CONTRIBUTIONS OF OUR GREAT THINKERS IN THE DEVELOPMENT OF SPATIAL IMAGINATION IN DRAWING LESSONS.

Umarova Sevara
TerDPI Fine Arts and Engineering Graphics
2nd Year Student of the field of study

Abstract

In this article, the role of pedagogical technologies in the acceptance by students of the topic of "developing spatial imagination and making clear images in the science of drawing" is incomparable. However, nowadays there are few methodological recommendations about the ways and methods of effective use of these modern pedagogical methods in the lessons of teaching the topic "Creating clear images in drawing" directly from the existing pedagogical technologies, interactive methods, and these methods do not have a good effect. I count (this applies to the science of drawing). It is explained that it should be.

Keywords: School, spatial imagination, method, drawing, clear image, clear spreading plane, geometric figure, Parabola, hyperbola, spatial curve, etc.

Based on the tasks set in the National Personnel Training Program of the Republic of Uzbekistan to improve the quality of education, conducting training using innovative teaching technologies opens a wide way for students to strive for independent thinking and deepen their knowledge of science. In the process of training engineer-pedagogues, mastering and applying highly effective innovative educational technologies in the world education system is one of the priority tasks.

The development of drawing mainly started with painting. When people did not know how to write yet, they drew pictures of what they built. Images carved by primitive people on rocks, cave walls and other places have reached our time. Images carved on such rocks were found on the banks of the Yenisei River, in Kazakhstan, Uzbekistan, Altai 7 and other parts of our country. Based on the description of such simple pictures, the first writings were discovered. The ideas of depicting and using three-dimensional geometric shapes (structures) on a plane with the help of conventional symbols in a graphic way have a long history in the development of human society. As an example, we give the Babylon statue in Egypt, which belongs to 2500 BC. The plan of the palace and its scale are depicted on the slab on the lap of Babylon.

A number of scientists have taken a leading position in the field of developing the methods of depicting spatial forms on the plane, developing the theory of their

practical application. Among them, the ancient Greek scientists Aeschylus, Anaxagoras, Democritus, the scientist Eliodora Larissky, who created a work on the perspective of observation (optics), Euclid created 12 axioms, 61 theorems and theories on the perspective of observation in his work Optics. The ancient Roman architect Vitruvius gave information about plans, facades and projections related to construction drawings in his "Ten Books on Architecture". The place of great thinkers of Eastern scientists in the development of drawing science is incomparable. The great thinker Abu Raikhan Beruni, one of the scientists of Central Asia, applied the projection method in his scientific works, drew drawings and used it. He pointed out that when drawing a picture depicting an object, attention should be paid to its appearance, and he wrote: "If it is assumed that an animal is standing inside a right-angled hexagon looking at one of its sides, then the legs of the animal are the front, back, there will be right, left, top and bottom", Abu Rayhan Beruni made the tools he used in his scientific works with the help of drawings. Beruni in his book "Masud's Law" dwells on the issues of measuring the distances between places where the surface of the globe is not visible from one to the other and depicting the results on special maps. In this he says that a special type can be used, formed by 90 circles of different radii around a chosen center and 300 rays radiating from that center.

In another famous work, Kitab at-tahfim, Beruni himself cites a map of the surface of the globe called "Surat-ul-arz". In the section on geometry in that book, he says that it is possible to make five different regular polygons inside the sphere, and Plato gave them, and translates their names into Arabic as follows: Also Beruni "The extent of bodies in space is in three directions, the first is along the length" , the second will be along the width, and the third will be along the depth or height," he wrote. The abstract drawing of the object (not as much as it appears to the eye), but the existing elongation (real size) is determined by these three lines. By means of the lines of these three sides, the body has six sides, and it is limited in space by this number of sides. If you imagine that an animal is standing in the center of these six sides (parallelopiped), and if you imagine that its face is facing one of these sides, then these sides are its front, back, right, left, top and bottom (emphasis is ours) sides. serves. In addition to medicine, Abu Ali ibn Sina was also involved in a number of other sciences. In his scientific and practical work, he created the theory of drawing images and recommended drawing drawings of a much higher level. Our great compatriot Muhammad Musa al-Khorazmi laid the foundation for the development of many sciences. Khorezmi made a great contribution to algebra, astronomy, geography, geometry and other sciences during his life. Khorezmi's spatial ideas in the field of geometry differed from other scientists with his views in algebraic, trigonometric and

