

## INTRODUCTION OF COMPUTER TECHNOLOGY IN EDUCATION

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**ABSTRACT:** This article discusses the possibilities of using computer programs in teaching graphic disciplines. It is argued that the interest of students in the science of engineering graphics has increased due to the use of computer programs.

**Keywords:** engineering graphics; computer programs; scanning; image; designing; sight; lessons; spatial and creative thinking; spatial awareness.

**Introduction.** The purpose of using computer graphics in the lessons of students of engineering specialties is the formation of students' spatial imagination, the development of spatial and creative thinking, thereby increasing their graphic literacy, and the effective use of computer graphics in course and graduation projects. In the introductory part of the engineering graphics course, it is desirable to add general information about computer graphics, formats, basic symbols, line types, scale topics, ready-made standard basic notations in computer graphics, format topics. The teacher's ability to conduct classes on a computer ( Microsoft power Point , Microsoft Word , AutoCAD ) increases students' interest in the discipline and computer graphics [2].

**Methods.** It will be necessary to develop optimal plans for the use of computer graphics in the classroom. Computer graphics can create two types of images: static (in Microsoft power Point , Microsoft Word , etc.) and dynamic ( AutoCAD , 3D MAX, Corel draw ). Demonstrating Drawing Problems at Microsoft power Point , Microsoft Word , the teacher develops the skills of reproductive (spatial imagination) thinking in students. That is, students can solve their problems based on ready-made sample problems. Demonstration of spatial problem solving in AutoCAD , 3D MAX, Corel Draw allows students to develop semi -creative (spatial thinking) and creative thinking skills faster.

**Materials.** The use of computer graphics in teaching engineering graphics is recommended in the following cases:

- in showing spatial solutions to problems;
- when scanning surfaces;
- when creating spatial curves;
- when defining lines of intersection of surfaces;
- in the construction of axonometric projections;
- at a section and cuts;
- when constructing the third projection and technical drawing based on the given two projections of the part;
- when creating a sketch of a part and its technical drawing;
- when working with assembly drawings, reading and detailing them. The use of computer graphics by the teacher during the transition to these topics ensures the effectiveness of the lesson. During the lecture, the teacher can use pre-prepared electronic lecture texts, methodological recommendations. During a brief explanation of the topic and after the students are given frontal or individual tasks, some of them are performed by the teacher in graphic programs ( AutoCAD , 3D MAX, Corel Draw ), which develop students' spatial thinking skills and interest in science. When

finding the true dimensions of the plane, the introduction of the three-dimensional AutoCAD system, that is, entering the coordinates of points A, B, C of the ABC plane, and demonstrating its spatial solution to students, expands the spatial imagination of students and teaches independent creative thinking [1]. Students mostly see the solution to this problem in a 3D graphics program and follow the rules of descriptive geometry on paper.

