral (explanation, lecture, conversation,

discussion, etc.), demonstration (demonstration, etc.). (problem solving, calculation-graphic work, etc.) methods were used. Explanation method: deductive conclusion, problem statement, partial research method. Processing methods such as step-by-step development of the material using test tasks, independent work of students under the guidance of the pedagogue are used.

The formation of practical knowledge and skills among students of higher education institutions for teaching mechanics is carried out using a set of developed methods and training manuals. It is used in accordance with the organizational forms of training, taking into account the educational goals and the characteristics of the content of a certain block. The educational process should be organized in such a way that students can work individually, in groups, and collectively, depending on the complexity of the task. For this, it is necessary to use different forms of teaching: individual (publications, lectures, theses, presentations, etc.), group (practical training, etc.) and collective (seminars, conferences, debates, etc.).

Another component of the model of the process of formation of practical knowledge among students of higher education institutions - the consistency of the content and effectiveness of the process of goal achievement through planning - an effective evaluation component that works as a result of training: a selected organizational structure that includes a combination of activities for monitoring, analyzing, and making corrections to its results and management tools. The implementation of an integrated approach to the educational process helps the successful formation of practical knowledge among students of technical specialties in the teaching of mechanics. This includes engaging students in creative activities throughout the academic period. For example, the use of modern computer technologies (presentations, publications, etc.), stimulating the activity of students to achieve the goal - forms a positive motivation to study and learn [5, p. 83].

Improving the educational activity of students and turning it into a continuous dynamic process of formation of practical knowledge and skills in the process of learning mechanics is considered as a promising goal of the studied model. Thus, when the special course "Practical Mechanics" is included in the educational field of mechanics based on the framework of the structured model of the process of formation and development of practical knowledge among students in the teaching of mechanics in higher educational institutions, the formation of practical knowledge among students of higher education occurs step by step, that is, the special course is technical mechanics is the basis for learning, and the practical knowledge formed during the study of technical mechanics is the basis for further training of students in special subjects.

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