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Research Article

IN HIGHER EDUCATIONTEACHING DRAWING THROUGH DIGITAL TECHNOLOGIES

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ABSTRACT

The article examines the features of using information and communication technologies in the educational process. In particular, the possibilities of ICT as a means of increasing the effectiveness of education in the educational process are described.

KEYWORDS

Information and communication technologies (ICT), computer technologies, educational process, systematization of knowledge.

INTRODUCTION

The development of the digital economy is one of the most urgent and priority areas for Uzbekistan in the coming years, as stated in the Address sent to the Parliament by the President of the Republic of Uzbekistan Shavkat Miromonovich Mirziyoyev. The main goal of teaching engineering computer graphics in higher education is to teach students the procedures and rules of computer-aided execution of graphic information such as drawings, diagrams and schemes.

The analysis of scientific research shows that in drawing classes, the implementation of drawings by hand and parallel execution on the computer (in independent lessons) gives a high result. Working with a computer ensures students' independent work, observation, accurate and correct drawing. When studying the topics of detailing and assembly drawings, new possibilities for computer-aided drawing appear. That is, the ability of the program to save drawing details in separate files, copy them when necessary and automatically put them in the right place

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will increase the interest of students and encourage them to do creative research.

Also, making changes to a drawing done on a computer can be done in a few seconds, while on paper it would naturally require a lot of work.

Writing the main notes when drawing on paper, drawing the frame itself takes a lot of time, and if the drawing is done incorrectly with the slightest mistake, you have to start all over again. And this does not affect the student's psyche, that is, he either continues to draw with this mistake or loses interest and stops drawing altogether.

The computer helps to develop independent thinking skills and to search for new ways of solving various problems, which are great for activating learning. It makes training more interesting, reliable and effective, and provides a wide opportunity for students to easily use and master its database. For example, by effectively using computer technology in the teaching of drawing, showing students the location of details in space and the process of their appearance on the screen expands students' spatial imagination.

The main role of the computer in the educational process of the use of computer technologies in the teaching of drawing is that it creates a person-oriented pedagogical process and feedback, and serves as an artificial intelligence tool that develops the intellectual potential of a person. (Figure 1)

Therefore, when computer technology is used in drawing education, the following positive results are achieved:

- the educational process is activated;
- lesson time is saved;
- students' interest in science increases;
- spatial imagination of students expands and makes it possible to understand science more fully;
- the skills of working with a computer are formed;
- students' ability to use information sources increases and their creative thinking develops;
- the student's creativity and independent work experiences increase.

The current exchange of information gives the teacher the opportunity to provide the student with knowledge specific to today's production process, which is especially emphasized in the qualification requirements.

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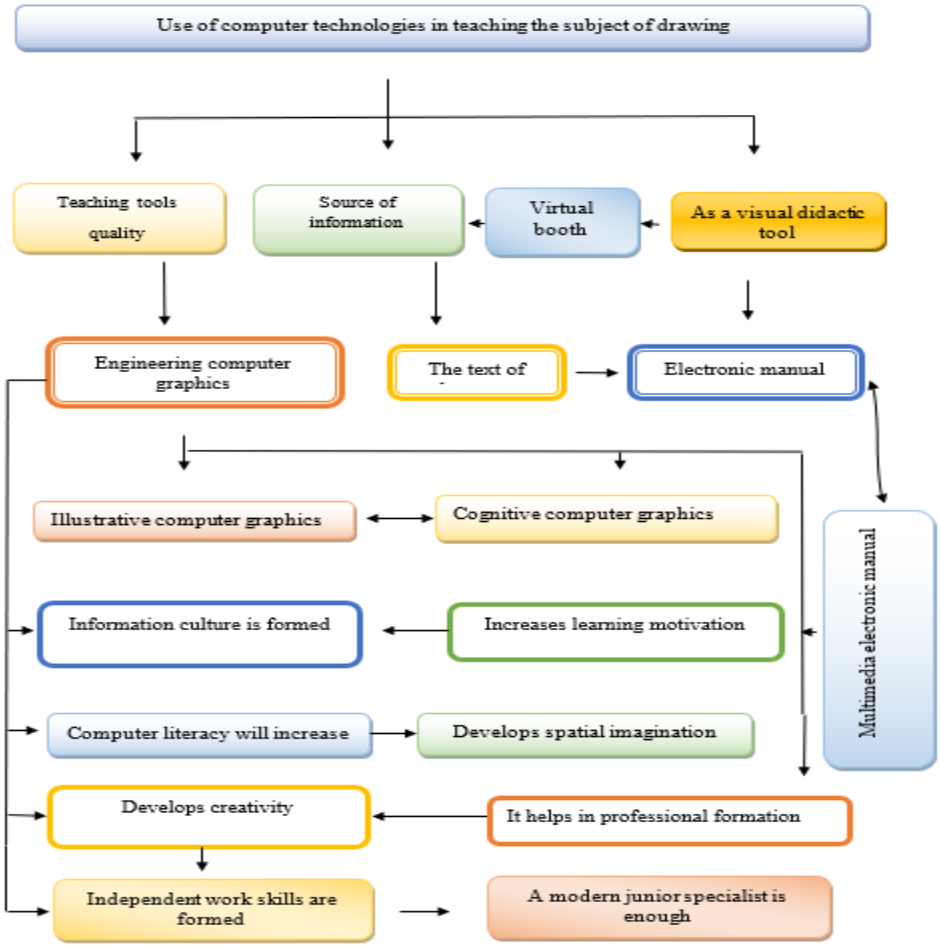

