

TOOLS FOR DEVELOPING STUDENT DESIGN SKILLS IN CONSTRUCTION DIRECTIONS

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Abstract: *The article presents methods and tools for developing students' skills in architectural design, drawing, reading, creating new ideas in the design process.*

Keywords: *architectural design, computer graphics, imagination, sketch, modeling*

The most important factor in the development of leading countries is the growth of potential, competitive personnel, highly professional personnel. Of course, where science is advanced, new ideas, initiatives, new technologies will continue to grow. The training of potential staff is carried out in a continuous chain from school to school, ie in continuous education. Intensive work is being carried out in the new Uzbekistan to radically reconsider and develop the content of non-violent education, and, most importantly, to improve the legal framework and existing mechanisms for improving the quality of education. The result of this can be seen in the example of the cadres who are emerging in the world arena today with their ideas and initiatives.

In the process of rapid development of society, scientific and technological progress is reflected in unprecedented achievements, inventions, discoveries. The basis of this development are people with high talents. Highly advanced professionals are creating a variety of material, household and similar technical devices that create convenience for people by creating new ideas and demonstrating its positive solutions. As a result, human life is becoming more prosperous.

The work in the field of technology in particular is a vivid example of this. The results achieved in the construction of various buildings and structures, in the automotive industry, etc., are creating conveniences for people. Therefore, one of the most pressing issues today is the training of qualified personnel. Professors have a great responsibility to train specialists in higher education institutions in accordance with modern requirements and to develop their creative abilities.

One of the most pressing issues today is the training of qualified personnel, and to solve this problem it is necessary to effectively use information and communication technologies (ICT) and modern technologies in the organization of the educational process [1]. The possibility of computer modeling facilitates the teaching of disciplines in the field of construction and architecture. It is necessary to organize training on the topics specified in the science program through the possibilities of computer graphics. Today, great importance is attached to the process of independent learning. In science lectures and practical lessons, the teacher does not have time to fully convey the necessary knowledge to students. The teacher guides the student as a consultant on the use of the necessary resources. Can convey basic concepts in science to students by accelerating the learning process. In

the design disciplines it is necessary to organize the selection and use of complex drawings and their drawing, depending on the type of course of digital methodology to develop students' spatial imagination and others in a short time and ensure their mastery. Therefore, in teaching this subject, first of all, it is necessary to ensure that the teacher can use computer software without the help of others.

CAD design systems have a positive effect on students in the design disciplines, architectural design, building design issues and projects. Because the sequence of creating projects in these programs is simple and high in terms of design, it attracts the user's attention. This set of programs was considered the most convenient and advantageous in ensuring a high level of exhibition (colors, materials, textures, gradients, shards, etc.). Science teachers need to develop and use a variety of visual aids in CAD design systems that are necessary for the lesson process.

Modeling is a clear and understandable view of the real event and process of the object of study under study in a particular area. The following types of modeling can be used in the teaching of graphic sciences: computer modeling and graphic and geometric modeling.

The modeling process involves three elements:

- subject (researcher);
- object of research;
- A model that defines (reflects) the relationship between the perceived subject and the perceived object.

Computer modeling is the virtual presentation of mathematical and geometric modeling. Computer modeling can be used in many areas. Wide use in all types of electronics, energy, chemistry and biology, architecture, design, engineering is yielding good results today. In particular, on the subject of "Architectural Design" it is possible to model various project drawings, building models using computer graphics.

Virtual modeling is the modeling of parts, objects, mechanisms, structures, etc. using computer graphics. It also allows you to easily and cost-effectively perform a variety of editing (cutting, trimming, engraving, adding elements, coloring, adding materials, etc.) on virtual models. The use of virtual modeling in conducting experiments provides great economic efficiency [12].

The role of practical lessons is also invaluable for the application of theoretical knowledge in practice, so that students can apply their knowledge and become skills. From this, the student can understand the essence of the theoretical material being studied. If students are able to analyze the information they receive, to ensure that they are able to allocate the necessary part, then the mastery of the knowledge imparted by the teacher will be higher. By motivating students in their field by the teacher, it leads them to be active. As a result, students are able to master knowledge consciously.

