

CREATION OF NEW GENERATION TEXTBOOKS FOR TECHNICAL EDUCATIONAL INSTITUTIONS BASED ON INNOVATIVE TECHNOLOGIES

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ABSTRACT

A brief comparative analysis of educational and methodological support in the framework of modules of traditional and innovative training and the need for further improvement of the technology for creating new generation textbooks in the subjects “Technical Mechanics” and “Material Resistance” are considered.

Keywords: Educational materials of a new generation, pedagogical technologies, educational technologies, didactics, model, competence, design, diagram.

INTRODUCTION, LITERATURE REVIEW AND DISCUSSION

Reform of education is impossible without reform of the entire social system, without changing the economic, political and moral principles of society.

The main aspect of the education sphere is, firstly, the social process of transferring knowledge and experience from generation to generation, secondly, the individual process of assimilation and development of universal knowledge and experience, and thirdly, the acquisition of the character of a continuous, ongoing process.

The modern stage of scientific and technological progress is characterized by the dynamism of ideas and solutions to problems that require a creative approach to engineering activities related to the creation of new equipment, unique structures, improvement of technology and scientific organization of labor, and adoption of operational decisions.

The importance and relevance of the problem of training an engineer of any specialty is directly related to the design and calculation of specific parameters and sizes of elements of certain structures, such as details of mechanisms and machines, building structures, bridges, tunnels, etc. Naturally, for these engineering disciplines, the resistance of materials is one of the classic and important subjects, which is the engineering alphabet that underlies the solutions to many special engineering problems.

The results of the training on the resistance of materials are the acquired knowledge, skills, and mastered competencies. At the same time, competence in the resistance of materials is understood as the ability to apply knowledge, skills and personal qualities for calculating and constructing rods, shafts, beams that are elements of an engineering structure, parts of mechanisms and machines for strength, rigidity and stability [1, 2]. In addition, competency is determined by the target guidelines for training specialists, the implementation of which should ensure that graduates are in demand and the importance of acquired knowledge outside the field of education, and, therefore, competitiveness in the global labor market.

The main contradiction in the modernization of both the general education system and the engineering and vocational training system for qualified, competitive personnel is the contradiction between the fast "spasmodic" rate of knowledge growth in the modern world and the limited possibilities for their assimilation by an individual. This contradiction requires a modern pedagogical approach, i.e. abandon the ideally "comprehensively developed personality" and go to "self-education". Therefore, innovative education is needed, the essence of which is a paradigm shift, a new pedagogy, new educational processes, new technologies.

The priorities of the new educational paradigm are orientation to the interests of personality development, the fundamental nature and integrity of education.

The new paradigm of vocational education has identified the need for the development of a pedagogical and psychological system for organizing educational and cognitive activities of students, which should not only rely on innovative achievements in this field of knowledge, skills and mastered competencies, but also be technological, allowing the transition from teaching to self-learning.

New information technologies of general education and vocational education can significantly increase the speed of information delivery, the speed and intensity of perception, understanding and deep assimilation of vast amounts of knowledge, skills and competencies necessary for students to carry out activities [3].

In the preparation of highly qualified, competitive personnel in engineering areas that meet the modern requirements of new generation specialists with a high level of professionalism and competence, creative thinking, a deep understanding of the importance of their production and social activities, wide-scale informatization and computerization of education is necessary, which, based on new information technologies, allows radically improve the organization of the process of cognition.

Innovative training technology based on computer and telecommunication systems will provide wide access to professional education, increase the productivity of the educational process.

A scientific analysis of the state of affairs of the informatization of vocational education in practice shows that in this education system program products are usually of high technological quality, but the methodology for presenting educational and cognitive material requires appropriate scientific research. In this case, it is necessary to take into account the importance of educational computer products that characterize three interrelated components of cognitive activity: reading educational texts, viewing dynamic illustrations, when ACT means demonstrate the dynamics of a phenomenon or process (the so-called virtual experimental laboratory studies of the physical, mechanical and technological properties of structural materials, subjected to various static and dynamic effects) and the performance of computer testing ENTVO.