Figure 1

Modeling is two-dimensional and three-dimensional (2D and 3D). Two-dimensional and three-dimensional modeling programs are useful for design and engineering development. In addition, these programs can be supplemented with three-dimensional animation, polygraphic, presentation packages.

Among the modeling programs, the most powerful automated design system used in the WINDOWS environment is Autodesk's AutoCad program. AutoCad is generally regarded as the graphical core of an automated design system (CAD). With the help of the program, you can create and edit various lines, arcs, texts, create 2D and 3D models, automate the solution of many problems that arise during the design process, create custom scripts and macro commands, adjust and adapt the system to specific problems and applications.

In the course of learning in drawing classes, it is possible to further strengthen the study of graphic tasks, the possibility of additional work for students, and the opportunity to further strengthen the acquired information. In drawing circles, each student is dealt with individually, and a sequence of topics is drawn up based on their goals and interests. In order to further develop the creativity of students, the topic "Designing the shape of the detail based on the design and the

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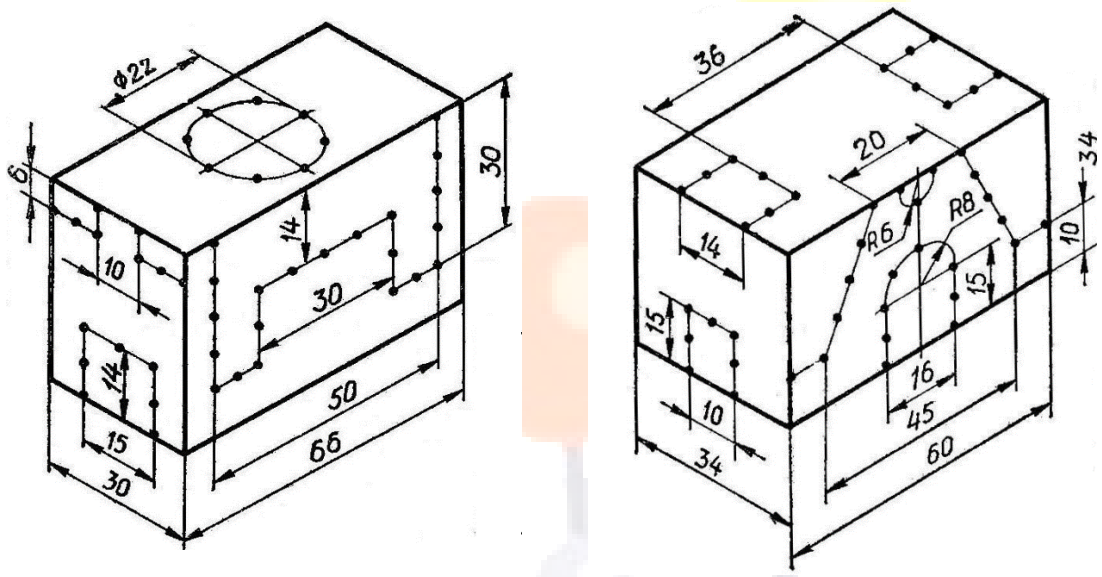
constructive change" is presented, and this topic plays a very important role in improving students' graphic literacy. Below is an effective way to teach this topic using graphics software.

