The Mechanism Of Using Computer Graphics Programs In The Development Of Students' Spatial Imagination

Mamatov Dilshod

Bukhara state universitety

Abstract – The textbook of drawing in the development of spatial imagination of students through computer graphics was studied, its possibilities in terms of topics were studied, it was shown that activation of the process of drawing education is an important methodological condition for the development of spatial imagination and technical literacy.

Keywords – Computer Graphics, Students' Spatial Imagination, Student.

Forming students' spatial imagination and developing the skills associated with it is the most important component of graphic activity. Indeed, no academic science can develop spatial imagination and spatial hypothesis as a science of drawing.Textbooks for 8-9 grades on the subject of "Drawing" include "Projection of straight lines", "Projections of flat shapes", "Geometric objects and their projections", "Drawing of the model according to its origin", "General concept of axonometric projections", Topics such as "Creative work on changing and redesigning the spatial state of a detail" and other topics are included, which provide a wide range of information about spatial imagination, spatial hypothesis, spatial understanding, spatial geometric images and their creation.

Comprehensive education of human has always been a dream of mankind, and our ancestors sought ways and means to teach the younger generation how to enlighten and cultivate, to lead them to perfection.

The national basis of pedagogy is the realization of the problems of education in connection with the national heritage of each nation, as well as universal, universal values. For example, the encyclopedic scholar Abu Rayhan al-Biruni wrote in the Book of Jewels: If a merciful endures hardships as the peace of men; if he gives to others what is given to him without stinginess, without giving to others, such a person is considered a brave man who is famous for such power; he is known for his meekness, gentleness, steadfastness of will, perseverance, humility, and greatness, and although he is not of this rank, he rises to the highest level. He is respected not by lineage, but by righteousness (with those qualities). "[3] Today, every field needs people who have been favored by A.R. Beruni. Because only such people contribute to the development of the country. This can only be achieved through strong education and training. It is necessary to bring up a perfect person based on the rich experience created by the people, the works of thinkers and scientists. Teaching technology (Figure 1.2.2) plays an important role in the educational process. By improving the stages of teaching technology, the implementation of modern teaching technology guarantees the effectiveness of the learning process. Teaching methods play an important role in the optimal organization and study of the learning process based on modern teaching technology.

Therefore, in the implementation of modern teaching technology, the task is to implement modern educational technology by combining non-traditional teaching methods with the traditional teaching methods that make up the current teaching technology learning process.

Below we view the didactic tasks of some of the teaching methods:

- Didactic tasks of e-learning in computer-assisted learning technology - independent visual acquaintance with new material, independent mastering of new material, expansion and consolidation of knowledge, self-control, independent learning, achievement of "free learning", the ability to distinguish basic concepts, formation of skills in working with electronic textbooks;

- Didactic tasks of the video method - skills of acquaintance and study of new material, consolidation, generalization, systematization, modeling;

- Didactic tasks of the method of mental attack - the acquisition, regulation, consolidation of knowledge, stimulation and formation of interest in learning;

- Didactic tasks of the method of demonstration - visual acquaintance with new material, study and understanding of the formation of concepts, observation, analysis, performance of actions;

- Didactic tasks of the method of exercises - deepening of knowledge, development, repetition, strengthening of skills and abilities for practical use of the studied material; - Laboratory work - didactic tasks of the method - the reception, understanding, mastering, consolidation and deepening of knowledge of new material, the ability to conduct independent research, rational solution of problems, the development of effective creative thinking, communication with equipment, measurement;

- Didactic tasks of the method of working with books - acquaintance, comprehension, mastering new material, expanding and consolidating knowledge, writing abstracts, self-monitoring, independent learning, habits of reading, knowledge of "free reading", the ability to distinguish the main, to take notes, to form structural-logical schemes, to form the basic abstracts, the choice of literature;

- Didactic tasks of the method of discussion - the acquisition, organization and consolidation of knowledge, stimulation and formation of interest in learning, communication skills, logical expression of ideas, the formation of questions, the argumentation of conclusions; -Story - didactic tasks of the method of explanation - narration, explanation, analysis of new material, proof with evidence of various cases; - Didactic tasks of the lecture method - acquaintance with new material, description of complex systems, events and so on.

In the educational process, the appropriate teaching methods and the structure of management of students' learning activities are determined. On this basis, a list of teaching aids is compiled. The system of methods and teaching aids is harmonized with organizational forms, that is, technology is developed, including educational technologies.