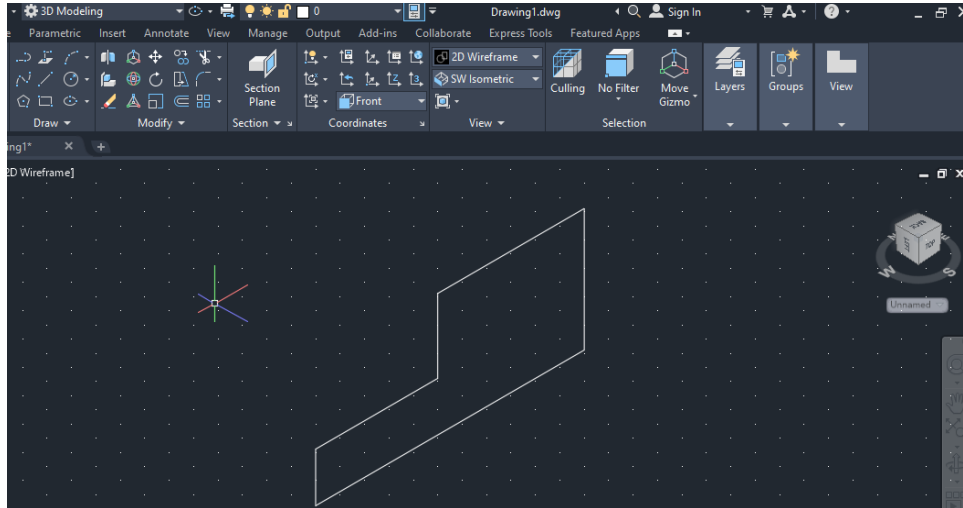


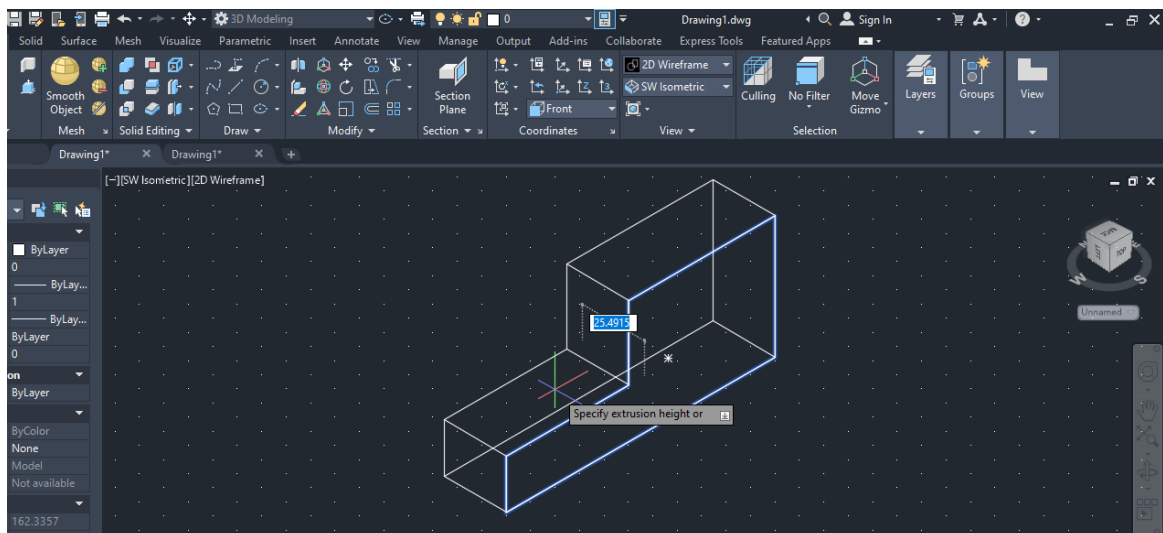
Fig.1. Performing a detail front view

For example, consider how AutoCAD performs an axonometric projection of a part and its three views with cuts:

To do this, select "2D Wireframe" in "Visual Styles" and "View Front" in "Restore Unswed" and perform a front view of the part (Fig. 1).

Now you can give the volume of the finished figure. Using the "Press" command, a shape and a rectangle inside it are selected, its width is set and a three-dimensional detail is created (Fig. 2).

Fig.2. Creating a 3D Part



After the part model is completely built, it is necessary to depict its axonometric projection and three projections with cuts. To do this, from the "Model" to "Layout1" (sheet). From "Vid" and from "Baza" the command "From model Space" is selected and the views of the part are arranged in order.