In order to create a drawing of a detail or item, according to the shape of the detail, first, based on the overall dimensions, a whole part is taken and unnecessary parts are removed from it. First, we draw the above-described shape in three dimensions using the Auto CAD graphic program, and the necessary parts are drawn with a dotted line. Through these lines, students imagine the state of approximate formation of the detail (Fig. 2-a,b). Dotted lines are drawn from the given shape in a position corresponding to the coordinate axes. For this, in the Auto CAD graphics program, the dotted lines are bounded by a closed line, that is, by a continuous line, and to these bounded lines with the help of the command, the required volume is given (Fig. 3-a,b). These are the parts from the detail after giving the necessary sizecarved



a) b)

(Figure 2-a,b)

is taken. To do this, draw in a graphics program we use the command. This command is used to cut out unnecessary parts of models drawn in a graphics program. The procedure is to first select the main model and press the Enter button, then select the part to be carved and press the Enter button again (Fig. 4a,b). As a result, redundant parts of the initially given model are removed and the constructive state of the detail that we want to design is created.

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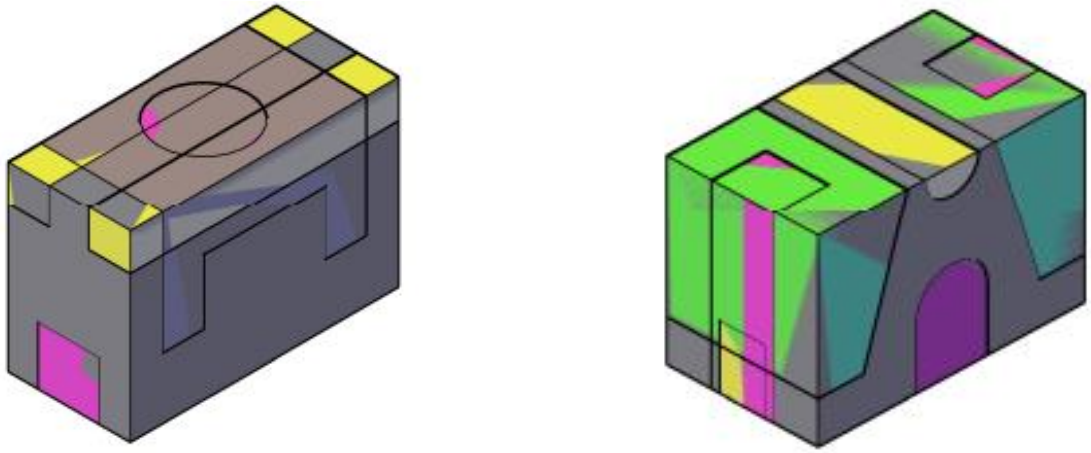
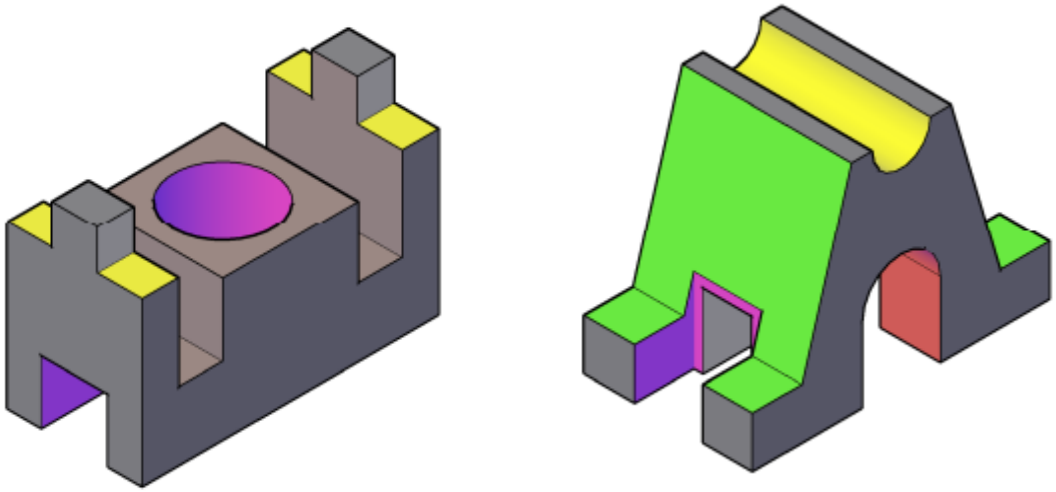


a) b)

(Figure 3-a,b)



a) b)

(Figure 4-a,b)

Below are options similar to the details described above that can be used to test students' knowledge.

