Methodology of Using Modern Graphics Programs in Teaching Engineering Graphics

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Abstract. This article reflects the role of computer graphics in the teaching of engineering graphics and an improved method of teaching modern automated design software.

Key words: CAD, natural mastering, artificial mastering, computer graphics, engineering graphics.

Introduction. The role and importance of "Computer graphics" science, which is currently being taught in higher education institutions, can be seen as the satisfaction of material and spiritual needs in our social life and the wide range of opportunities for automating the work of all specialists in this field[1-3]. That is why, at the same time, computer graphics are divided into various fields in the HEIs of our Republic, creating methodical bases for using its capabilities in a number of fields, effective use of computer technologies, and new fields entering our lives (specialized artist, special effector, vector art master[4-7]. The issue of providing qualified specialists (such as CAD-master, modeler, animator, texturist, visualizer, etc.) has led to an increase in the need to teach "Computer graphics" as a subject in HEIs. Today, it is important to apply the necessary pedagogical and psychological tools and their scientific justification in teaching the subject of "Computer graphics" in higher education institutions, in order to form students' purposeful actions towards the subject and instill in them the possibility of achieving a certain result[8-10]. It is known that before coming to OTM, if students have the necessary basic knowledge and skills in the field of "Computer graphics", they will develop the necessary spatial imagination and ability to read drawings. This indicates that it is appropriate to start the related courses from the secondary special vocational education system. Thanks to the scientific research of a number of researchers in this regard, scientific results are being achieved, which can have a great effect on the educational process[11-12]. KAGrebennikov studied the problem of developing the pedagogical and technological basis of using computer graphics in the teaching of general professional subjects in the secondary special vocational education system in the "Design" specialty. In this research work, a pedagogical model of using computer graphics was created in the professional training of specialists - designers in the secondary special vocational education system, and the importance of computer graphics was revealed in it. 1 Ye.M. In the scientific research conducted by Tretyakova, the
technology of designing and implementing the content of "Computer graphics" for the construction specialty in vocational colleges was developed. In it, a special course "Computer graphics" was designed, and it was scientifically proven that it is possible to increase the knowledge and skills of students trained on the basis of the model program developed for the use of computer technologies[13-15]. 2 Also, in the scientific research conducted by DC Saidahmedova the theoretical foundations of teaching the subject "Technical drawing" using the possibilities of computer technologies have been developed in vocational colleges. The method of activating the learning process of students through the use of dissertation didactic games, It has been scientifically proven that it is possible to create pedagogical conditions and increase the efficiency of the lesson by using computer graphics in the teaching of "Technical drawing"[10-13]. The author has developed a multimedia electronic study guide called "Technical drawing" based on interactive methods, didactic games and computer technologies for students of vocational colleges and combined it with traditional teaching methods., improved the teaching methodology, including tasks designed to develop students' spatial imagination, to read drawings correctly and quickly, as well as to form such qualities as observation, resourcefulness and intelligence in them, intellectual game programs used on the computer ("Crossword", "Rebus", "Charshpalak" and "Labyrinth") were developed. 3 As a result of the research conducted by LVPavlova, interesting issues and graphic sciences were developed in the formation of engineering graphics and computer graphics knowledge of technical students. it is scientifically based that the use of computer graphics in teaching and the development of students' creative activity can be developed with the help of the AutoCAD graphic program. 4 According to MV Matveeva: the illustrative function of computer graphics is performed when students learn ready-made graphic, animated and video educational materials. If they acquire knowledge by creating a mathematical model of the studied object, the cognitive function of computer graphics is fulfilled. Illustrative and cognitive functions of computer graphics are conventionally distinguished. On the one hand, even a simple graphic image can cause a new idea to be born in a student or open up new aspects in him[10-14]. On the other hand, the cognitive function is not always fully realized, for example, when the student reflects only the already known features of the studied object, only the illustrative function is fulfilled. 5 Indian scientist J. Rush in his scientific research In his work, he showed that the main goal of teaching "Computer graphics" should be to develop creative activity of students in computer design of production issues. 6. Computer graphics are computer graphics or graphics created with the help of a computer[12-15]. Computer graphics is used as a drawing and modeling tool. If computer graphics is understood as an image on the monitor, then computer graphics can be said to have appeared at the same time as the computer. Sometimes, the birth of computer graphics is associated with the year when computer games appeared. In other words, computer graphics is one of the rapidly developing directions of new information technologies, and it forms the content of the automatic design system. "A modern automatic design system not only turns a drawing into an "electronic drawing", but computer technology is distinguished by the breadth of its database and the possibility of using effective methods of geometric modeling of objects. 7 Working with information in graphic programs is based on human vision, will be focused on auditory and sensory organs, that is, images and sounds are widely used to convey information. The main goal is to convert information into images and sounds. Although there are many computer graphics programs available today, they differ from each other depending on their areas of application. Professionals in each field choose a graphic program that is convenient for their activities. The capabilities of the programs are also focused on a specific field. Therefore, when choosing a graphic program, it is necessary to take into account its capabilities. In most cases, it is necessary to master other programs or disciplines before using a graphics program. In order to develop spatial imagination in the student's mind, first of all, it is observed that interest in science is formed in him and based on this interest, he acquires knowledge and remembers it, knowledge is gathered and turned into skills and competences. Based on the acquired knowledge,