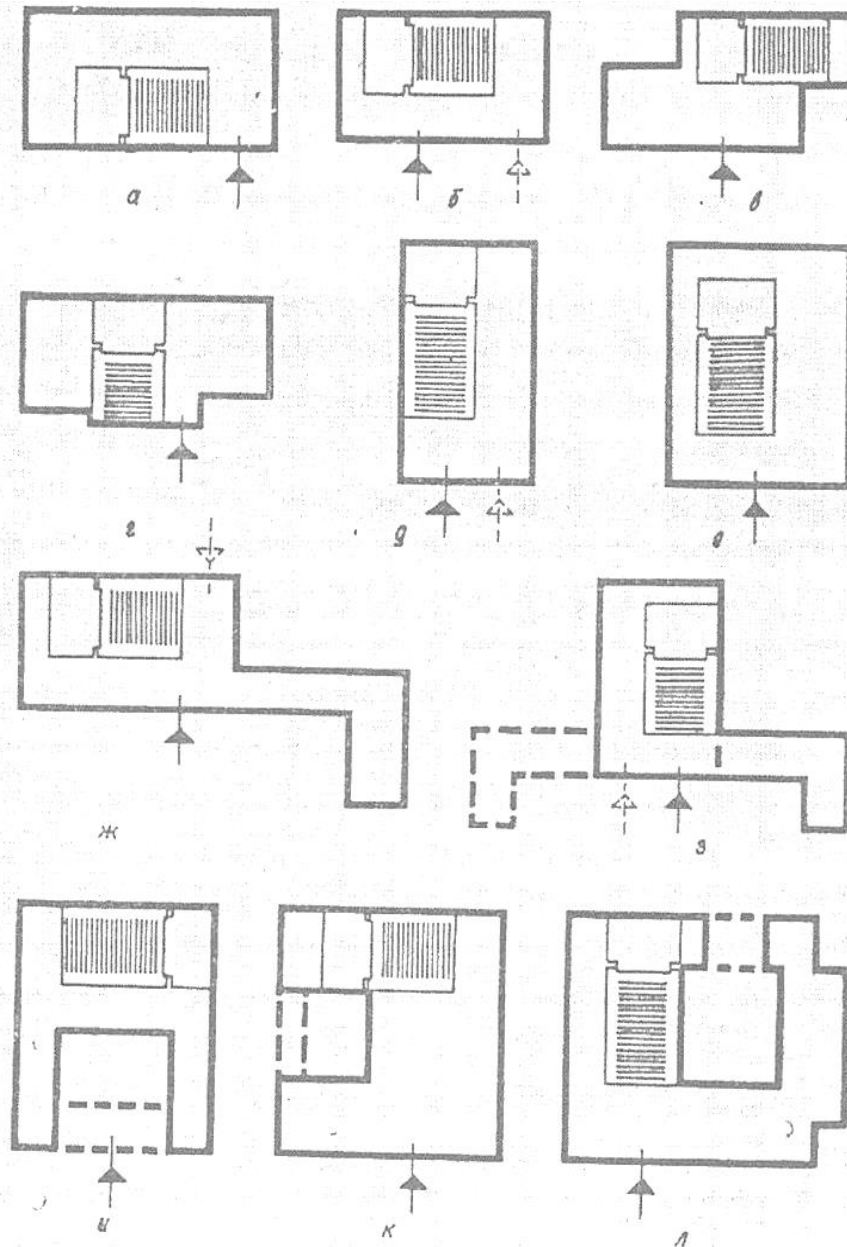


Figure 1. The first sketch on the types of clubs - ideas - clauser

An important factor is the conscious and active acquisition of knowledge, the organization of the teaching process, taking into account the pedagogical and psychological aspects of students. Assignment in Figure 1: The first sketch on the types of clubs - ideas - clauser. At the same time, the professor provides students with sketch samples of the selected project. Students will first need to draw a sketch by hand and form a drawing skill. By drawing by hand, it leads to the emergence of new ideas in students. It helps to imagine what the project will look like in real life during the drawing process. If students do not have enough imagination of what the project will look like in advance, the

professor will help develop imagination by showing the 3d model of it using the capabilities of computer graphics.

