WEB OF SYNERGY:
International Interdisciplinary Research Journal
Volume 2 Issue 1, Year 2023 ISSN: 2835-3013
https://univerpubl.com/index.php/synergy

Computer Graphics Programs and Processes of their Application to Engineering Graphics

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Article Information

Received: November 22, 2022
Accepted: December 23, 2022
Published: January 24, 2023

Keywords: *raster graphics, vector graphics, fractal graphics, Microsoft Office Power Point, AutoCAD.*

ABSTRACT

At any time, students' learning of various subjects has been considered a form of meeting their demand for information.

At the present time, when educational reforms are being implemented step by step in our republic, based on the requirements of the national personnel training program and the main goal of the reform, students of educational institutions should be able to independently perform certain educational tasks, search for and analyze the necessary information, training and formation and development of the skills of accepting responsible solutions on this basis is a task.

Computer graphics is input, output, representation, change and editing of graphic objects in computer control.

Computer graphics appeared as an independent field in the 60s of the XX century, and a package of special application programs was developed. The term computer graphics was first coined in the 1960s by Verne Hudson and William Fetter, computer graphics researchers at the Boeing Company. Although the abbreviation of the phrase is CG (Computer Graphics), sometimes it is interpreted as CGI (Computer Generated Imaginary).

The main areas of computer graphics include: interface design (interface design), sprite graphics, vector graphics, 3D modeling, shaders, GPU design computer vision and others. Its main methodology is mainly dependent on geometry, optics and physics. The task of computer graphics is to effectively and meaningfully reflect art and visual expression to the user and to process the object taken from the moving world. Nowadays, computer graphics are studied mainly in three types:

raster graphics;

vector graphics;

fractal graphics.

Computer graphics can be considered as the science of mathematical models of geometric objects, shapes and principles and their representation methods. The interest in computer images is explained by the fact that they store a large amount of information: there is an opportunity to clearly display images, and their analysis does not require special knowledge in the field of information technology.

Computer graphics means creation, storage, processing of volume models of objects and their demonstration with the help of EHMs. Computer graphics is one of the constantly developing directions among new information technologies. Such a development is seen in the field of engineering as well. Also, this field is becoming a continuous part of today's global engineering education process.

Modern computer graphics are widely used in the analysis of information on the topic of polynomials, in the preparation of presentation materials, in the processing of images, in finding solutions to complex problems.

The process of covering the topic of polygons and applying it to practice on the basis of computer graphics programs in drawing geometry classes consists of the following tasks;

- to develop theoretical and practical knowledge of modern computer graphics in students;
- to achieve students' mastery of modern computer graphics tools and their use, and to develop the potential of applying this knowledge in solving various problems on the topic of polynomials;
- study the technological structure of computer graphics and preparation and presentation of various presentation materials on the subject;
- to know the role of computer graphics in studying the subject of polygons in drawing geometry lessons and the current situation;
- to know how to use modern computer graphics in one's educational field and professional activity;
- to know how to use technical tools of computer graphics and modern programs related to the field of science.

Today, we can cite the following computer graphics programs that are widely used in the field of engineering education. Including Microsoft Power Point (full name - Microsoft Office Power Point, English: power point' power point - convincing report) is a program for creating and viewing presentations, which is part of Microsoft Office and Microsoft Windows, it is able to work on macOS systems.

Today, there are many computer graphics programs, which differ from each other depending on the field of application. Specialists in each field choose a graphic program that is convenient for their activities. The limits of the programs will also be focused on a specific field. So, 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 subjects before using a graphic program. And with that, graphics programs become more complex.

AutoCAD - It is an automatic design package from the US company Autodesk, a system that allows the user to perform high-quality computer modeling and design work, to quickly and competently develop technical drawings with a high level of accuracy, as well as to simultaneously print them on paper.

