CURRENT RESEARCH JOURNAL OF PEDAGOGICS
(ISSN –2767-3278)
VOLUME 04 ISSUE 03 Pages: 47-52
SJIF IMPACT FACTOR (2021: 5. 714) (2022: 6. 013) (2023: 7. 266)
OCLC – 1242041055
Publisher: Master Journals

Journal Website: https://masterjournals.com/index.php/crjp

Research Article

COMPUTER MODELING AND ITS INFLUENCE ON THE DEVELOPMENT OF ABILITIES FOR DESIGN ACTIVITY

Submission Date: March 19, 2023, **Accepted Date:** March 24, 2023,
Published Date: March 29, 2023
Crossref doi: https://doi.org/10.37547/pedagogics-crjp-04-03-09

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ABSTRACT

This article reveals the influence of computer graphics on the development of students' design ability.

KEYWORDS

Modelling, COREL DREAM 3D, 3D STUDIO MAX.

INTRODUCTION

The manifestation and development of students' abilities for design activities in the process of mastering computer graphics has its own specifics compared to traditional types of graphic activities and requires in-depth research by psychologists, teachers, methodologists in order to develop and improve effective learning technology.

The use of tasks with elements of design creativity in the process of teaching computer graphics, performed using computer programs for creating and editing two-dimensional vector objects and three-dimensional modeling, makes it possible to determine which abilities are updated at different stages of students' activities.

When modeling objects of the virtual world, it is of particular importance to create conditions for the implementation of an individual approach to learning, the teacher's assistance in developing such students' abilities for design activities as active imagination, spatial representation, visual-figurative and emotional thinking, the accuracy of a planar and three-

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dimensional eye, completeness and emotionality. perception, etc.

For the successful implementation of educational and creative activities of students, the volume, high mobilization readiness of memory, high concentration of voluntary external and internal attention, the level of intellectual activity and other personality traits are important.

At the stage of modeling vector geometric objects in a two- or three-dimensional workspace and in the process of searching for a compositional solution, students get the opportunity for free creative search: choosing a realistic or fantastic image, options for shaping objects in a virtual environment, the relationship between the shape, size, scale of elements of complex objects, etc.

In 3D computer graphics, in the process of shaping objects, students make a constant transition from the perspective window to windows of orthogonal projections, windows for modeling the shape of primitives or complex objects, which causes a mobile switching of attention, the development of spatial representations, and stimulates sensorimotor processes.

The subsequent stages are more focused on finding a color scheme, compositional expressiveness, materiality of the project. Here, the success of educational project activity depends on compositional abilities to the full extent.

Determining the materiality of objects requires from students not only practical observations, but also the development of active creative imagination. Working with cameras and light sources is of great importance in the process of creating a computer project. The possibility of using a large number of light sources of various shapes, intensity, direction, degree of distraction, the use of lighting of any color at the initial stages of design requires strict obedience to the conceived artistic image.

Light sources and cameras are independent scene objects. Their editing in the process of transition to different projection planes and placement in space in order to find the most successful angle is impossible without a constant change of point of view on the designed objects, variable anticipation of the result of the activity, development of spatial representations, actualization of mnemonic abilities and creative imagination of students.

Let us dwell on the features of the development of individual components of the structure of abilities for design activity in more detail.

Modeling of three-dimensional objects in computer graphics is impossible without developed spatial thinking, since in the process of work the image of the designed object is constantly compared with the result obtained. Let's trace the features of its functioning and development in the process of mastering computer graphics.

The use of computer technologies for solving creative problems in the graphic activity of students, including elements of artistic design, provides an almost unlimited choice of options for combining objects of the virtual environment, a variety of functions and modeling strategies. In the process of computer modeling of an object in the space presented on the monitor screen, it is constantly necessary to change the reference point, move from one projection to another, change the type of projection (transition from axonometry to perspective and vice versa) in accordance with the strategy of activity. Images of objects are presented on the screen depending on the capabilities of the software with varying degrees of conventionality: sometimes they are presented in the

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form of a wireframe, if necessary - with photorealistic accuracy.

When modeling an object in computer graphics, students constantly operate with its position, change the shape and proportions of its constituent elements, and perform scaling in accordance with the sizes of other objects in the scene. The positioning of the elements of an object relative to each other implies a constant change of reference point, since there is a need to change projection windows. Thus, conditions are created for the development of spatial thinking of students.

For example, when building a scene in COREL DREAM 3D, in 3D STUDIO MAX, the following steps are performed sequentially:

- creation of simple objects;
- combining simple objects into more complex ones;
- placement of complex objects in the scene;
- assigning colors, grayscale coloring and textures to scene objects by using the toning editor;
- placement of light sources and cameras in the scene;
- visualization of the scene and viewing the resulting images. Simple CorelDream3D objects are built in the following ways:
- by combining basic geometric bodies - primitives;
- by combining complex objects based on elements designs of blanks available in the library of the program;
- using a modeling tool (based on the creation of a flat section of complex shape by editing Bezier curves and transformation into a three-dimensional object by extrusion - extrusion);
- using the "Modeling Wizard" based on the algorithm program (successive selection of three-dimensional objects,

step by step approaching the user to the result of object modeling predetermined form).

The use of computer technology allows you to first mentally make the necessary spatial reorientation, and then display the results of mental actions on the screen almost in real time. Thus, visual perception, productive imagination and spatial thinking of students are updated.

The specificity of the functioning of the productive imagination in the process of computer design deserves the attention of psychologists. The images that arise during the implementation of educational design work using computer graphics are closely related to the capabilities and functions of application programs. In addition to the features that reflect the original intent of the project, they are able to reflect the features of images specific to computer graphics. Building "in the internal plan" a sequence, a strategy of project actions, students, conditionally speaking, "think about the functions of the program", predicting a possible result. At the same time, the result obtained may exceed expectations, turn out to be better than the predicted image in some respects, cause a positive emotional reaction and, as a result, stimulate the continuation of creative activity.

Modern software tools significantly reduce the time and effort of a designer when working on original, fantastic projects, and help create conditions for the emergence of a new associative range.

The development of attention in the process of teaching computer graphics is most productive not only at the stage of mastering new software, but also in the implementation of specific projects. The arbitrariness, awareness of internally directed attention is especially important in three-dimensional modeling of objects, since externally directed attention dominates at this stage of design activity.

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There is a need to display the results of search activity on the screen.

It can be assumed that in this case, voluntary attention "on the internal plane" should be conscious and simultaneously directed to the following aspects:

1) search for the result of solving a creative problem;

2) the content of the 3D modeling process, search

rational sequence of transformations of the designed object;

3) search for the optimal algorithm for modeling an object, taking into account the specifics of computer graphics, its functional and technical features (for example, the use of "smoothing" objects to achieve the effect of saving RAM, the introduction of temporary auxiliary objects when constructing complex models, etc.).

With the help of externally directed attention, the tasks of evaluating the results of actions performed, choosing additional software functions, etc. are solved.

In the process of teaching computer graphics, they have their own characteristics and conditions for the manifestation of the mnemonic abilities of a person.

In the process of two and three-dimensional modeling of objects by means of computer graphics, the willingness to easily and quickly reproduce from memory not only the shape of individual structural elements of complex objects, but also the methods of their modeling, corresponding to the specifics and functional features of the software used, plays a role.

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