

METHODS OF DEVELOPING STUDENTS' DESIGN ABILITY

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Abstract: Developing students' design skills using graphic programs and 3D printers and other programs. In addition, theoretical information on the development of design skills is presented.
Key words: Technology, creativity, design, projection, method, model, design.

TALABALARNI LOYIHALASHTIRISH QOBILIYATINI RIVOJLANTRISH USULLARI.

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Annotatsiya: Talabalarning loyihalash qobiliyatlarini grafik dasturlar va 3D printer va boshqa dasturlardan foydalanib rivojlantrish. Bundan tashqari loyihalash qobiliyatlarini rivojlantrish bo'yicha nazariy ma'lumotlar keltirilgan.

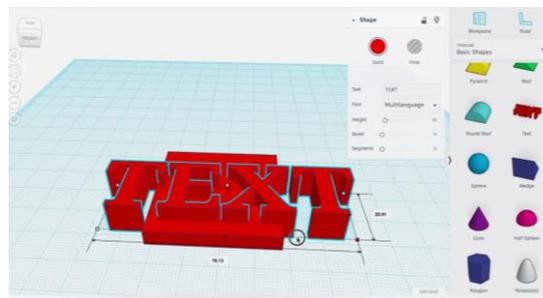
Kalit so'zlar: Texnologiya, ijod, loyihalash, proyeksiya, usul, model, dizayn.

It is known that drawing is a complex process, it requires patience and hard work from the artist. The quality of the drawing depends on the artist's intuition. When it comes to drawing clean and beautiful drawings, mainly the intuition of the hand is of great importance. Lines of the same type to be drawn should be of uniform thickness and be drawn evenly. If a person has a well-developed sense of hand, he can skillfully move the pen on the paper. In order to test the sense of a person's hand, the tip of the pencil is thinned out (sharpened) and a few lines are drawn with the help of a ruler. Then, if most of the drawn lines come out the same, his hand intuition is considered well developed. Some people have relatively undeveloped sense of hand. They draw the same pressure on the pencil regardless of whether the tip is thin or thick. Then the tip of the fine-pointed pen will break, and it is not important to draw gently with the fine-pointed pen. By regularly practicing drawing with a fine-point pencil, you can improve the sense of hand movement. Hand sensitivity decreases after various physical labor processes. It is also recommended to take into account that it will be a little more difficult to draw drawings. Drawing plays a very important role in our life. Today's production cannot be imagined without drawings. The accepted methods of depicting things in technology have been created for many centuries. In production, it is necessary to have their drawings in order to

make a product, for example, the details of machines and mechanisms, and to assemble them, as well as to build buildings and structures. Because you can't make things without drawings. An image that clearly shows the shape and dimensions of an object on a plane is called a complex drawing or, in short, a drawing.

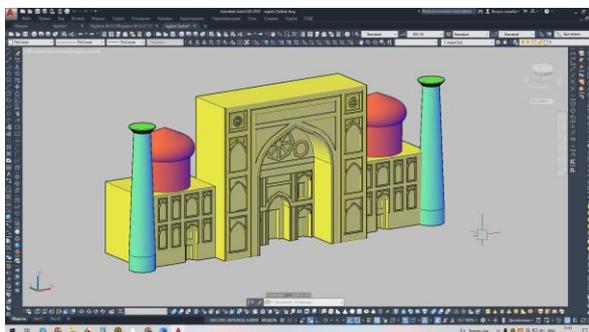
To teach engineering graphics, students need to understand important basic concepts. It includes types of knowledge, basic principles of viewing and teaching.

It is necessary to conduct practical training for students to learn engineering graphics. They should learn to draw, create 3D models, and learn technical skills. Figure 1.

