

# Development Of Professional Competences of Students in Technical Field Based on Software Tools

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**Abstract.** The article provides feedback on the development of professional competencies of students of technical universities. Recommendations for the use of software in the development of professional competencies are given. The capabilities of a number of software tools and the benefits of using them have been compared.

**Keywords:** professional competence, software, model, graphic editor.

Using new electronic software tools, such as 3D graphics programs (AutoCAD, Sketch up, Sweet Home 3D, Blended and NanoCAD), it is advisable to understand complex phenomena and develop scientific recommendations, process observations, mathematical or descriptive models of events. Research conducted in research institutes on educational technologies has shown that the use of electronic software tools in the educational process resulting from the classical scheme of full-time education and the ongoing process, students develop a relatively complete knowledge and understanding of the subject. For example, the Internet is characterized by a single theoretical model during the training. So it has to be, and it is a unique method of science, and different processes can be described by a single theoretical model.

Let's look at the components of the pedagogical model:

- the goal is an effort to improve the professional training of students;
- content is a system of knowledge, skills and abilities, the acquisition of which lays the foundation for the development and formation of the individual;
- educational content - is determined by the curriculum, state standards and curricula. Taking into account the tasks set by the teacher, the content of individual topics indicates the need to reflect the specifics of the industrial and social environment of the educational institution, the level of training, the interests of students. The study of each subject involves the acquisition of knowledge and the formation of certain skills and competencies. In the process of training, general scientific and intellectual skills related to the ways of working with different sources of knowledge, the methods of studying the material are also formed.

It is necessary to find an answer to the traditional didactic question of "How to teach?", which leads us to the category of teaching methods. Without methods, it is impossible to achieve the set goal, to implement the intended content, to fill the

training session with cognitive activities. The method is the core of the learning process, the link between the projected goal and the end result. We have a concept that defines the system “goal-content-method-form-teaching aids”.

Method (from the Greek *metodos* – way, means method) – determines the way to achieve the goals and objectives of education. Yu.K.Babansky defines the method of teaching as a method of orderly interaction of teachers and students, measures aimed at solving the problems of education, upbringing and development in the learning process. Teaching methods are one of the most important components of the learning process. Without appropriate methods of activity, it is not possible to achieve the goals and objectives of teaching and to achieve the mastery of a certain content of teaching material by students. According to Yu.K.Babansky, each method can be thought of as a set of methodological methods. At this stage, the methods are defined as a set of methodological methods that provide solutions to learning tasks. This definition is correct, as the aspect considered does not yet reveal the activity-based nature of teaching methods, and therefore initially defined teaching methods as ways of interaction between teacher and students to achieve learning goals. However, the above does not diminish the usefulness of identifying those methodological methods that make up any method in each specific case.

Forms of organization of education are an external expression of the coordinated activities of teachers and students. It is done in the prescribed manner and in a certain mode. Forms of organization of education reflect the need to unite students in lessons organized by the teacher, in the process of which educational activities are carried out. They are socially conditioned, regulate the joint activities of the teacher and the student, determine the ratio of individual and group teaching, the level of activity of students in cognitive activities and its management by the teacher.

The tool is a subjective provision of the learning process. Tools are the teacher’s voice (speech), his or her broader skills, textbooks, classroom equipment, computer technology, software products. Modeling is a multidimensional research method widely used in pedagogy. It really involves the study of existing pedagogical phenomena, processes, systems. Given the complexity and variability of pedagogical processes, modeling aims to:

- on the one hand, to show the current state of the pedagogical problem;
- identification of the most specific contradictions in the professional training of students of technical specialties;
- on the other hand, identifies development trends and factors that help to find optimal solutions to non-pedagogical problems and defines the model as one of the outcomes of the lesson modeling process.

In any pedagogical research, the practical value of the model is determined mainly by its adequacy to the studied aspects of the object, as well as the basic principles of modeling (appearance, accuracy, objectivity) are taken into account in the stages of model construction:

- is to create a quality model of the object under consideration and to build its model.

The model of professional activity of students of technical specialties using electronic software tools should reflect the generality and integrity of all elements of this process, show the way of their activity and interaction. The model of professional activity of students of technical specialties by means of new electronic software is represented in this research by means of five interrelated blocks:

- procedural;
- systematic and reasonable;
- step by step;
- a block of important professional qualities;
- criterion block.