If the teacher educates the students with the help of the Auto CAD graphics program using the above-mentioned method, he will achieve several times higher results than the lessons conducted in the traditional way. In the traditional way, it takes a lot of time and high skill of the students to draw a picture on the board and show it to the students. Drawing

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drawings with the help of graphics programs also saves time and provides accurate and high-quality drawings and helps students to improve their imagination.

The development of software tools for working with graphic information led to the computer becoming the main tool for creating, storing and processing drawings. If we analyze the types of graphic data used to provide information in engineering activities from product production to disposal, different types of electronic documents are relevant at each stage. Among them are traditional project documents, product information virtual model and presentation data. In this regard, graphic education at a higher educational institution should be aimed at forming a specialist with modern means of presenting information.

Drawing geometry is a general professional subject in which engineering graphic education begins at a university. To learn it successfully, the student must have a certain level of development skills and perform the simplest geometric constructions.

In recent years, we have been offering students to use AutoCAD as a drawing tool to design drawing geometry diagrams. The skills of two-dimensional geometric constructions in AutoCAD, formed during the process of drawing drawings, allow the transition to three-dimensional modeling. The use of AutoCAD modeling tools to demonstrate algorithms for forming surfaces studied in drawing geometry helps to better understand educational information and master the skills of creating electronic models of objects. The learner is required to be graphically literate in order to master it according to the specific nature and demand of drawing geometry and engineering graphics. The use of the AutoCAD program in the process of performing graphic tasks increases students' graphic literacy along with the strengthening of theoretical and practical knowledge. These models contribute to the conscious construction of polygons in determining the line of intersection (Fig. 5), in determining the line of intersection of surfaces (Fig. 6), and comparison with the drawing obtained in AutoCAD helps the student to complete the work allows you to independently check the soundness (Fig. 7-a,b).

At the end of the semester, students studying drawing geometry using AutoCAD will have geometric modeling skills - 2D and 3D, which in turn will allow them to study engineering graphics in AutoCAD.

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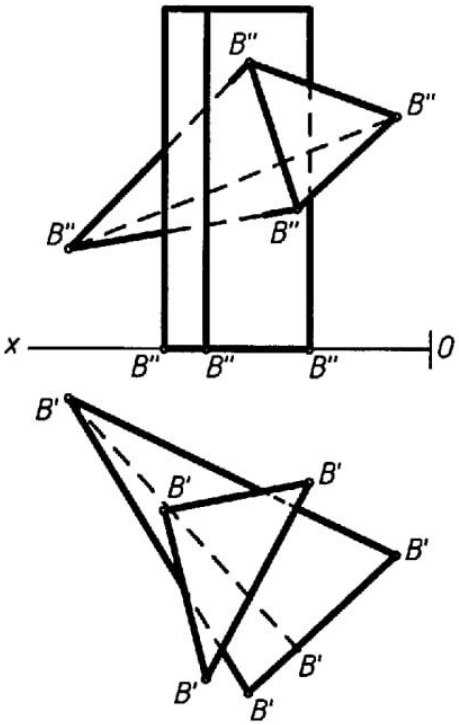
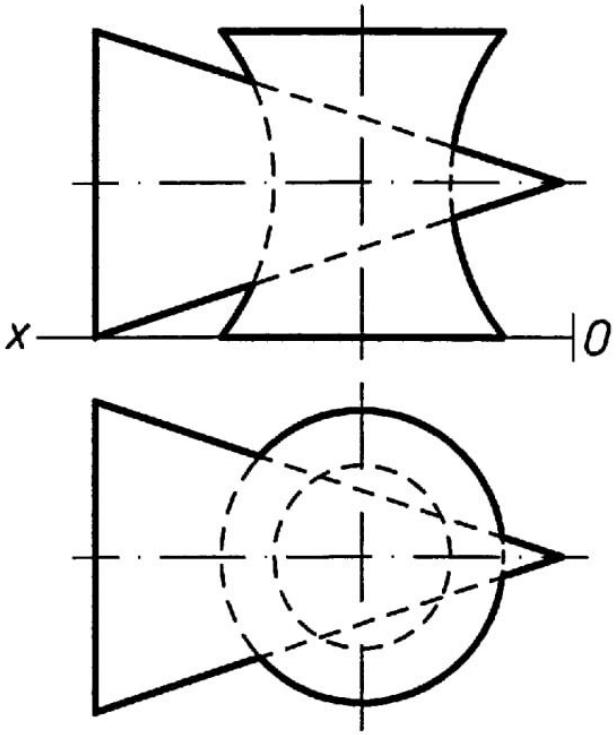