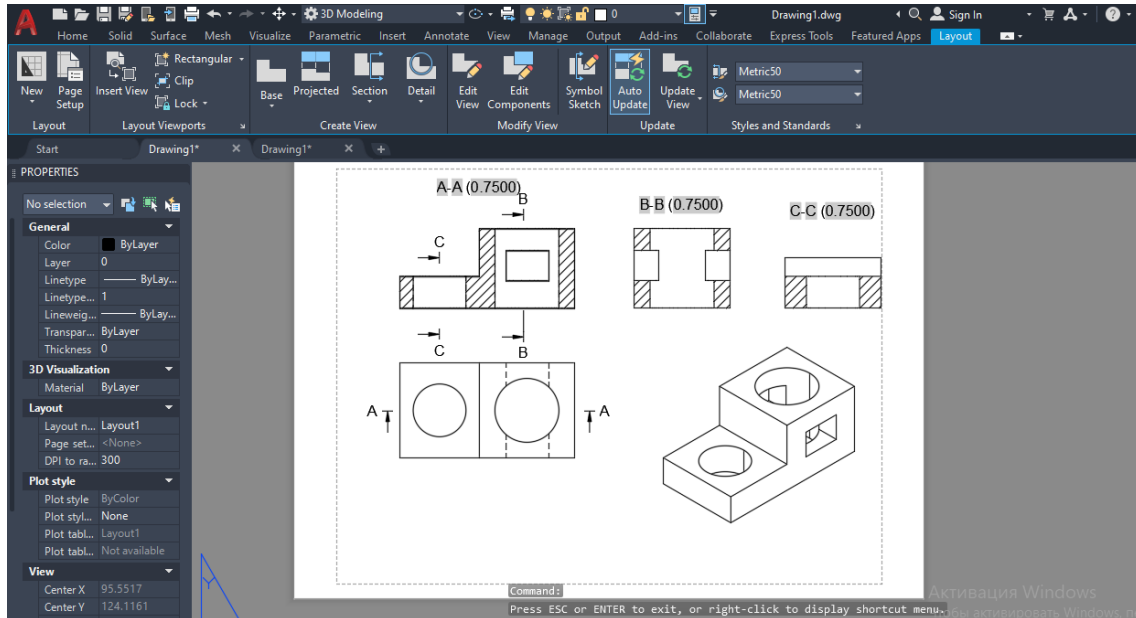


Fig.3. Axonometric projection of the part and its three views with cuts.

After the views are placed, you can make cuts on them. It is enough to set the cutting plane for its clipping (Fig. 3).

For example, when determining the line of intersection of surfaces, the condition of the problem is first read and drawn on the board, or a ready-made electronic methodological instruction is used. AutoCAD will be launched to show students the spatial solution. In the "View" section of the "View" menu, select "4 Point View" and the screen will be divided into four sections. Each screen has a name, i.e. frontal, horizontal, profile projection plane and axonometric projection plane. Two intersecting surfaces are constructed. The construction of these surfaces is generated simultaneously on all screens. A 3D (realistic) intersection of the surfaces is displayed first, followed by a 2D (2D wireframe) representation of them. On a three-dimensional (realistic) image, students see a spatial image of the intersection of surfaces, and their spatial representations are formed. On drawing paper, their ability to reflect drawings creates a two-dimensional (2D wireframe) image. In the 2D image, the line of intersection of the surfaces is not visible (a problem arises for the students), as a result of which the students are forced to think in space. In a two-dimensional (2D wireframe) image, the "unify" command is used to create an intersection of surfaces. The Merge command is selected, two intersecting surfaces are selected, and the Enter button is pressed to create a line of intersection of the surfaces. In hands-on labs, students can demonstrate a spatial solution by completing some of the tasks assigned to them in the AutoCAD software.

**Results.** The fact that some tasks are performed by the teacher increases the interest of students in working on computer graphics. Also on the topic of axonometry, students learn how to perform axonometry by doing the task with the help of the program, and then doing it manually. It is recommended to use computer graphics as a teaching aid and as a subject in engineering graphics

lessons. In AutoCAD, the screen is divided into four parts using the "point view" item in the "View" menu, and the projection plane is named accordingly. For example, one view of a simple model (a view that is easy to grow) is drawn and enlarged using the extrude command. Holes are made where necessary. In this case, the flat shape will have volume.

**Conclusion.** The formation of three-dimensional details as a result of the growth of flat forms, given by students, increases the students' skills of independent spatial thinking and interest in independent work.

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