In the implementation of modern teaching technologies (Table 1), non-traditional teaching methods were generally compared with traditional teaching (Table 1). Comparison of teaching methods Table 1 clearly shows the advantages of non-traditional teaching methods. From this it can be concluded that traditional teaching methods are reshaped and improved by non-traditional teaching methods (using computer technology).

Table 1. Table of comparison of teaching methods

Traditional teaching method	Non-traditional teaching method
The teacher informs the student, Unclear learning objectives, Statement of ready knowledge, Conversation and storytelling are the priority organizational forms of teaching, Visualization and a certain degree of rigidity, Constant encouragement to memorize, consolidate, and accumulate knowledge compulsorily, The stages of learning consist of disciplines that are not sufficiently connected to the whole system, The trainings are (mostly) of an academic nature and are not sufficiently related to the future activities of the professionals	Designing the learning process using a systematic approach, Defining as much as possible the learning objectives in the form of a set of possible actions of the learner according to the intended pattern, Learning through student behavior, Make adjustments to the learning process by communicating with learners, Formative and generalizing assessments, Criteria control (testing), Full mastery of knowledge and skills, Guaranteed achievement of planned results, Achieving high efficiency of education

- The task is to develop ways to use computer technology, based on the advantages and peculiarities of computer-assisted learning technology; - In contrast to traditional teaching technology, the teaching aids, forms of teaching and active teaching methods required for the implementation of computer-assisted learning technology are selected, identified and the learning process is planned;
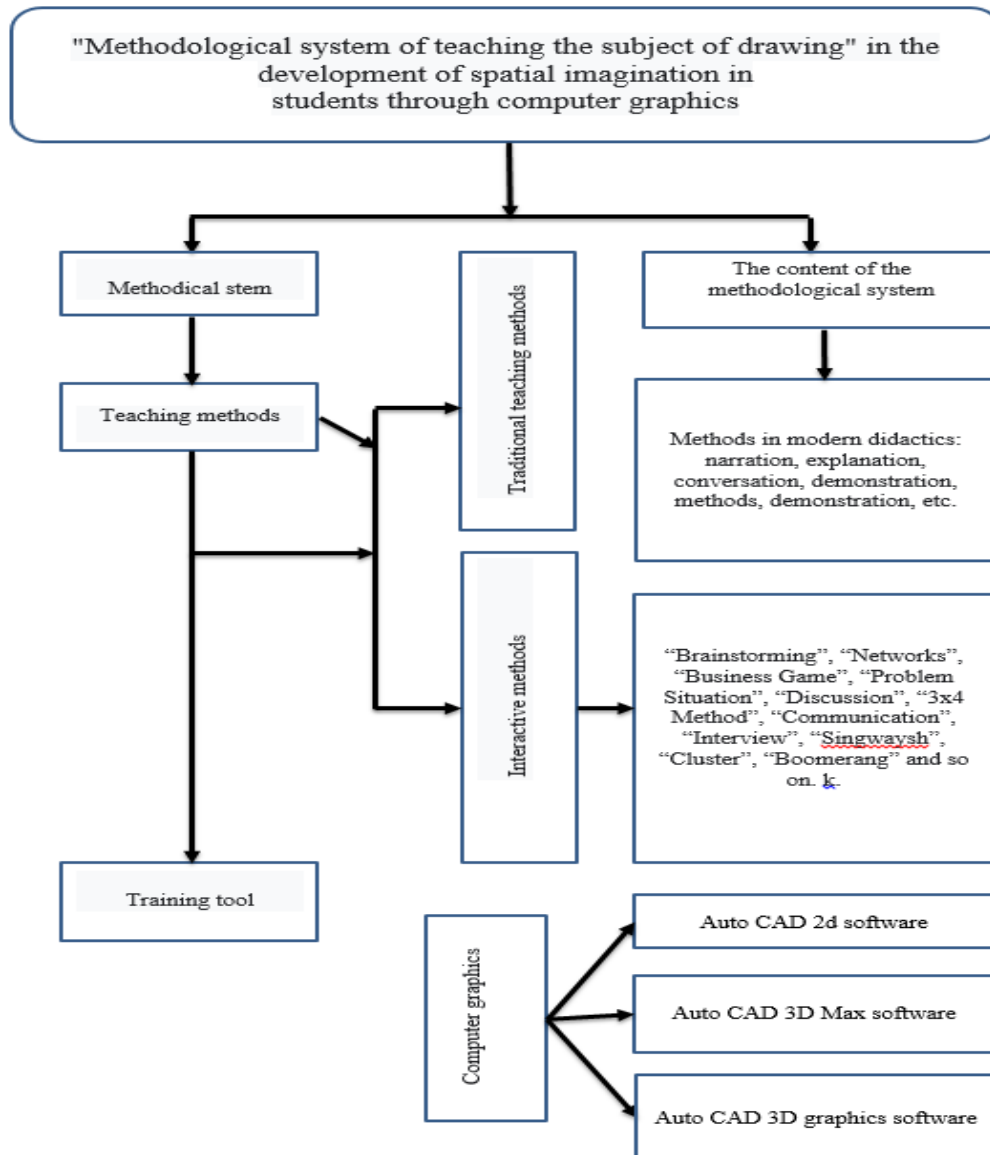
- New teaching tools, forms and methods are selected when planning the teaching process of the curriculum and program topics. In the implementation of modern teaching technology based on teaching methods, it is assumed that the teaching tools, forms and methods are focused on the use of computer technology;

