ACTUAL PROBLEMS OF MODERN SCIENCE, EDUCATION AND TRAINING

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ADVANTAGES OF USING 3D TECHNOLOGIES IN TEACHING SPECIALIZED SUBJECTS IN HIGHER EDUCATIONAL INSTITUTIONS

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Abstract: This article provides information on the role of the use of computer technology in improving the quality of education, the possibilities and benefits of using 3D special programs of computer technology in teaching specialized subjects to students studying in the direction of design and all levels of education, as well as data on the systematization of special programs for design design clothes in 2D and 3D technologies.

Also in the article, the process of designing clothing design in the 3D program is compared and analyzed with the process of execution in the 2D CorelDRAW program.
**Key words:** three-dimensional design 3D design, computer technology, teaching methods, innovations, designer, modeling, student, CAD, independent work, thinking, creativity.

**Introduction.** Socio-economic and cultural changes in modern society require a qualitative study of the problems of developing creative abilities in the preparation of future specialists for professional activities at all levels of education. In modern conditions of reforming the education system, democratization and humanization of education, as well as increased attention to the development of professional training of students in the areas of "Interior Design", "Costume Design", "Industrial Design", and other areas of professional education of various profiles in higher educational institutions deserve special attention. [1,c.2] The changes taking place in the life of society require the development of qualitatively new methodologies and methods of education, the development of pedagogical technologies, and on the basis of this, the formation of creative and universal abilities of a person, the training of personnel capable of solving problems of a professional nature [2, c.43].

At present, it can be seen that the use of physical models in the design industry has noticeably decreased. At the same time, great attention is paid to digital technologies to reduce costs and costs, as well as to maximize time. When implementing these requirements, it is impossible not to use information and computer technology systems.

The introduction of computer design technologies makes it possible to promote the use of fundamentally new approaches to solving a number of problems in the field of clothing design. Also, the modernization of the clothing design process based on the introduction of 3D computer technologies made it possible to solve the problems of engineering-spatial design and spatial-form visualization. Using 3D software packages for object design, clothing modeling techniques take design to the new stage.[3,c.1]

**Analysis and results.** At the heart of the scientific direction called "three-dimensional geometric modeling of clothing" is a three-dimensional study of the three-dimensional surface of a clothing model created on a monitor screen, which has not yet been prepared.

Including such scientists as E. E. Alexandrovna, conducted research on the use of automatic design systems (CAD) in teaching specialized subjects to students of engineering and pedagogical direction, T. Chemodanova conducted scientific research on the use of CAD in general technical drawings, Professor V. A. Obukhovets . conducted research on the use of 2D programs in order to provide organizational and methodological support for the process of teaching students of a technical university to work with a computer-aided design system. As a result of scientific research, designing clothes in 2D vector programs at one time greatly simplified the process. But the main disadvantage of 2D design is that there are only two options for checking the result: manual calculations and testing real circuits. Undoubtedly, in both cases, time and a significant expenditure of money are required. In 2D models, it is impossible to represent the final product formed during the design process; if it has a complex appearance, then this process becomes more complicated. This situation creates a need for 3D modeling. And in the 3D program, the analysis of virtual circuits is much cheaper and, in addition, allows you to develop many options for the execution of...
structures and choose the most optimal solution. Students who know how to create these high quality models expand their visual vocabulary. Will have experience with a visual application that includes elements such as texture, light, color, line, space, and shape.[4,c.36]

The implementation of the development of individual labor, artistic creativity and independent work skills of young people living at a time when the world has turned into an Internet space for communication in the process of obtaining higher education is rising to a new qualitative level. From this point of view, it is necessary to identify specific measures aimed at changing the teaching of modern and professional knowledge, realizing the potential of teachers and students, developing personal activity and initiative activity of students, as well as the ability to work independently.

To date, the use of special programs in education is seen as a relevant and popular direction of the pedagogical process, not only for the transfer of knowledge and skills to students, but also for the implementation of the pedagogical process. 3D design, associated with the trends of the changing modern world, is one of the promising teaching methods for special programs, which is reflected in the use of innovative technologies in education.

Design students avoid 3D modeling because they think it's hard to master. It is not difficult to work with three-dimensional graphics, because modern software allows you to get high-quality models without having extensive knowledge in the field of 3D. But, starting to study 3D modeling, students must have technical knowledge and theoretical knowledge in core subjects along with creativity. A student familiar with 3D panels and 3D software will find it easier to communicate with other signs of the creative process. This makes the workflow a bit easier.