Comparative results of scientific analysis, the main goals, content, methodology for the provision of educational materials, which are the main component of the complex educational and methodological support (textbooks, teaching aids and educational and methodological developments) within the framework of traditional and innovative teaching modules are given in table 1.

**The main components of the complex educational and methodological supplies
(for example, items “Resistance of materials” and “Technical mechanics”)**

№	The nature of the complex educational and methodological support	
	<i>in traditional learning</i>	<i>with innovative learning</i>
1	Based on memorization and reproduction	Information occurs in an active mode and enhancing students' cognitive activity is achieved through co-creation and cooperation.
2	Aimed to give only certain knowledge, ignores the requirements of student activity training. Do not allow students to implement certain practical actions, such as computer modeling of professional, managerial and other situations, performing graphic design work, course and diploma design, available in the classroom.	It contains computer support technologies for organizing productive cognitive activities of students, which significantly increase the motivation and quality of training. At the same time, the methodological part contains the necessary didactic blocks, which combine the basic educational information, methods of studying and deepening it, self-monitoring and self-assessment of knowledge and competencies, as well as methods of automated monitoring and analysis of the results of final and current control.
3	The reproductive type of training, as the cognitive activity of educators is reduced to the assimilation of ready-made knowledge (listening and taking notes of lecture materials, solving typical problems, performing template laboratory experiments, etc.). It does not stimulate the independence of students, as a result of which the meaning and goals of cognitive activity are not formed	A creatively productive type of training is brought to the forefront when a student is engaged in search activities for the assimilation of new educational technologies, solving problem problems, developing non-standard thinking (for example, during the preparation of an olympiad or competitions, completing a training task in the framework of well-educated formations to study the dynamics and stability of structural elements , with statically undefined uncertainties, etc.).
4	The structure is built on the principle of a monograph, which does not make it possible for a person-oriented one, aiming at providing conditions for the development of intellectual abilities and personal qualities of students, the formation of meta-knowledge and enrichment of their mental experience, etc.	A dialogue style of communication with a student is used, for example, it is proposed to draw up a statement of the problem, find an algorithm for solving a learning problem, participate in computer didactic training, etc. At the same time, the variety of forms and means of instruction used makes it possible to appeal not only to intellect, but also to the feelings of students.
5	The uniformity of a model textbook limits the possibility of individual learning interests	Training materials are differentiated by difficulty levels to allow everyone to make a choice.
6	Learning texts are overloaded with background and illustrative material.	The principles of mastering the competence of mechanics are used: modeling processes and phenomena, a combination of fundamental, polytechnical, economic and

		environmental entities, a combination of traditional and innovative modules.
7	For general education, there is no methodological “docking” in continuing education.	Repetition blocks included, problematic, additional, expanding the scope of the standard program.
8	The training materials consist of three-component classical educational information: paragraphs, questions, exercises, tasks.	Multicomponent, which allows to include, in addition to educational information, two components: didactic innovations, new information technologies.

The practical significance of the study lies in the fact that the proposed methodology for comparative scientific analysis of the main components of the complex educational and methodological support in the framework of modules of traditional and innovative training are:

1. The elimination of these contradictions is possible by creating a new generation of educational literature based on innovative didactic technologies, including computer technology, which, in turn, will provide conditions for the modernization of both the general education system and the professional training system.

2. Considering the integration features, three components: educational information, didactic innovations, new information technologies according to the mechanism: “information + innovative didactics + computer”, educational literature with computer support using Math CAD was created in the educational materials of the new generation [4, 5, 6].

3. Combining the book with the use of the educational and computational program Math CAD in determining the internal forces of structural elements and plotting them using computer technology and the Internet, creates the conditions for effective independent work of the student and student in the development of subject content.

4. As a result of the introduction of new technologies, the learning process turns into a joint activity of the teacher and students, that is, the emphasis is shifted from the information-teaching activities of the faculty to the cognitive activity of the student.

5. A comprehensive concept for introducing the didactic process of the university with new teaching technologies ("Debate", "Critical Thinking", "Case Methods") allows you to provide an individual form of training; individualization of training, in turn, provides significant advantages, since it allows you to take into account the systemic quality of the personality and its activities, including a combination of psychological mechanisms for the perception of educational materials, processing, memorizing information inherent only to a particular student.

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