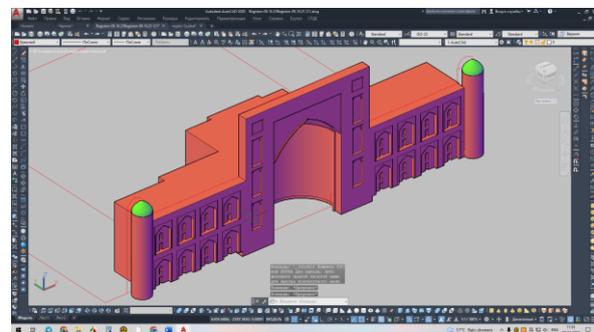


1-fig.

Another part of teaching design in engineering graphics is to create a variety of teaching and hands-on activities through field interactions with students. This can help them learn better and develop their designs. Figure 2.



2-fig.



3-fig.

In order to learn engineering graphics, students must learn computer graphics software. These programs make it easy to draw, model, edit graphics, and create 3D models. Figure 2-3.

What is important for students is that they can create projects and projects in the process of drawing and model making and create their design and structure.

It is important to organize practical skills and practices for the development of design in engineering graphics of students. This will help them increase their practical work experience and develop their knowledge in the field. Figure 4.



4-fig.

One of the complementary aspects of designing teaching in engineering graphics is to give students the opportunity to create their own designs and projects. This gives them an opportunity to learn and implement their own design and technological solutions. Figure 5.



5-fig.

It is important that mentors and teachers are able to support engineering graphics students in their development and mastery.

It is necessary to observe international standards in studying and conducting design in engineering graphics. This will be important for their students to develop themselves as they develop their practice around the world.

These techniques can help students learn to design in engineering graphics and help them develop their design skills.

Engineering graphics is a discipline that involves the creation of drawings, schematics, and drawings developed for design and modeling in engineering fields. In this subject, students learn technical drawing, design, modeling using computer programs and 3D graphics development. The design process goes through the following stages:

- Students learn basic concepts in engineering graphics, general principles of drawing, coordinates and explanatory drawing;
- Includes learning to draw and design using AutoCAD, SolidWorks, Adobe Illustrator and other design programs. Through these programs, students learn practical engineering design;
- 3D modeling techniques, 3D design and modeling programs are aimed at learning how to bring objects and processes to 3D form;
- Students learn how to represent planes and materials in technical drawing. This can help prepare them for real-life engineering projects;
- In engineering graphics, students learn the process of converting created models to prototypes and testing them;



- In Engineering Graphics, students learn the engineering skills, spatial vision, and approaches needed to understand, support, and prioritize design standards;
- Students learn to participate in team design. This provides a good opportunity for them to experience teamwork, design and teamwork.

Studying design in engineering graphics allows students to learn the processes of creating successful engineering projects, drawing and modeling them, designing and producing projects together with other professionals.

Design - designed objects (apparatus and tools, buildings and structures, roads and bridges, machines and equipment, airplanes and spaceships, radio receivers and televisions, telephones and computers, clothes and shoes, furniture and other new types of various products and the process of drawing up and drawing their projects to build and create samples).

It is used in all fields of science and technology. It includes scientific research work, economic and technical calculations, making estimates, drawing and reproduction of drawings, on the basis of drawings, a model of an object (building, machine, etc.) is often prepared. One object can be designed individually (in a single order) and typical (in a mass order). design is carried out by special organizations, firms or groups. These operate by industry or specialization. Standardized details, aggregates, nodes and normative documents are widely used in the design of an object.

Designing is done in these steps: project assignment, project solution, and project testing. In the project assignment, the conditions and expediency of the construction of the future object are based and its details are determined. In the project solution, the works from the plan to the ready state of the future object are determined. In project testing, the finished project is checked based on a specially designed program.

In the implementation of these stages, it is necessary to carry out scientific research and engineering research. At present, the automation of the design process is especially widely paid attention to. It uses organizational and technical tools, electronic calculators, computers, automation tools. This set of tools constitutes a "man-machine" system, that is, an automated design system. This system frees a person from complex and laborious calculations, making difficult tables, and makes designing much faster.

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