If students are given a graphic assignment and explained without the use of computer technology, only certain requirements can achieve the expected results. When the algorithm for the implementation of practical projects is presented in a dynamic (animated) form through the multimedia capabilities of the computer and the 3D model of the project is shown virtually, students have a clear idea of the building being created. Then students can complete the assignment selected or presented to them and have the necessary information.

The multimedia electronic form of various materials used in the course provides a comprehensive convenience for teachers and students. For example, if you help the teacher with time in drawing a sample of a graphic task during a practical lesson, it will be easier for students to be interested and understand them based on the principles of demonstration and comprehensibility. The visual capabilities of the computer are highly effective in creating a variety of animated sequences [3].

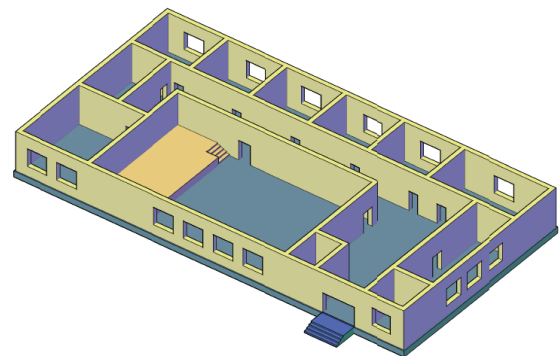
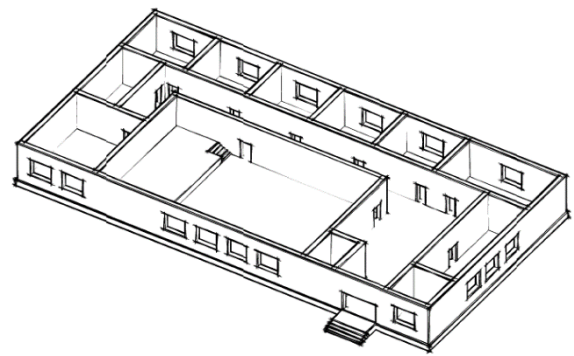
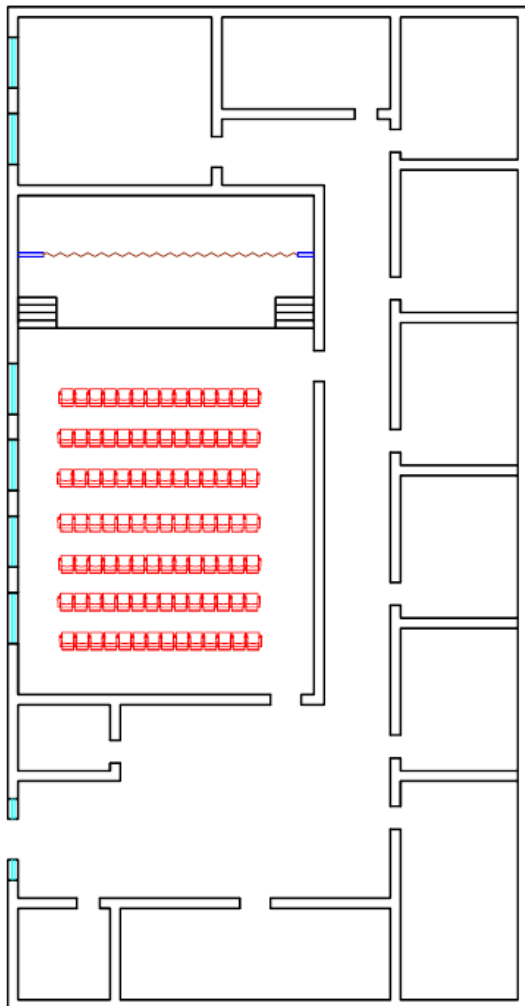


Figure 2. Plan of the selected building

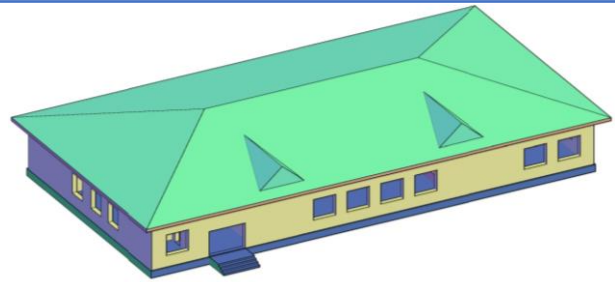


Figure 3. Virtual models of the selected building

It is convenient to create a 3D model of drawings on a computer in AutoCAD graphics program. The created 3D model can be processed using Autodesk Inventor Fusion software, which ensures that it has a high level of visibility. In this program, it is easier to perform editing in the desired part of the 3D model than in the AutoCAD graphics program.

