

## THE INTRODUCTION OF THE STUDY OF 3D GRAPHICS IN THE EDUCATIONAL PROCESS IN INSTITUTES OF UZBEKISTAN

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**Abstract:** The article is devoted to the problems of implementing the study 3D graphics are included in the educational process at institutes in Uzbekistan, namely at the National Institute of Fine Art and Design named after Kamoliddin Behzod at the Department of "Applied Graphics". The article analyzes in detail the implementation of the experience of foreign institutes, and also considers the lack of highly qualified specialists in the field of 3D graphics in the country. The rapid development of technology obliges society to keep up with innovations and innovation news. In turn, the introduction of the study of 3D graphics at the National Institute of Fine Art and Design named after Kamoliddin Behzod will serve to train highly qualified specialists in this field.

Of particular relevance is the study of transformations in the structure of science and technology in the XXI century and its impact on education in the country.

**Key words:** 3D graphics, 3D modeling, animation, designer, visualizer, technology, science, technology, program, art, creativity, graphics, artist, qualification, design.

### INRODUCTION

Year after year, we observe how humanity has achieved progress and its continued pursuit of perfection. The world around us is changing and the digital future with fantastic fictions from movies is getting closer and closer to reality.

With the development of computer technology and software, the world has learned about 3D modeling. Advanced modern computer graphics programs realize the embodiment of an idea into a ready-made, visible result, allowing you to create three-dimensional models and projects of large-scale forms and solutions with perfect accuracy.

### THE MAIN RESULTS AND FINDINGS

3D graphics is the process of creating a three-dimensional model with the support of special computer programs. 3D graphics are actively used everywhere: in advertising, in TV shows, in video clips, but it occupies a special place in the creation of video games, applications and in cinematography. Naturally, the above spheres are not complete without special effects and require special visual constructions.

3D modeling and 3D graphics programs are improving every year and gaining enormous popularity. For example, today, the film industry in all countries of the world is almost entirely based on 3D graphics. With the help of a database in the form of drawings, "technical specifications" in which a description of graphic data is carefully selected, a 3D model with a three-dimensional image of the object is created. The designed objects in special 3D programs are unique in that the created model can be viewed from different angles, integrated into absolutely any plane and into any environment. 3D graphics helps to create an object with photographic accuracy and helps to better imagine what an object recreated in real life will look like.

In our republic, special attention is paid to the development of science and innovation. Over the past four years, 28 scientific organizations and 4 innovative technoparks have been created, salaries of scientists have increased. A lot of money was spent on updating the material and technical base of the organizations of the sphere.

On December 3, 2020, under the chairmanship of President Shavkat Mirziyoyev, a video conference dedicated to priority tasks in the field of science and innovation development was held, where the head of state stressed that - "without science, without innovation, we will never achieve our goals. Issues related to higher educational institutions, scientific organizations, industries and regions of priority tasks in the field of science and innovation development were discussed in the video selector.

Unfortunately, there are not enough specialists in 3D modeling in Uzbekistan. Also, it can be observed that today it is relevant to attract young highly qualified specialists to the organization who have qualified in the profile in institutes of Uzbekistan. It should be noted that the introduction and development of 3D graphics in particular at the Department of "Applied Graphics" in the future will serve as the foundation for the development and improvement of this direction. The existence of the problem of studying 3D graphics at the Institute can be solved as follows. For example, to begin with, you can introduce basic training of the concept of 3D graphics in general. Thus, you can gradually switch to practical classes. It is also important to introduce the experience of foreign countries in this area into the program.

Being a very complex and difficult process, 3D graphics requires a lot of time and experience. There are

very few specialists and teachers in this direction at the moment. The shortage of personnel in a narrow specialization is an urgent problem today. Especially, today you can see a lot of people who want to become specialists in this field, young people who study and acquire knowledge in paid courses in the city, in special training centers, and not institutes, as is customary in other countries.

In the future, when studying the theory and practice of 3D graphics, it is possible to reasonably divide all stages of training. As an auxiliary educational resource, you can use specialized ready-made video lessons for certain programs. Step-by-step study and practical exercises will undoubtedly be productive for the development of students of the Department of "Applied Graphics".

Today, students study according to a special program, which was compiled by the Department of "Applied Graphics". This program introduces the study and creation of corporate identity, the study of design, as well as art photography. The inclusion of 3D graphics in the program will serve as the beginning of the training of qualified specialists.

3D graphics itself is a separate "modern" current of fine art. 3D modeling and 3D graphics are the same drawing skills, but in special programs, only improved and suitable for use in electronic form. But, nevertheless, 3D modeling requires more mathematical precision and naturally artistic view.

There are several stages of creating and visualizing 3D models:

- 1) Modeling - creation of three-dimensional objects and models.
- 2) Texturing - the imposition of textures and materials on three-dimensional models.
- 3) Rigging (from the English Rig - installation, equipping) - the production of a virtual "skeleton" for subsequent animation of a character or object.
- 4) Animation - "animation", imitation of the movements of three-dimensional characters or objects.
- 5) Rendering (3D visualization) - visualization of the created graphics and recording.
- 6) Compositing - combining each individual element into the final scene. For example, the introduction of 3D scenes in the captured video, color correction and adding effects.

Within the concept of 3D modeling, polygons and texturing are important aspects - this is a kind of foundation and root of the study of 3D graphics. The higher the number of polygons the simulated object has, the higher the detail, quality and resolution. Based on this, high-poly and low-poly models are subdivided. In the production of films and advertisements, highly polygonal models are most often used, rendering of which is carried out for several weeks or even months.

Texturing is not only the selection of colors and materials for a three-dimensional model, but also a huge area of activity. In some project teams, texture artists work, their task is to correctly visualize the texture and color of the 3D model. The perfect design of the object

with polygons and texture helps to visualize the finished image to the smallest detail.

The work of 3D modeling requires a fairly large amount of time, effort and calculations. It is also necessary to introduce the use and work with relevant and popular programs in the educational process. To study the basics of the theory and practice of 3D modeling and Motion graphics, the interaction of programs, as well as to study the directions and applications by fields of activity.

The study and implementation of working with programs like Maxon Cinema 4D, ZBrush, 3ds Max, Maya, Houdini at the National Institute of Fine Art and Design named after Kamoliddin Bekhzod expand the opportunities for training specialists in the field of computer graphics and gaining new knowledge.

In the study of 3D graphics, the basis of everything is the function of depicting and placing in a real environment object that do not actually exist (extinct prehistoric animals, spaceships, alien life forms) or those that need to be recreated due to the loss of the original (historical urban development, etc.).

In the process of learning 3D modeling and animation, it is necessary to study the experience of foreign specialists in this field. It is especially necessary to study how 3D visualizers work in the "team" for the implementation of the project, regardless of whether it is a movie, animated film, documentary or product advertising. This will be a kind of manual for working with 3D graphics.

## CONCLUSION

Therefore, the study of 3D graphics must be associated with constant practice and updating of information in the field of modeling and animation. These factors, in turn, will serve students who will study 3D graphics and animation to perceive themselves as "free artists" who draw with "electronic politers".

Thus, the introduction of the study of 3D graphics at the National Institute of Fine Art and Design named after Kamoliddin Bekhzod will be the initial stage of introduction into the modern future, where interactive graphics will develop. In the future, more and more highly qualified specialists in the field of 3D graphics in the country will be trained and graduated here.

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