

CONDUCTING PRACTICAL TRAINING IN THE SUBJECT OF “ENGINEERING AND COMPUTER GRAPHICS” USING INTERACTIVE METHODS

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Abstract

The content of the practical training in the subject “Engineering and Computer Graphics” is to teach students the most convenient working methods for performing graphic work, as well as the forms and means of effectively organizing the learning process. The purpose of using interactive methods is that students easily master the topics covered and become active participants in the educational process. The use of interactive teaching methods should be tailored to the individual capabilities of the professor. This takes into account the degree to which the professor is armed with the theory and practice of teaching methods, the laws of the teaching process, theories of knowledge, the theory of educational content, and other existing laws. If a professor-teacher organizes practical classes using interactive methods that are specifically geared towards students' psychology, he or she can achieve the goal he or she sets for each laboratory session. However, if he or she neglects this task and conducts the laboratory sessions in a dull and uninteresting manner, students will lose interest.

Keywords: Brainstorming, interactive methods, cluster, insert, discussion, syncwine, debate, call stage, thinking stage, drawing conclusions, problem solving, innovation, technology, form, construction, teaching technology.

Introduction

It is no exaggeration to say that the rapid introduction of new pedagogical technologies, innovations, new pedagogical and psychological concepts, and interactive methods by educators into the higher education system in recent years has fundamentally changed the content of education.

Nowadays, there is a growing interest in the use of interactive methods, innovative technologies, pedagogical and information technologies in the educational process. While until now, students have been mainly taught to acquire ready-made knowledge, modern technologies teach them to search for the knowledge they acquire themselves, to study and analyze it independently, and to draw conclusions on their own, if possible. In this process, the professor-teacher creates conditions for the development, formation, acquisition of knowledge and upbringing of the individual, and at the same time performs the function of a supervisor and guide. In such an educational process, the professor-teacher becomes the main figure.

The use of modern teaching methods leads to high efficiency in the teaching process. It is advisable to study and select these methods based on the didactic task of each lesson. Enrichment with various methods that activate student activity in practical classes leads to an increase in the level of student mastery [1]. A modern professor-teacher must organize his students' creative approach to science, form in them the qualities of inquisitiveness, and, of course, organize a lesson using new pedagogical technologies. To do this, he must be well versed in several teaching methods.

The use of interactive methods in practical classes in the discipline of "Engineering and Computer Graphics" aims to achieve high results in a short time without excessive mental and physical effort. In practical classes, conveying certain theoretical knowledge to students, developing skills and qualifications in drawing drawings in a computer program, forming their spiritual qualities, and monitoring and assessing students' knowledge require high skill and agility from the professor-teacher. In this regard, some pedagogical tools that the professor-teacher can use in practical classes of the subject "Engineering and Computer Graphics" are: variant drawings, in which the level of knowledge of students can be determined based on the drawing they draw using computer graphics. The professor-teacher creates an environment in the group that develops such qualities as creativity, research, comparison, finding similarities and differences through alternative, student-inviting drawings. In addition to drawing 2D and 3D drawings of details and assemblies in computer graphics for students, students also develop the ability to draw 2D and 3D views of various details and assemblies.

Research methodology

The professor has the opportunity to observe the work of each student and show them rational ways to complete the drawing, explain difficult parts of the topic, and check the work completed. Therefore, much depends on the professor's organization of the lesson.

The focus of the professor-teacher should always be on the formation of students' skills in practical graphic work [2]. The type of lesson should also be selected based on this. When choosing teaching methods, it is necessary to take into account the characteristics of practical training in the discipline “Engineering and Computer Graphics”.

A thorough study and practical application of each interactive method used in practical classes of the subject “Engineering and Computer Graphics” expands students' thinking and has a positive effect on finding the right solution to the problem. Increases students' creativity and activity. When various theoretical and practical problems are analyzed through interactive methods, students' knowledge, skills, and competencies are expanded and deepened [3].

In the process of teaching the subject “Engineering and Computer Graphics”, the professor-teacher often has to use concepts and terms that are unfamiliar to students. In order for students to learn the subject “Engineering and Computer Graphics”, it is necessary to thoroughly master these concepts. On the other hand, the large number of unfamiliar terms that need to be remembered, the need to understand theoretical concepts during practical graphic activities can reduce students' confidence in mastering the subject. However, students cannot learn the subject “Engineering and Computer Graphics” without thoroughly mastering these concepts. Taking this into account, the professor-teacher faces the problem of quantity and quality of concepts (terms) in the subject “Engineering and Computer Graphics”.

It would be a great methodological aid, especially for young teachers, if the concepts in the subject of “Engineering and Computer Graphics” were classified according to their complexity, level of precision or abstraction, and other qualities. In addition, many of the concepts in the subject of “Engineering and Computer Graphics” are used with slightly different meanings depending on whether they are used in the projection process or when reading a drawing.

Discussions

Each form of the lesson has its own laws. In this case, specially directed educational problems serve as a unique method of forming educational activity so that students acquire the necessary theoretical knowledge and practical skills. Thus, students are given the task of learning to project and read a drawing. In the process of solving these problems together with the professor-teacher, cognitive activity similar to the formation of concepts occurs in them.

In practical classes in the discipline “Engineering and Computer Graphics”, it is necessary to pay attention to the development of the following qualities in students:

- a) management of knowledge acquisition processes (targeted attention, memory, etc.);
- b) students' speech capabilities, the ability to understand and use various sign systems (symbolic, graphic, figurative) [4].