geographical fields. According to historical sources, Khorezmi chose the meridian that passed through the city of Arin (now Ujain in India) as the starting meridian in his "Zij", according to Indian tradition. Christopher Columbus, who followed in the footsteps of the great scientist Musa al-Khwarazmi, according to the notes he wrote on the border of his copy, the idea of Arin is a spatial idea that the earth is pear-shaped and that there should be a place opposite to Arin on the diametrically opposite side of the earth. produced. Musa al-Khwarazmi and Abu Nasr al-Farabi's views and thoughtful opinions show that in order to develop spatial imagination, it is necessary to bring the drawing and its appearance before our eyes.
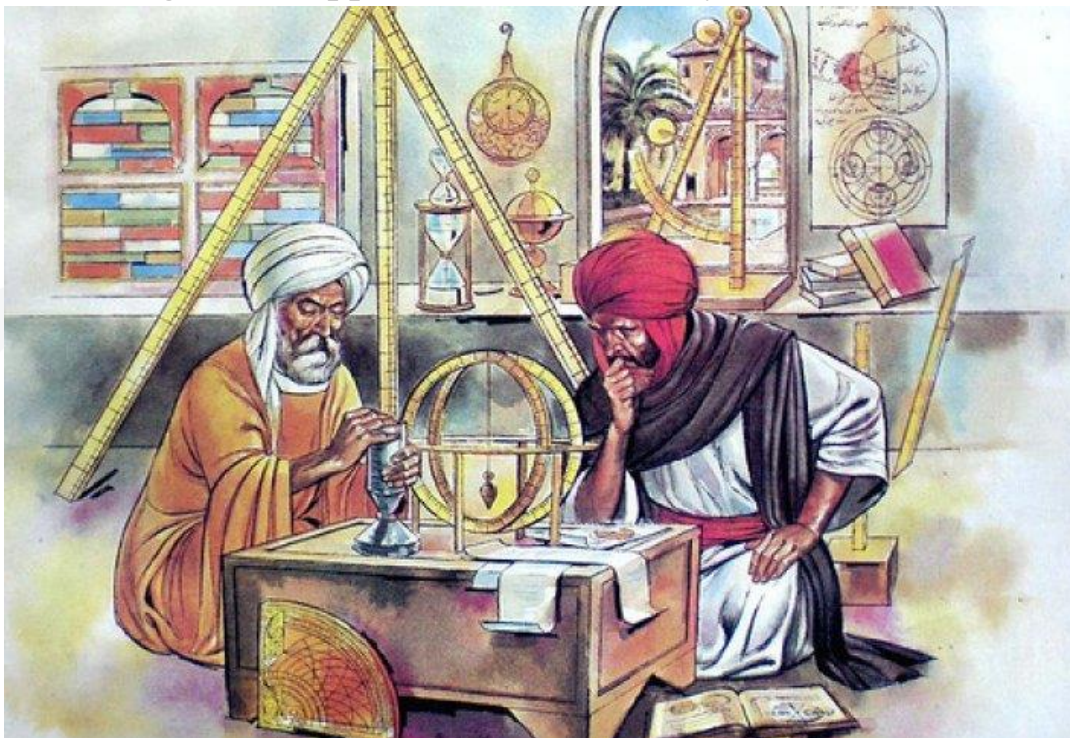
Figure 1

Failure to refer to the drawing during each work sequence can lead to various errors. After all, oriental thinkers were the first to scientifically justify the use of drawing tools, especially the use of a ruler and a circle to perform various graphic works. For example, Abu Nasr Farabi (870-950) in his book on "Geometric constructions" consisting of 10 chapters. With this, Farabi proves the uniqueness of making each shape based on drawings based on scientific evidence. Abu Ishaq Ibrahim ibn Sinon ibn Qur'a (980-946) in his book "Making Three Legal Sections" explained 7 ways to make an ellipse.

