Development of technical competence of the students - future engineers in the application of electronic manual

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Abstract - In education of the students - future engineers need to focus on the development of their technical competence. It is important to form in the mind of the teachers and students a new perspective on the concept of “technical competence”, because now the competence is more than knowledge and skills in any area of study or profession. Keywords - education, students, technical competence, electronic manual.

To form the technical competencies should intensify development in the future specialist training for new content, but based on the local traditions of humanistic thinking. It must be based on the updated content of general and vocational education, on the self-development of technical skills of the students through the usage of e-learning. This will provide an opportunity for students as future engineers to assimilate concepts and positions of technical sciences, culture and technology, equip them with new knowledge in an infinitely renewing life. The society has set a modern educational institution the task of preparing the intellectual, professional and competitive mobile specialist with the necessary competencies. Particular types of future professional activity define the content of the educational and professional program developed by the university. The students - the future engineer must understand the value of technical skills as one of the leading professional values - the basis of self-identity, the development needs of application techniques in the future professional activities, formation of motivation to achieve professional success, the presence of reflection in self-development, etc.[4] The student needs knowledge of mathematics and computer science, knowledge of physics, biology and ecology, knowledge of special subjects.

The student also needs his own technical competence: to be able to choose the optimal design solutions; to apply laboratory diagnostic techniques; to use basic species, specific, the principles of engineering structures; to apply the fundamentals and modern production technology, to apply the methods of feasibility studies and evaluation of design decisions, to use the laws and to design methods, to apply knowledge of physical, operational, technical and aesthetic properties of the materials, to read and to depict drawings structures (including computer), to identify the causes of deterioration of materials, etc. Then, based on the structure of technical competencies, we can provide the following indicators and criteria for their development.

Indicators: 1) the availability of technical expertise 2) the formation of the technical skills 3) the priority value orientations to study at a technical college and the application of technical skills in their future professional activities, etc. 4) the presence of the needs and motivations for self-development of technical skills5) developed technical ability.

Criteria: 1) consistency, depth, volume, strength of technical knowledge 2) the effective application of technical skills and knowledge in a typical, modified and creative situation 3) a specific structure of value orientations 4) an interest in the learning process: expressed the need for training in technical college, high motivation in the study and application of technical knowledge5) the systematic technical thinking: predictive intelligence, technology transfer and integration of knowledge, reflection, rolled operations in solving technical problems, etc.

The sense of development of the technical skills of students can be seen in the fact that, first of all, to make significant process of self-discovery in the study of technical disciplines. Then the basic principles of the development of technical skills of students - future engineers are the principle of self-development, reflection, integration principle, and the principle of systems, complexity, and the principle of cultural studies. We can imagine the didactic model of the development of technical skills of students through the usage of e-learning (Figure 1). In this case, the tasks associated with the development of technical skills cannot be viewed in isolation from the general objectives education and training. The solution of problems related to the
development of technical competencies is particularly effective through the integration of academic disciplines due to the achievements of scientific and technological progress, as well as due to the widespread introduction of information technology training in the higher school.

The development of technical competencies expediently carries out with the help of physics, computer science and other technical disciplines. One of the main tools of the modern educational process can become a computer. Therefore, an important trend in the usage of electronic media in education is to provide training courses with computer support and modular e-books included in a single training complex.

The use of computer technology in education must comply with the following principles: adequacy, use of the computer as a tool for learning, self-reliance in the application of computer-based study material, systematic [7].

The main means of student learning can be an electronic manual, which must comply with certain requirements and include a number of components. An informative text should be short enough and clear. For convenient moving your eyes on the text it is necessary to apply the mechanism of hyperlinks. The mechanism for hyperlinks can be used to access Internet sites. For substantiation and illustrating of theoretical material to students is very important its experimental verification. The most important condition is the presence in each electronic textbook monitoring program. Monitoring program for assessing the level of mastery of the material, in distance learning educational discipline may, upon request of the student to offer him a series of questions of the studied section. Answers to questions can be obtained in various ways, one of the responses, the construction of the proposed elements of the response, indicating the connection with the proposed answers by entering a numeric or text response.

It should be remembered that, in assessing the general level of readiness cannot be guided by the average student, it must be used a differentiated approach [8]. The final evaluation may be indicated after the pilot control the level of development of students. After answering the test questions the program should allow the student to see in what areas he was wrong (but without specifying the correct answer to it again carefully studied the material and he figured out his mistake), and expose him to assess. Such principles of the usage of e-books will intensify the training of students between sessions, as they provide students with more independence and self-development, provide an opportunity to significantly outperform the standard training process.

References