There is no doubt that a good designer needs to communicate their idea through sketches, but using a 3D model has an added advantage. Although it sounds difficult, design students should approach 3D modeling with an open mind because it will unlock their creativity, improve their work efficiency, improve design quality, teach them to work independently and to think and make decisions.

Consider the advantages of creating a design in a 3D program using the example of creating a design project for a transformable women's coat:.[5,c.73]

The advantages of creating a design in a 3D program are as follows.

- modern software allows you to create high-quality models without extensive knowledge in the field of 3D;
- the presence of the author (ready-made mannequin) in the 3D design design program;
- Ample opportunity to change the size of the author in the program CLO 3D;
- Availability of sewing clothes directly on the avatar. This feature is ideal for difficult-to-measure custom avatars, providing a perfect fit.
- Then, using the copyright function, you can develop several draft versions of the product on the same basis using constructive modeling methods and change the forms according to copies of the original.
- the ability to create, modify, divide and move an object to another program;
• checking clothes in 3 different planes using animation; in programs to directly try on perfectly tailored clothes and check their fit in motion;
• the possibility of demonstrating clothes;
• availability of the "materials" panel in standard program objects

To solve the tasks set in the work, we use a 3D object modeling program, analyzing the theoretical foundations, structural and system analysis of an automated clothing design system (CAD), the possibility of creating costume design objects.

Figure -1. Appearance of a woman's coat, created in the 3D program.

Consider the process of designing a transformable women's coat in a 2D program.

In a 2D program, after drawing the first view of the dress, you must run the process again to draw the view of the dress in the plane.

Figure 2. View of a woman's coat drawn in 2D CorelDRAW 2022.

To create a model of clothes in 2D programs, you need to perform two stages of working with graphic programs. The first is to create detailed costume elements in any vector program (CorelDraw, AutoCAD, etc.), then create a 3D model, import these drawings into 3D programs (3DS MAX, ZBrush, Maya, etc.) to improve it. If the second stage is not implemented, it will be impossible to see and work on the construction and construction of clothes, as well as directly try on perfectly tailored clothes and check their fit in action. And special programs of 3D MAX technology have functions that can be used at all stages of the development process of fashion design [6, c.94].
In addition, there is an academic version of the CLO 3D program, which is designed for fashion industry companies, fashion school students, to create clothing designs and tailoring simulations very easily and quickly. As with all 3D programs, the entire process is performed in the 2D window, and the result is immediately visible in the 3D window.

To date, there are very large blocks of computer programs that can be used as visual aids in the educational process to improve the efficiency of studying subjects. After analyzing the capabilities and technical characteristics, we have identified a number of programs that are most used in the educational process of design students, they are presented in scheme 1 [7.c.40].

It should be noted that the entire block of computer modeling programs can be divided into two options - these are editors for working with 2D graphics and 3D programs, systematized based on their practical significance in the design direction.

![Programs for computer graphics](image)

**Scheme 1. Programs for computer graphics**

Society and the modern labor market expect a creative approach to solving professional problems from the younger generation. This approach is closely related to the dynamics of the development of society, the rapid flow of information that comes to us, the emergence of new activities in previously unknown areas. [8.c.24]. It can be assumed that the successful development of artistic and creative activity in modern conditions of clothing design becomes a product of 3D programs. This method of product development using 3D technologies allows solving the problems associated with the creation of complex forms of clothing using non-traditional methods. The proposed approach to the design of a clothing model allows us to present various options for the designed product. [9.c.52].

Before making a final decision, the designer can visually determine the shape, silhouette, cut, sleeve, texture, texture, color scheme of the proposed clothing model. The solution of the tasks of the entire process is entrusted to the program algorithm and is carried out without human intervention [10, c.94]. The originality of the result, the final product of creative activity is considered the main evaluation criterion. From experience, it can be assumed that this approach will change the attitude of students to obtaining the necessary information. In addition, in creative activity, not only the result, but also the process itself is of certain importance, which allows developing the imagination. Working in 3D design programs awakens creative activity in the student.
that is, the ability to combine certain information. It also reveals the creative abilities of students, improves work efficiency, improves the quality of design, teaches independent work, thinking and decision-making. A person who is free and creative, able to take responsibility and take initiative, can provide professional growth and self-esteem.

**Conclusion.** Based on the results obtained in the process of work, an analysis and systematization of existing methods for designing clothes was carried out. As a result of the research, it was determined that 3D design methods should be separated into a separate group based on their current perspective and importance.

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