He showed how to draw parabola and hyperbola using a ruler and a circle. It is clear from the ideas of the scientific theoretical foundations of knowledge expressed in the works of the great thinkers of the East on the science of drawing that this science has
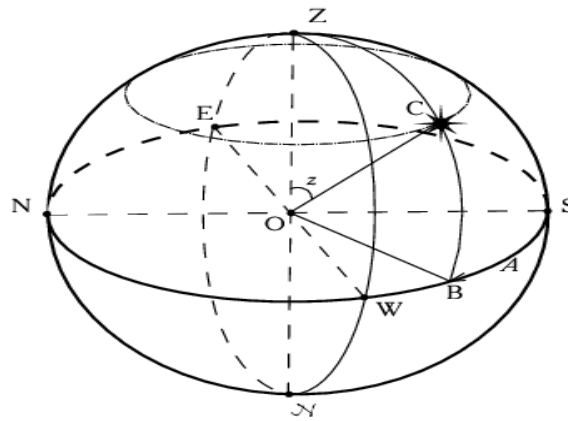
a special significance in the development and uniqueness of this science in world science. Figure 2

After all, one of the scientists of the European countries did not say for nothing that you should learn real science, enlightenment, culture, manners from the countries of the East. Because, as we mentioned, it is not an exaggeration to say that the reason for the development of any science, including the science of drawing in its own way, was the Resonance period in East and Central Asia. Further development of graphic representation methods corresponds to the renaissance period. Lorenzo Ghiberti dedicated his works to the theory of creating perspective images. Italian scientist, artist and sculptor Leon Battista Alberti and artist Pero de Francesco created the works "Architecture" and "Application of perspective in painting". The great Italian scientist and artist Leonardo da Vinci developed the theoretical basis of perspective representation, which belongs to drawing geometry. French mathematician and architect Girard Dezarg wrote several works on image making. French scientist Gaspar Monge is the founder of graphic geometry.
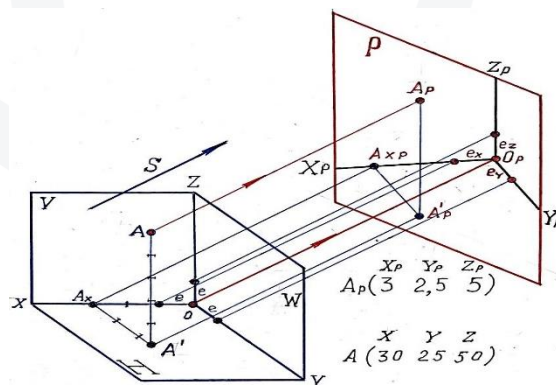

Figure 3

In 1798, Gaspar Monge published the book "Drawing geometry". This book is the first textbook on the science of drawing geometry, in which the generalized theory of the method of orthogonal projections is described. The method of orthogonal projections was used in graphic works even before Monge, and Monge generalized and systematized this method theoretically. Foreign scientists, in particular, Aleksandrovich Sevostyanov, who was the first to establish the science of drawing geometry in Russia, Ya.A. Sevostyanov, was the first to publish a textbook of drawing geometry in Russian in 1821. considered the only textbook. After Ya.A. Sevostyanov, among the Russian scientists, prof. A.H. Reder, N.I. Markarov, V.I. Kurdyumov, D.I. Kargin and others made a great contribution. Professor V.I.Kurdyumov wrote 14 scientific works that include all sections of drawing geometry. Acad. Ye.S.Fyodorov is a geometer-crystallographer who made a great contribution to the development of the science of drawing geometry, his practical and theoretical recommendations are used in physics, chemistry, mineralogy, netrography and other fields of science and technology. Professor N.A. Rinin wrote many scientific works related to graphics. Including "Course of drawing geometry", "Methods of depiction", "Orthogonal projections", "Perspective", "Axonometry", "Numbered projections" and others. Professor A.I. Dobryakov developed methods of applying drawing geometry in construction and architecture and wrote a textbook in this field. His scientific works in the field of shadow theory and perspective developed this branch of drawing geometry. Full member of the Academy of Pedagogical Sciences, science of physics and mathematics. doctor, prof. N.F. Chetverukhin created major scientific works in the field of sketch geometry and projective geometry. In addition to these, scientists V.O.Gordon, M.Ya.Gromov, S.M.Kolotov, G.A.Vladimirsky did great work in the development of the science of drawing geometry. Yu. Kyrgyzboev, R. Khorunov, E. Sobitov, I. Rahmonov, Sh. Murodov, M. Jumaev, A. Umarov, among our scientific and methodical research scientists, to improve the teaching methodology of drawing subjects and traditional educational methodology in our republic . Many compatriots like Mirhamidov, M.Badiev, I.Mamurov, Y.Askarov, Sh.Kengliev, A.Ashirboev, J.Mirhamidov, S.Davletov made a great contribution and are still contributing. In recent years, a number of scientists of our republic, Sh. Abdurakhmanov, K.Madumarov, N.Khurboev, E.Ruziev, D.Kuchkorova, K.A.Zoyirov, U.Rikhsiboev, N.Yodgorov, S.Saydaliev, Ch.Shokirova, A.Damrakulov, and research assistants A.Abdurakhmanov, B. Nigmonov, A. Valiyev, along with creating educational literature, are also conducting scientific and methodical research works. Our scientists and their comrades, whose names are mentioned above, in addition to carrying out scientific research work, created educational literature, textbooks,