- Ways to use computer technology are used in the classroom. Which of the ways of using the developed computer technology is effective is determined by control and results. According to the results, the ways of using computer technology in this group will continue to be used again, or the optimal ways of using computer technology will be redeveloped.

Thus, (Table 2) is a computer-based learning technology that evaluates the learning process as a system, its organizers, that is, the teacher's use of teaching aids, content and methods, the impact of a particular sequence in a given situation and the learning outcome. is done.

Computer-assisted learning technologies are new learning technologies that create forms of learning based on electronic means. The organization and conduct of training, seminars and practical training, etc. are forms of training, which are carried out in conjunction with teaching aids and methods. According to this system, the teaching process is planned on the basis of curricula and programs in the subject. New teaching tools, forms and methods are selected in the planning of the teaching process.

Computer-assisted learning technology

```
┌─────────────────────────────────────────────────┐
│ "Methodological system of teaching the subject   │
│ of drawing" in the development of spatial         │
│ imagination in students through computer graphics │
└─────────────────────────────────────────────────┘

Methodical stem

Teaching methods ──→ Traditional teaching methods

Training tool

Interactive methods

The content of the methodological system

Methods in modern didactics:
narration, explanation,
conversation, demonstration,
methods, demonstration, etc.

"Brainstorming", "Networks",
"Business Game", "Problem
Situation", "Discussion", "3x4
Method", "Communication",
"Interview", "Singwaysh",
"Cluster", "Boomerang" and so
on. k.

Computer graphics ──→ Auto CAD 2d software
             ──→ Auto CAD 3D Max software
             ──→ Auto CAD 3D graphics software
```

Teaching aids are auxiliary training materials necessary for the successful implementation of a particular teaching method - tools, weapons, hardware, etc., where the use of computer technology involves computers, video, projectors, screens and other technical means.

Forms of teaching - laboratory, practical classes, colloquiums, etc., are a form of theoretical and practical knowledge, ways to introduce computer technology are developed on the basis of curricula and programs in science, planning the teaching process.

Teaching methods are first and foremost a process, a way of knowing. It consists of a set of actions aimed at acquiring knowledge of a process (Table 2). The research focused on the introduction of forms, tools and methods of computer-based learning and their coordination with modern teaching methods without abandoning traditional teaching methods, the development of methods of using computer technology.

Computer-assisted learning technologies are new learning technologies that create forms of learning based on electronic means. This, in turn, became the basis for the introduction of computer-assisted forms, tools and methods of research and their coordination with modern teaching methods without abandoning traditional teaching methods, the development of methods of using computer technology.

In order to optimally solve this problem, serious attention was paid to the development of electronic exhibitions and manuals on the subject of "Drawing", the organization of teaching in modern methods, the mental and physical capabilities, abilities and interests of students. To this end, Al Beruni Works [2; 3], Abu Nasr Forobi [1], Abdulla Avloni [4] and psychological literature [20; 36], and In the research of U.A.Kasimov [116], strong ideas and opinions on the issues of upbringing a perfect person, the development and complexity of the interests of the student period, the formation of curiosities were analyzed and ways to take into account the individual interests of students were studied.

Students can be divided into the following types according to their personal characteristics: • Extrovert (emotionally and environmentally oriented) learner - prefers an active learning process, interaction with other people (social interaction - group assignments, exercises). • Introvert (focused on the emotional and internal environment) learner - the individual enjoys independent learning, i.e. listening to lectures, reading books, and completing written tasks. People differ in their information processing, data perception activities:

• Hearing and verbal perceptors: those who prefer to perceive this type of information tend to listen and summarize the speech;

• Logical-mathematical perceptors: those who prefer to perceive this type of information tend to calculate with more numbers, to reason logically, to justify each reasoning. They remember numbers and dates better.

