

The content of teaching using computer technologies in conducting independent work in engineering and computer graphics

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***Abstract.** Until now, attention has been focused on teaching in the education system, but now, in the era of computer technologies, it is necessary to focus on increasing the content of teaching and enriching it with news using several programs. For this reason, the shortcomings of the work carried out in the field of teaching in higher educational institutions of higher educational institutions based on the method of mutual comparison of engineering computer graphics science programs were studied.*

***Key words:** "Computer technologies", "educational technologies", "computer modeling", "multimedia".*

Introduction:

Until now, education has been considered a priority in the existing education system, but at the same time, it is the period of informationization of society. Modern pedagogic personnel should be focused on organizing students' independent learning activities on the basis of modern technologies, independent acquisition of knowledge and formation of skills for their practical application. For such purposes, the teacher should choose the methods and technologies of teaching in such a way that they should enable students not only to acquire ready-made knowledge, but also to acquire knowledge independently from various sources, to form a personal point of view, to justify it, and to use the acquired knowledge to acquire new knowledge.

Analysis and results: Although the acquisition of knowledge is considered an important factor that develops thinking, but any acquisition or acquisition of knowledge does not have a developing effect on the student's thinking. For this, it is necessary to activate knowledge and forms of activity. Simple retelling of acquired knowledge will not be enough to develop students' thinking. Active cognition, independent thinking activity is very necessary. The activity of independent acquisition of knowledge and the process of applying the acquired knowledge become the formation of new knowledge and the source of effective thinking of the student.

According to L.N. Anisimova, it is necessary to use computer technologies and interactive lectures and an innovative approach based on independent learning to successfully form students' professional competences and graphic preparation. One of the conditions for successful training of students in the field of "engineering computer graphics" is to organize their independent education. This process is aimed at mastering and strengthening the learning material by students. The most important advantage of computer graphics as an intensive technology is that it has the possibility of a variable and individual approach to the organization of classes in order to demonstrate the independent creative activity of students, to overcome stereotypes and inertia of thinking.

Taking into account the above, if independent education is an activity, independent work can also be considered a type of activity. We believe that the proper organization and control of students' independent learning is an effective means of achieving the tasks of the taught subject.

Because today half of the time allotted for each subject should be devoted to independent education

Carrying out independent education using computer programs increases the effectiveness of the course content. There are several computer programs, among which the Solid Works program with its capabilities has several conveniences and opportunities for students to explain science:

3D CAD Design: Allows users to create, simulate, publish and manage 3D models. SolidWorks is known for its user-friendly interface and powerful tools for all aspects of product development.

Simulation: Provides tools to simulate physical behavior such as kinematics, dynamics, stress, deflection, vibration, temperature or fluid flow to improve product performance.

Data Management: SolidWorks offers PDM (Product Data Management) solutions that help manage project data, facilitate collaboration, and increase productivity by tracking all changes to design data.

Electrical Design: Includes tools for designing and integrating electrical systems into 3D models, such as wiring harnesses and printed circuit boards.

Technical Communication: Creates 3D product documentation and visualizations to assist in the creation of manuals, assembly instructions and marketing materials.

Collaborative environment: MySolidWorks, a collaborative space, connects SolidWorks users and provides access to a wealth of resources, tutorials, and an online community.

For example, in Europe, the USA and Japan, students' hours of independent study make up 50-60% of the total study hours.

I. Kovalevsky distinguishes two types of independent work:

- works performed in the auditorium (independent work is performed under the direct supervision of the teacher and on his/her assignment during the training sessions);
- work performed outside the classroom (independent work is performed on the teacher's assignment, but without his direct participation)

Based on the above information, it is possible to state the nature of independent work of engineering computer graphics students and the issue of their organization.

We believe that it is appropriate to organize independent education in this way. Students' independent tasks in science should be structured in such a way that they should be encouraged to think freely and creatively during the performance of the given task.

Conclusion: Based on the above information, the organization of independent education based on Solid Works, Auto CAD, and 3D Max technology creates the basis for a student's creative approach to the task.

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