The modern AutoCAD (Auto Computer-Aided Design) system interface is created taking into account the capabilities of the most modern computer tools and technologies, which guarantee high-quality execution of drawings and schemes, design issues. AutoCAD program has been created for more than 25 years, but it still occupies a leading position among automatic design

programs. Because the AutoCAD program is an excellent and popular program, which creates any type of scheme and drawings with high accuracy and quality. Also, this program will help the users to fully realize their creative potential. Because of this, millions of specialists, scientists, engineers - technicians and students use the AutoCAD system in the field of automation of design work.

KOMPAS program - It is an automatic design package of the ASKON company of the Russian Federation, a system that allows the user to perform high-quality computer modeling and design work, to quickly and competently develop technical drawings with high accuracy, and simultaneously to print them on paper. The Kompas program is the creative center of ASKON of the Russian Federation is a program produced by the "MS WINDOWS" operating system.

Kompas program includes a comprehensive library of design documents, detail templates, working drawings of commonly used details, assembly drawings, and others. For example, surface roughness, dimensional accuracy and deviations, mutual arrangement of surfaces, dimensional tolerances, etc. can be used automatically in the application.

The Compass program automatically performs labor-intensive tasks such as connecting details, assembling sequence, and separating them. Adding fixtures in assembly drawings is done quickly and accurately. Because the "Kompas" program works mainly with students of the system of uniformity of construction documents (ESKD), the working and assembly drawings designed in it fully correspond to the state standard. In the "Kompas" program, not only details can be designed, but also the technological process of their mechanical processing can be created. The interface of the modern Kompas program system is created taking into account the capabilities of the most modern computer tools and technologies, which guarantee high-quality execution of drawings and schemes, design issues.

The **3D MAX** program is widely used in three-dimensional graphics scientific investigations, engineering project work, and building computer models of physical objects. Three-dimensional graphics is the most complex and comprehensive direction of computer graphics. A user who works with three-dimensional graphics should have knowledge in areas such as designing, lighting, moving objects and cameras, using sound and display effects. Here is information about the organizers of this field - spaces, object modeling, demonstration.

Wide and effective use of all graphic programs in drawing geometry lessons is important in improving students' spatial imagination. In the future, it will serve to acquire the knowledge and skills that will be necessary in the pedagogical activities of future personnel. In order to meet the requirements of the educational process, a pedagogue must have modern computer literacy. Today's task of education is to teach learners to effectively use the flow of information and to create opportunities for them to work independently in the conditions of the information-educational environment that is increasing day by day.

Using modern computer technologies, directing students to the creative process in the course of the lesson, and organizing classes in an interactive way based on the new pedagogical technologies of transitioning on the basis of graphic programs in the course of the lesson, multimedia and presentation based on computer programs that are interesting for students during the lesson it is necessary to organize classes using tools.

Organization of the subject of polygons using graphic programs in drawing geometry classes of pedagogical higher education institutions creates the following opportunities while increasing the quality of education and creating an educational environment;

1. Creating a unified information space - focusing on unifying areas of expertise through modern technologies in order to create the necessary conditions for teaching and directing students to the creative process, to move to a new level of quality in education;

2. Creating a management system for the process of computerization of science subjects - moving to a qualitatively new stage in the organization of education and training of students;
3. It is aimed at improving the qualifications and professional training of teachers, increasing the information culture of students, and helps to move to a qualitatively new stage of organizing lessons on the topic and to ensure the educational process in a methodical manner;

Until then, in traditional education, students were taught to acquire only ready-made knowledge. Such a method extinguished students' independent thinking, orientation to the creative process, intellectual research, and initiative.

Nowadays, the interest in increasing the efficiency of education by using interactive methods (innovative pedagogical and information technologies) in the educational process is growing day by day. Training conducted through modern computer graphic programs should be aimed at students finding the knowledge they are acquiring, independently studying and analyzing it, and even drawing conclusions by themselves.

In this process, the teacher creates conditions for the development, formation, learning and education of individuals and the team, and at the same time, he acts as a manager and guide. In such an educational process, the student becomes the main figure.