To accelerate the teaching of students to read drawings, the following innovative didactic technologies are proposed. These proposed interactive methods provide a transition from one topic to another, one graphic concept to another. They help to master the topics more easily and deeply and encourage students to carefully monitor their practical training. In this case, the desired result can be achieved by using various innovative didactic methods that are suitable for the psychological changes of students. The use of interactive methods in laboratory classes of the discipline “Engineering and Computer Graphics” has its own characteristics.

Example 1. Who reads quickly and can draw.

Game condition: Draw a profile view of a detail using frontal and horizontal views in computer graphics.

Objective: To teach students to visualize the shape of a part through the types of lines used in the subject “Engineering and Computer Graphics” and to develop their competence in reading drawings.

Equipment. Enough handouts (Figure 1) and computers for all participants in the game.

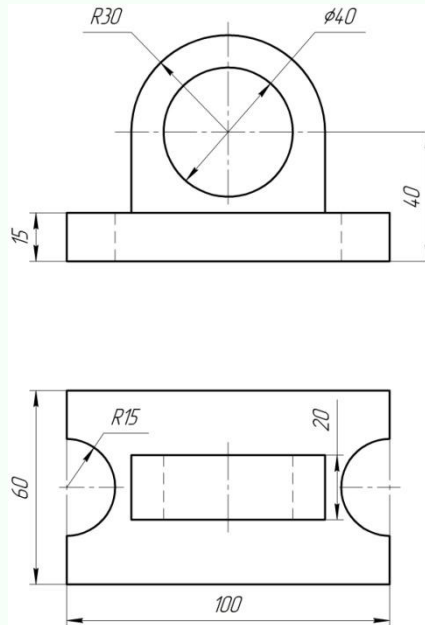


Figure 1. Frontal and horizontal view of the detail.

Game details. After distributing the handouts (Figure 1) to the students, the professor-teacher shows the frontal and horizontal views of the detail and emphasizes, “You will draw its profile view,” that is, gives instructions. If the students have difficulty completing the task, the option (Figure 2) previously drawn by the professor-teacher in computer graphics is displayed on the projector and after a while turns off the projector.

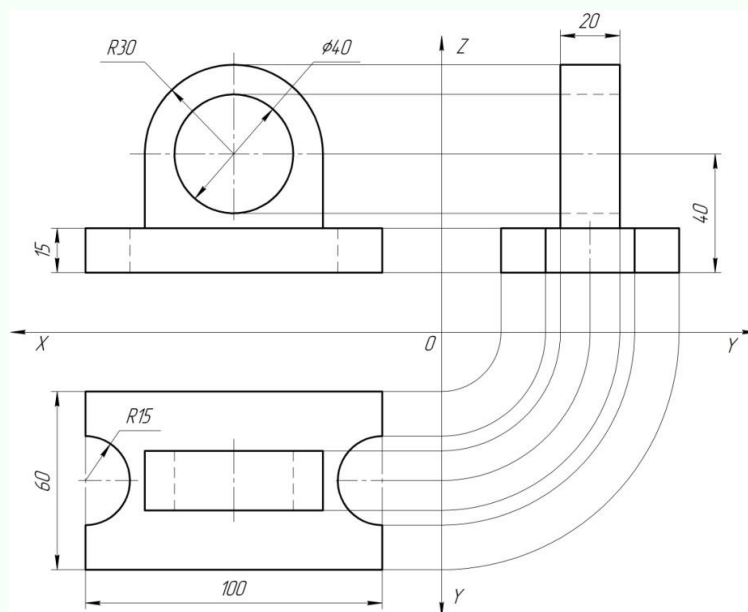


Figure 2. Finding the profile projection of a part

Results

The student is encouraged to quickly complete the game conditions and tells about the mistakes made and ways to eliminate them.

The following positive situations arise during the lesson, organized using interactive methods:

- the coherence of memory and attention increases;
- the student's interest in educational materials and the subject of “Engineering and Computer Graphics” increases;
- communication between the student and the professor-teacher accelerates.

The professor-teacher must always remember that the outcome and result of the lesson are directly related to the attitude and interest of students in the subject, their preparation, knowledge and skills. Inattention, irresponsibility and other shortcomings always have a negative impact on the results of working with students. During the lesson, the professor-teacher must monitor all students, provide assistance if necessary, and maintain order. The professor-teacher must keep the situation under control and attract the attention of students throughout the lesson. Without this, it is impossible to achieve the pedagogical goals of education.

Conclusion

The use of interactive teaching methods should correspond to the individual capabilities of the teacher. This takes into account the degree of integration of the theory and practice of teaching methods with the laws of the teaching process, theories of knowledge, the theory of educational content and other existing laws. Another criterion for choosing interactive methods is their full compliance with the learning capabilities of students, that is, ensuring the unity of internal and external conditions for effective learning. In each of these methods, the professor-teacher gives students appropriate tasks. These methods and techniques lead to the growth of communicative abilities in students, the ability to solve problem situations, work in a group, listen to the opinions of others and not only express their own opinions independently, but also to their self-confidence, the ability to rely on their knowledge, the strengthening of their interests, and broad thinking. In order to form students who are spiritually mature, have high intellectual potential, are independent and free-thinking, and creative, the use of pedagogical innovations, the use of an integrative process, and interactive methods is

insufficient. It is necessary to take into account the student's inner world. That is, it is necessary to take into account his personal opinion, notice his abilities, and have a positive impact on increasing his vocabulary.

In these processes, the interactive game on the topic **“Who can read and draw faster” presented** above allows students to quickly and effectively understand the topic. Conducting practical exercises in the form of a healthy competitive game is the most optimal option for interactive methods.

In computer programs, there is no problem of matching the speed of learning to individual capabilities. Because each student works in a convenient way. The second advantage is explained by the saving of time spent by the student on information transfer, as well as an increase in the time allocated for mastering the material and constant monitoring of its results.

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