training manuals and methodical manuals on the subjects of drawing. They are used by students, masters, doctoral students and young teachers studying these subjects in our republic. The main goal of the scientific research conducted by them is to increase and develop students' interest in science, to develop drawing skills and competencies, and the research work on computer graphics is carried out and is currently ongoing. and the use of computer capabilities, raising the efficiency of the lesson to high levels, training strong specialists.

The science of drawing, like other sciences, emerged as a result of human labor. Some information about projection is given in the geometry and astronomy works of Muhammad al-Khorazmi, Abu Nasr al-Farabi, Ahmad al-Farghani, Abu Rayhan Beruni, Abu Ali ibn Sina and others, who lived and worked in Central Asia in the 9th-11th centuries. .

In 1976, Yu. Kyrgyzboev published the textbook "Sets of problems in drawing geometry". Under his leadership, "Technical Drawing Course" (co-authors Z. Inogamova, T. Riksiboev) was published in 1987. The set of drawing terms in the Uzbek language has been expanded, and their methodological quality has been improved. In 1974, the textbook "Mechanical drawing course" was created for the first time in the Uzbek language by Yu. Kyrgyzboev, E. Sobitov, L. Khakimov, I. Rakhmanov. In addition to theoretical and practical information, the textbook contains a collection of science terms used in drawing. From 1963 Sh.K.Murodov was the first pedagogue of our republic to become professor in Kiev. Scientific contacts with Ukrainian scientists appeared due to his admission to postgraduate studies at S.M. Kolotov Scientific School. In 1968, the current head of the Kyiv scientific school, the honored scientist, doctor of technical sciences, Professor E. Mikhailenko, first came to Bukhara (BDPI) and Samarkand (SamDAQI) universities to give lectures and in the following years Several visits to the cities of Tashkent, Samarkand, Bukhara, Urganch, Ko`kan, Shymkent and Dzhambul and the selection of researchers and graduate students after holding scientific seminars is one of the main reasons for the development of the science of "Drawing geometry" in Uzbekistan and neighboring republics. It's done.

As a result, 24 of the 26 candidates of sciences in our republic defended their dissertations in this scientific school, and 4 of them - Sh.K.Murodov, R.Q.Ismatullayev, J.Ya.Yodgorov, D.F.Kochkarova (doctor of technical sciences) became professors. Abu Rayhan Beruni, one of the scientists of Central Asia, applied the method of projections and drew drawings and used it in his scientific works. When drawing a picture depicting an object, he stopped to pay attention to its appearance and wrote: "If it is assumed that an animal is standing in a right-angled hexagon

looking at one side of it, then the legs of the animal are the front, back, and sides of the animal. There will be left, right, top and bottom. Abu Rayhan Beruni made the tools he used in his scientific work with the help of drawings. In his scientific and practical work, he created the theory of drawing images and recommended drawing drawings of a much higher level.

A number of scientists have taken a leading position in the field of developing the methods of depicting spatial forms on a plane, developing the theory of their practical application. The work of the ancient Roman architect Vitruvius "Ten Books on Architecture" contains information about plans, facades and projections related to construction drawings. In this way, graphics continued to develop along its own path of development.

Finally, the French engineer and scientist Gaspar Monge, who developed, proved and put into practice the most appropriate system of projecting an object onto two mutually perpendicular planes, made a sharp turn in the science of drawing. As a result, the "Monge system" was created, and in 1798, the first book "Draft geometry" was published. This book is the first textbook on drawing geometry, in which the improved theory of the orthogonal (parallel) projection method is described.