skills and abilities, the student analyzes the given problem in his mind and makes a conclusion. Whether a student's spatial perception is correct or incorrect is directly related to the above-mentioned characteristics. In computer graphics, each component of the graphic objects that are integrated into the spatial image is connected both technically and graphically, which expands the spatial image, ensures the correct execution of actions and the correct conclusion, otherwise in other words, it provides technical and graphic communication. For example, if we imagine the concept of "conic sections" spatially, then first of all we need to analyze and synthesize the situations of cone, plane and the intersection of a cone with a plane one by one. This, in turn, leads to the expansion of human consciousness and the possibility of gradually developing a person's realistic spatial graphic imagination[13-15]. During the teaching of graphic sciences, the problem of developing creative graphic thinking together with spatial graphic imagination is relevant in the development of the student's creative activity. Natural absorption - can be caused by the character of a person or inherited. Students who are able to learn naturally can spatially imagine what the solution will be in the process of solving a problem (for example, when making a detailed drawing in third view and a clear image). Such students understand the topic quickly and are satisfied with the teacher's presentation of one example for solving graphical tasks. However, not all students have the above-mentioned natural learning process. They may not be able to imagine a solution to the problem even if they try. Therefore, it is appropriate to use the process of artificial assimilation at such a time. Artificial mastery - in which students are able to solve the problem by performing the problem according to different rules and using the capabilities of different software tools. In artificial mastering, students' creative activities expand and their professional knowledge and skills become qualifications[14-15]. As a result, it is observed that a student who learns science artificially has a stronger level of knowledge than a student who learns naturally. In both mastering processes, the student is first required to conduct independent creative activity in the subject. A student who has the ability to learn naturally develops the ability to learn science faster. In the case of artificial learning, it is slow at first, and as the level of knowledge increases, the acquisition of skills accelerates. Since the modern AutoCAD (Auto Computer - Aided Design) system interface is created taking into account the capabilities of the most modern computer tools and technologies, it guarantees high-quality execution of drawings and schemes, design issues. The use of various methods of 3D modeling (three-dimensional design) in the teaching of computer graphics during the course of the lesson not only develops students' interest in science, but also gives them the opportunity to use almost all the capabilities of graphic systems. On the one hand, this creates a motivation for the student to work on himself, and on the other hand, it activates the motivation for creative activity. he guarantees high-quality execution of drawings and schemes, design issues. The use of various methods of 3D modeling (three-dimensional design) in the teaching of computer graphics during the course of the lesson not only develops students' interest in science, but also gives them the opportunity to use almost all the capabilities of graphic systems. On the one hand, this creates a motivation for the student to work on himself, and on the other hand, it activates the motivation for creative activity. he guarantees high-quality execution of drawings and schemes, design issues. The use of various methods of 3D modeling (three-dimensional design) in the teaching of computer graphics during the course of the lesson not only develops students' interest in science, but also gives them the opportunity to use almost all the capabilities of graphic systems. On the one hand, this creates a motivation for the student to work on himself, and on the other hand, it activates the motivation for creative activity.
Tasks specific to one category of appearances are divided into three levels. Although these tasks are typical of the same category, their levels of complexity are different. This indicates that several commands should be used depending on the level of complexity in the execution process using the AutoCAD graphics program. In completing each of the tasks related to the views in the picture 1- (a,b,s) below, students are required to develop their creative activity in the field of mathematics, drawing geometry and engineering graphics, as well as to use AutoCAD graphics program "izmenit", "cherchenie" and " razmer" requires familiarity with the following commands on the toolbar: to perform a view task of simple complexity: "line", "ortho mode", "tipy linear", "vesa linear", "linear" commands; to perform an appearance task of medium complexity: in addition to the above commands, the commands " similarity", " crop", " move"; to perform a task of a complex level of appearance: in addition to the tasks given for performing tasks of simple and medium complexity, the task is completed by using such commands as " Break it up", " Break at the point", "Extend".

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