(Figure 5)



(Figure 6)

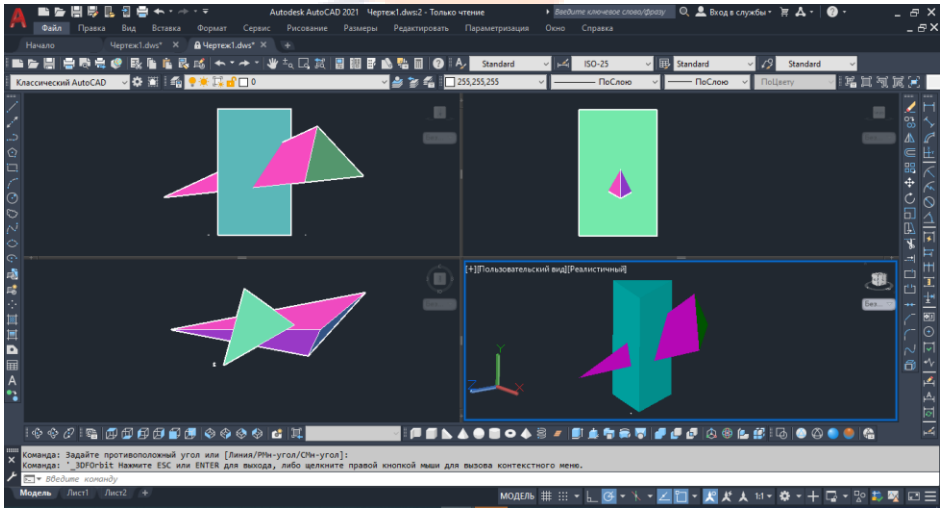


Fig. 7.a

The practice of using AutoCAD in the process of teaching drawing geometry has shown the feasibility of using graphic programs as part of primary graphic education in higher education institutions. At the same time, it should be noted that the use of graphic drawings to solve educational problems at the initial stage of higher education helps to form stable skills in

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the use of modern information technologies in solving production problems, and in various creates conditions for training a modern IT specialist for industries.

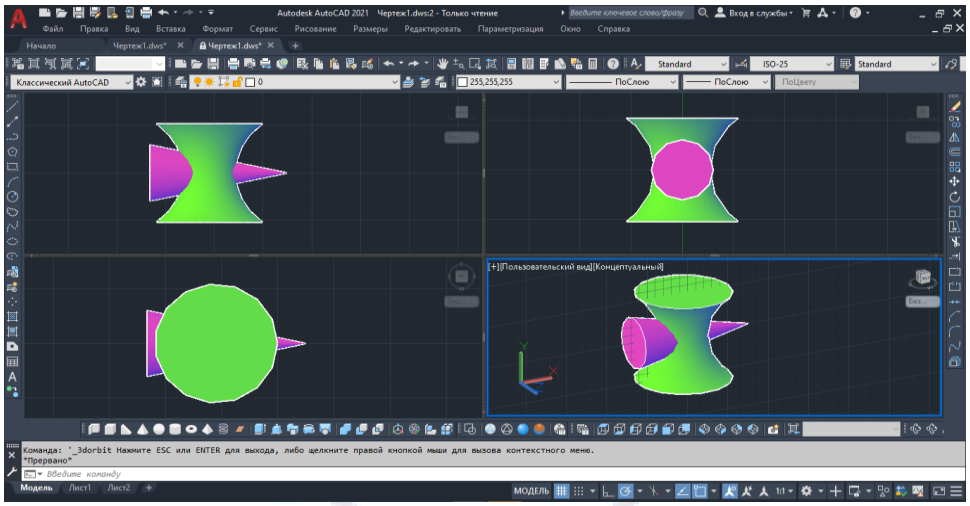

Figure 7. b

Today's students, using the favorable conditions created in our country to study, as well as their eagerness and agility to acquire knowledge, are second to none in their achievements in this regard. It is worth saying that at the modern stages of the development of information and communication technologies, computer technologies cannot take the place of a specialist with thorough knowledge, but they facilitate his work.

With the help of computer technologies, the educational process intended for mastering the subject of "Drawing" allows students to master the subjects thoroughly, to acquire knowledge, skills and qualifications within this subject, to fully and deeply understand and understand the essence of the studied materials. provides and provides an opportunity to organize monitoring of the student's educational process and control the quality of the educational process, on the basis of which he encourages students to study independently.

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