• Visual, spatial perceivers: Those who prefer to perceive this type of information consider visual aids, different shapes, structural plans, different maps, tables, diagrams, graphs, and diagrams importantly.

• Perceptors through interpersonal interactions and interactions: Those who prefer to perceive this type of information interact with each other in the process of acquiring knowledge. In the educational process, some of them prefer to study independently, to work alone, while some of them seek to work together, to learn in groups. This category of learners is quick to adapt to human relationships, social environment, is interested in learning about people, is more satisfied with the process of interaction, and likes to be around people.

• Self-awareness-based perceptors: learners tend to think more with a focus on self-awareness under the influence of a person's inner feelings and experiences. They tend to be more social and to know and understand those around them better.

• Physical and kinetic perceptors: Some learners are naturally inclined to perform physical activities, enjoy them, and perform physical exercises. They tend to do more practical work, physical labor, exercise with the help of arm and leg muscles, and the tendency to do different things. Learners who kinesthetically perceive and process information prefer modeled lessons, role-plays, and action-based learning;

• Naturalistic connoisseurs: This category of learners is nature-loving, interested in the flora and fauna, the earth and its structure, working with maps, collecting herbariums and natural objects. They love sciences like biology, geography, physics, animal husbandry and botany. • Musical, rhythmic perceptors: this category of learners are prone to melodies and songs, are able to perform their actions in accordance with musical rhythms, are emotional, sensitive and intelligent.

For the educator, it is desirable that the learner's interest is related to his or her other individual-psychological qualities: ability, talent, temperament, and character.

Therefore, using a variety of teaching methods, which form the basis of pedagogical technology, with the definition of pedagogical tasks in the teaching of drawing, to develop students' spatial imagination, thinking, speaking - debating, expressing their ideas through geometric spatial images. , taking into account the need to ensure interest in science in each subject, the methods of the educational process are selected according to their didactic tasks, implemented through the means, enriching the content of education.

In the process of implementation of modern teaching technology of the subject "Drawing" took into account the level of complexity of the curriculum, interdisciplinary relevance and didactic tasks of teaching methods [Appendix 2, Table 2]. In addition, changes were made to the form of teaching without changing the number of hours of lectures and practical classes in the curriculum.

The principle of unity of theory and practice in the education system is first implemented in the learning process, depending on the content and specific nature of the subject. These classes will equip them with the experience they need to be able to put complex scientific theories into practice in the future.

Students gain a comprehensive understanding of the essence of the learning material, the laws of nature and social development on a scientific basis, and develop the skills, abilities and competencies necessary for their future practical activities. Therefore, taking into account the characteristics of each subject, it is accepted as a principle of the educational process to apply the new knowledge studied as much as possible to practice.

The balance of forms, methods and tools of teaching is important for the learning process. While the science of education serves to study knowledge theoretically, to understand logical connections, to develop the ability to think, practical actions, to apply this knowledge in practice, help to form a more complete conviction, skills and abilities.

The conclusion is that the implementation of computer-assisted learning technology in the teaching of the subject "Drawing" simultaneously increases the effective use of information and telecommunications, the ability to work with modern technical means.

REFERENCES

[1] Н.Ж.Ёдгоров. Axborot-kommunikatsiya texnologiyalari chizmachilik ta'limida. http://uz.infocom.uz/2010/01/15/axborot-kommunikatsiya-texnologiyalari-chizmachilik-talimida/

[2] Маматов Д.К., Собирова Ш.У Особенности организации самостоятельной работы студентов Педагогические науки. http://wwenews.esrae.ru/pdf/2015/1/62.pdf

[3] Маматов Д.К. Организация самостоятельной работы студентов первая международная научно-методическая конференция междисциплинарные исследования в науке и образовании http://man-ua.edukit.kiev.ua/Files/downloads/%D0%9F%D0%9D-%D0%A1%D0%B1%D0%A2-14-09-2012.pdf#page=183

[4] Samadovich A. S. Methodics of using programmed means of education for the formation of professional skills of future teachers of fine art.

[5] 5.Азимов С. С. Психологические аспекты формирования профессионального мастерства будущих учителей изобразительного искусства // Вестник науки и образования. – 2020. – №. 21-2 (99).

[6] N.J. Yadgarov. (2021). Methods using the 3ds max package in teaching projection drawing in school. *Euro-Asia Conferences*, *1*(1), 124–127.

[7] 7.Odilova, M. O. "Improving the pedagogical potential of biology teachers using computer programs." *International Engineering Journal For Research & Development* 5.9 (2020): 4-4.