The problems of the method of teaching descriptive geometry

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Abstract. The role of software in the process of studying graphic disciplines and the impact of the results of the acquired knowledge and acquired work skills on preparing students for professional activity are considered in the article.

Key Words: graphic disciplines, software, professional activity, descriptive geometry, engineering graphics.

Graphic literacy, engineering and graphic competence and a high visual culture are essential attributes of a highly qualified technical specialist. The modern engineer should be able to express thoughts in a graphic form, understand and adequately interpret graphical information, know the composition of the design documentation, have the skills to develop drawings using modern technical means and organize electronic document management.

The classical course of descriptive geometry and engineering graphics, which is the basis of most of the work programs, is aimed at a student with basic knowledge in the field of geometric, projection, engineering drawing, having some experience with drawing tools, the skill of "reading" graphic documents. However, the modern entrant
does not meet these requirements. The school drafting course is significantly shortened and translated into a regional component, which makes it impossible to study it at all. Annual control of the entrance level of visual literacy and drawing knowledge shows that students are not ready to perceive the content of the disciplines of the graphic cycle, they are not able to carry out even the simplest drawings, they can not understand and mentally recreate the shape of the part by its flat projections, etc. The greatest difficulties arise first year students in the study of descriptive geometry, the main condition for successful mastering of which is the ability to mentally operate with images of three-dimensional objects, i.e. the development of spatial thinking. It is not easy to give a student and master the content of "Engineering Graphics". The lack of skill in working with drawing tools, ignorance of drawing techniques, elementary graphic illiteracy does not allow freshmen to understand and adequately interpret information presented primarily in graphical form.

"On modern computer graphics systems, any task of descriptive geometry is solved simply, clearly, accurately and quickly." Very doubtful is the existence of such graphic editors who could solve "any problems of descriptive geometry" without using descriptive geometry. The simplest, basic first positional problem, without knowing the algorithm for its solution when using existing editors can not be solved. The rapid development of computer technology has determined the need to use computer technology in engineering and graphic preparation.

Problems in the methodology of teaching descriptive geometry. Traditionally, it is believed that descriptive geometry is one of the complex disciplines in the university. To a large extent this is due to the very superficial knowledge of applicants and the shortcomings in the process of teaching drawing in school. The next restructuring of higher education consolidates the decline in the quality of education of students. Targeted orders of enterprises for workers and professionals, the introduction of market relations between enterprises and educational institutions leads to a certain danger of reducing the intellectual potential of society by reducing the content and volume of general scientific and general professional training.

Engineering graphics at the present stage and in the near future Lyukshin, "The purpose of the course of engineering graphics is to give students the knowledge, skills and abilities that an engineer of any specialty will need to present his technical thoughts with the help of a drawing, as well as to understand the design and operation principle of the technical product depicted in the drawing. The theoretical part of the course of
Engineering graphics is based on the provisions of descriptive geometry. In the course of studying the course of engineering graphics students get an idea of the details, assembly units and their drawings, as well as get acquainted with the elements of the design of parts and elements of the technology of their processing. Engineering graphics - the first step, which examines the basic rules for the execution and design of design documentation [1]. Thus, the tendency and attempts to "preserve the tradition" of engineering graphics and make students use a pencil and ruler in the presence of modern computer technologies look like unpromising. For this reason, it is not so much to preserve traditions as to master new computer technologies of engineering graphics, so to speak. The substantive part of this discipline does not change and does not suffer, and students in any case should understand what and by what rules they should portray. It is clear that none of the modern graphics editors (and apparently, in the near future this will not) by itself does not build the correct image. In this respect, the development of graphic systems does not spoil the student, because does not reduce the matter to pushing the buttons, but makes you think at drawing no less than when working with a pencil and ruler. At the same time, working with a \textit{PC} to a modern student is simply more understandable and interesting.

You can use the computer in the educational process not only as a means of facilitating the laboriousness of performing graphic works, but also as a tool that facilitates understanding of the methodology for constructing drawings. And it is possible, using computer technologies, under the necessary conditions of their application, to completely abandon the traditional methods of teaching graphics (for example, the program AutoCAD or "Compass", allow the construction of any graphic objects by sequential input of commands on the keyboard), but at the same time, logic and geometric rules for the construction of drawings. Students can remember the sequence of pressing certain keys and get the desired result, but they will not understand the process of image building, thus they will not be able to solve other graphic tasks and find new ways to solve them.

With the help of multimedia animations it is possible to show the detail from all sides, in order to reveal internal outlines and fully reveal the shape, apply the cut, demonstrating in dynamics, as the cutting part is cut into a detail and how half of the detail is removed between the observer and the secant plane. The process of this process can be supplemented with detailed drawings before and after the cut. When studying descriptive geometry, using the effects of animation, you can demonstrate the sequence of
projecting spatial geometric images on the plane of projections, more clearly consider the mutual position of different geometric images in space and their projection on the plane. All auxiliary constructions that characterize the progress of the solution of the problem can be hidden, which makes it easier to read the drawing, and also to restore it to trace the logic and verify the correctness of the executed image.

The main task of higher education institutions is the preparation of competent specialists who are able to freely navigate in the modern information space and are ready not only to master the information culture, but also to constantly improve their professional skills. With the advent of new software, the study of graphical disciplines becomes especially interesting and relevant, as their content and methods of instruction change. As a result of the knowledge gained about modern graphics programs and acquired work skills, graduates will be better prepared for professional work. This means that they will be able to compete in the labor market.

References

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