Describing the procedural block of the model, it is important to note that the dialectic of relationships and interrelationships in the student-teacher system is the central link in the whole pedagogical process. The pedagogical concepts that develop the modern personality are based on the joint activity of teachers and the joint solution of the educational task is carried out, there is a gradual division of activities. Technological, didactic, psychological, content, structural and others. By mastering the norms and methods of solving the tasks set in such an activity, students occupy an increasing part of it until they can solve the problem independently. The focus of the teacher's work with such a structure shifts to organizing and developing collaborative activities in incorporating the subject content, in particular, creating and reinforcing the overall semantic background. Thus, the process of professional activity of students of technical specialties at the university should be considered by the teacher as a multifaceted and mutually contradictory activity of students and teachers aimed at the selection, systematization and presentation of educational information; comprehension, understanding, processing and assimilation of this information by students; organization of independent, conscious, mental, active, purposeful and effective activity of each student by the teacher on the acquisition and use of educational information. Comprehensive, systematic accounting of all aspects of the educational process, based on the position of a systematic approach to pedagogy, allowed to identify ways to solve the main task of our research work and increase the efficiency of professional activities of students of technical specialties through new electronic software.

System-forming components of the process of professional training of students of technical specialties:

- target component that reflects the awareness of teachers and students of the goals and objectives of professional training;
- a content component that reveals the content of the professional activities of students of technical specialties;
- an integral part of the activity that directly reflects the procedural essence of professional training of future specialists;

- the assessment and performance component, which includes teacher evaluation and student self-assessment of learning outcomes, to determine the appropriateness of vocational training tasks, identify the causes of identified negative outcomes, and design to address identified gaps in knowledge and skills.

The purpose of preparing students for the profession is to form a high level of professional readiness of students of future technical specialties. 3D modeling is a very popular, evolving and multifunctional direction in the computer industry today. Creating virtual models of something has become an integral part of modern production. As can be seen, the production of media products is no longer possible without the use of computer graphics and animation. Of course, specific programs are provided for different tasks in this area.

In our study, when selecting an environment for three-dimensional modeling, we must first determine the scope of tasks appropriate to the students and the science. In our research, we also address the complexity of program learning and the time spent adapting to it, as working with three-dimensional modeling should be reasonable, fast, and convenient, the result should be quality, and the opportunity to work as creatively as possible. We move on to the analysis of the following 3D modeling programs that have such a feature:

**Autodesk 3ds Max.** The most popular representative of 3D models remains Autodesk 3ds Max. It is the most powerful, functional and versatile application for 3D graphics. 3D Max is a standard in which many additional plug-ins have been released, ready-made 3D models have been developed, gigabytes of copyright courses and video tutorials have been photographed.

This program is the best place to start learning computer graphics. This system can be used in all fields, from architecture and interior design to the creation of cartoons and animated videos. Autodesk 3ds Max is very suitable for static graphics. With its help, realistic images of internal, external and individual things are created quickly and technologically.

Most of the developed 3D models are created in Autodesk 3ds Max format, which confirms the reference to the product, and this is its biggest plus.

**Cinema 4D** is a program that is positioned as a competitor to Autodesk 3ds Max. These two programs have almost the same set of features, but differ in work logic and methods of performing operations. This can be inconvenient for those who are accustomed to working on Autodesk 3ds Max and want to take advantage of Cinema 4D.

Compared to each other, Cinema 4D has more advanced video animation features in addition to the ability to create more modern animated graphics. Cinema 4D is very popular among users, so the number of 3D models of this program is much less than Autodesk 3ds Max.

**AutoCAD** – used for construction, engineering and industrial design. This program has the most powerful functions for two-dimensional drawing, as well as the design of three-dimensional parts of various complexity and purpose.

By learning to work in AutoCAD, the user will be able to design complex surfaces, structures and other products of the material world and create working drawings for them. The user side has a menu in Russian, help and a system of instructions for all operations. While this software does not have a feature like Autodesk 3ds Max or Cinema 4D, the element is handy for detailed development of working drawings and models, for developing sketches, for example, in solving problems in the field of architecture and design.

**Blender software** is a very powerful and versatile tool for working with 3D graphics. It is large in size in terms of the number of features and the price is not less than the expensive Autodesk 3ds Max or Cinema 4D. This system is very suitable both for creating 3D models and for developing videos and cartoons. Blender can be difficult to learn because it has a complex interface, unusual work logic, and an English-only menu. But the program is free due to the open license.

Software tools can be divided into several groups depending on the field of application: interior modeling, interior and exterior, sculpture, animation creation, entertainment modeling and others.

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