The plan of the building shown in Figure 2 is created in AutoCAD graphics program, and editing capabilities are very convenient. The 3D virtual model of the building selected in Figure 3 is the various views shown, giving the clippings for students to imagine. By showing this process to students in the classroom, they have the opportunity to attract their attention, think and, most importantly, develop their spatial imagination.

A science teacher can create detailed models of topics, building models in AutoCAD and use them in the classroom. Created virtual models can be viewed from different angles using the extensive capabilities of AutoCAD, cropping, changing the color of the model, automatically resizing, and so on.

The following factors should be considered in teaching the subject of architectural design.

- Draw drawings;
- Edit drawings;
- Creating new ideas;
- Study of construction drawings;
- Mastering the requirements of GOST for construction drawings;
- Thorough study of plan, facade, shear topics;
- Know the essence of the subject of architecture;
- Know the types of design;
- Knowledge of architectural design elements;
- Know the basic factors in the design of buildings;
- Study of foreign experience in architectural design;

- Study the history of ancient urban architecture;
- By mastering the most basic factors, such as a perfect understanding of the importance of landscape design in architectural design, professional science teachers should be able to reveal that they are mature professionals. As a result, the attitude to the profession, interest, and the requirements for the training of high-potential personnel in the field can be met.

The creation of a professional education system, which is the main link of continuing education, has a positive impact on the quality of training. including the continuation of graduates of vocational schools, colleges, technical colleges in the field of higher education will ensure continuity and continuity. In particular, the approval of the relevant regulations on the admission of 2nd year students to universities on the basis of interviews after graduating from technical colleges has led to a new stage in the education system.

It is obvious that the success of technical colleges serves as an effective mechanism for training mature personnel by continuing their education in higher education.

For example, a graduate of the Namangan Industrial College, majoring in Architecture, will continue his studies in the 2nd year of Architecture at the Namangan Institute of Engineering and Construction. On the plus side, on the other hand, technical colleges have a great responsibility, which means that the initial part of the field of science should be given at an adequate and demanding level. For example, the subject of Descriptive Geometry and Engineering Graphics, which is taught in universities, is taught in the 1st year in 1-2 semesters. If a graduate of a technical school continues in the 2nd year, he / she will pass this subject without studying at the university. As a result, the teaching of the science of Descriptive Geometry and Engineering Graphics has been introduced in technical schools, but the subject of science programs is not given enough. There are not enough science subjects and topics in construction drawing in such areas as architecture, building construction. Therefore, it is necessary to reconsider and improve the subject and hours of science in technical schools.

The question naturally arises as to why exactly is the science of descriptive geometry and engineering graphics. Because this science is important in the training of specialists in the field, this science, along with teaching drawing and reading, serves as a basis for the formation of graphic knowledge. The science of architectural design based on graphic knowledge, and serves as a key factor in the implementation of works such as the creation of various projects in the field, the reconstruction of existing ones.

Table

Methods of explaining tasks in architectural graphics	
Hand drawing (on the board)	Using dynamic (animated) ICT technologies
Drawing a graphic sample of the projects to be implemented on the board is time consuming and the quality level is low. It is necessary	A high level of visualization (colors, materials, etc.) is the basis for preparing a sample of project graphic assignments in multimedia animated form using IT and creating a 3D model of projects. The ability to repeat the stored learning material (hdd, flash, googleDisk, etc.)

to draw again and again in each lesson.	serves as an assistant (tutor) in the process of independent and distance learning for students.
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In conclusion, it should be noted that the use of modern computer programs, graphics in improving the quality and efficiency of education in the field of architecture and construction will be the basis for the implementation of state educational standards. The use of a variety of modern computer programs in teaching the subject of architectural design has a positive effect on students' ability to draw, read, visualize their models and search for new ideas. The use of modern computer programs, graphics in the teaching of graphics helps students to develop as competitive professionals.

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