LIST OF REFERENCES

1. Uralovich T. F. Conducting classes on fine arts based on information and communication technologies //International Engineering Journal For Research & Development. – 2021. – T. 6. – C. 3-3.
2. Toshpulatov F. USE OF GEOMETRIC PATTERNS AND THEIR TYPES FROM ELIMINATIONS OF DRAWING AND APPLIED ART IN ARCHITECTURAL FACILITIES //Физико-технологического образование. – 2022. – T. 1. – №. 1.
3. Toshpo'Latov F. U. et al. Bolalarni o 'yin texnologiyalari asosida kasb-hunarga qiziqishlarini shakllantirishda rivojlantiruvchi o 'yinlar //Science and Education. – 2021. – T. 2. – №. 4. – C. 487-491.
4. Toshpulatov F. U., Turopova R. B. Games that develop children's interest in the profession based on game technology //Science and Education. – 2021. – T. 2. – №. 4. – C. 487-491.
5. Urolovich T. F. CHIZMACHILIK DARSLARIDA AMALIY SAN'AT ELEMENTLARIDAN FOYDALANIB TARKIBIDA TUTASHMA ELEMENTLAR QATNASHGAN NAQSH NAMUNALARINI CHIZISH //Eurasian Journal of Law, Finance and Applied Sciences. – 2022. – T. 2. – №. 2. – C. 158-162.
6. Urolovich T. F. et al. USE OF PERSPECTIVE POSITION AND METRIC ISSUES IN PRACTICAL DRAWING IN DESCRIPTION OF NUMBER LESSONS

//Innovative Society: Problems, Analysis and Development Prospects.-2022.-S. – C. 41-44.

7. Urolovich, T. F. "DEVELOPMENT OF INDEPENDENT LEARNING ACTIVITY OF STUDENTS IN THE PROCESS OF DRAWING GEOMETRY EDUCATION." *Eurasian Journal of Law, Finance and Applied Sciences* 2.2 (2022): 279-283.

8. Toshpulatov F. QIRQIM VA KESIM BAJARISHDA OQUVCHILARDA TIPIK XATOLARGA YOL QOYMASLIK KO 'NIKMALARINI RIVOJLANTIRISH //Физико-технологического образование. – 2022. – №. 4.

9. Toshpulatov F. CHIZMACHILIK FANINI TABIIY HODISALAR BILAN AMALIY BOG'LIQLIGI //Физико-технологического образование. – 2022. – Т. 1. – №. 1.

10. Toshpulatov F. U., Mominov B. K., Mamatkulov I. C. Determination of Sections of General Surfaces of the Second Order on Predetermined Circles //The American Journal of Interdisciplinary Innovations and Research. – 2020. – Т. 2. – №. 11. – C. 21-26.

11. Toshpulatov F. U., Mominov B. K., Mamatkulov I. C. Determination of Sections of General Surfaces of the Second Order on Predetermined Circles //The American Journal of Interdisciplinary Innovations and Research. – 2020. – Т. 2. – №. 11. – C. 21-26.

12. Холмуродов Ш. О. Роль инновации в технологии воспитания профессиональной и творческой деятельности будущего учителя информатики //Вопросы науки и образования. – 2021. – №. 18 (143). – С. 11-19.

13. Okboevich K. S. Mathcad system as a means of increasing the efficiency of physics //Archive of Conferences. – 2021. – C. 138-141.

14. Xolmurodov S. O. METHODOLOGICAL ASPECTS, CONTENT AND ORGANIZATIONAL FORMS OF TEACHING A COMPUTER SCIENCE COURSE AT HUMANITARIAN FACULTIES OF PEDAGOGICAL UNIVERSITIES //Theoretical & Applied Science. – 2020. – №. 4. – C. 239-241.

15. Садатов Ч. Обучение рисованию обнаженного мужского тела с передней стороны с карандашным рисунком //Общество и инновации. – 2021. – Т. 2. – №. 3/S. – С. 361-365.

16. Chorshanbayevich M. I. et al. RANG TASVIRNING QISQACHA RIVOJLANISH TARIXI //Scientific Impulse. – 2022. – Т. 1. – №. 4. – С. 273-282.

17. Baxtiyor o'g'li K. M. THE ISSUE OF DONATION AND CHARITY IN ISLAM //BEST SCIENTIFIC RESEARCH-2023. – 2023. – Т. 2.

18. qizi Maktabgacha T. R. B. yoshdagi bolalarning badiiy estetik madaniyatini o'yinlar orqali shakllantirish EURASIAN JOURNAL OF LAW //FINANCE AND APPLIED SCIENCES https://doi. org/10.5281/zenodo. – T. 6341593.

19. Baratovna T. R. Developing Dialogic Speech of Pre-School Children on the Basis of a Variative Approach //American Journal of Social and Humanitarian Research. – 2022. – T. 3. – №. 10. – C. 272-275.