Ethiopian International Journal of Multidisciplinary Research

pISSN:2349-5707 Volume:12,Issue 09,September-2025 eISSN:2349-5715

THE ROLE OF DRAWING IN THE FORMATION OF LOGICAL THINKING SKILLS IN STUDENTS: INTERDISCIPLINARY INTEGRATION APPROACH

Termez State Pedagogical Institute

Head of the Department of "Fine Arts,"

Doctor of Pedagogical Sciences, Associate Professor

Tashpulatov Fakhriddin Urolovich

Abstract: In this article, the role of drawing in the formation of logical thinking skills in students is analyzed within the framework of interdisciplinary integration. During the research, the processes of developing students' thinking through drawing lessons, strengthening spatial imagination, and forming an analytical approach to solving technical problems are highlighted. It is also determined that the didactic possibilities of the subject of drawing have expanded through its integration with computer science, mathematics, and technology.

Keywords: Drawing, logical thinking, interdisciplinary integration, engineering education, visual thinking, graphic knowledge, cognitive development, teaching methodology.

Introduction: In modern engineering and technical education, the formation of students' skills such as logical thinking, analytical approach, and problem-solving is becoming an urgent task. The subject of drawing is of particular importance in the formation of these skills, as it develops spatial imagination, graphic thinking, and the ability to visually represent engineering solutions.
The science of drawing, by its nature, is inextricably linked with such sciences as mathematics, computer science, physics, and technology. In particular, analyzing multidimensional images, projecting based on geometry, and creating models of real objects develops a logical approach to problem situations in students.
Therefore, this article is aimed at determining the role of drawing in the formation of logical thinking, assessing the effectiveness of the interdisciplinary integrated educational approach, and providing practical recommendations.
Methods: this study aims to determine the role of drawing in interdisciplinary integration in the formation of logical thinking skills in students. The study used a combination of qualitative and quantitative approaches. In the research process, practical and theoretical data were collected and analyzed. Focus:

- **Practical tests** - as a result of applying interdisciplinary integration in the educational process, a change in students' thinking abilities was observed. During the tests, interactive classes, group work, and project activities were carried out.

- **Data collection methods** - tests for assessing logical thinking, assignments, as well as analytical approaches to drawings and diagrams in students' creative works were used.

- **Statistical analysis** - the obtained results were analyzed, and comparative comparisons, averages, and variances were calculated to determine the effectiveness of interdisciplinary integration.

- **Observation and document analysis** - attention was paid to the educational materials and textbooks on the subject of drawing in the educational process, as well as to the methodological developments of teachers.

Based on the research results, effective methods and techniques for the formation of logical thinking skills through interdisciplinary integration were recommended.

pISSN:2349-5707 Volume:12,Issue 09,September-2025 eISSN:2349-5715

Results: research results showed the following key aspects:

1. The role of the science of drawing as a means of developing spatial and logical thinking is strong**.** Students learn to analyze the structure, proportions, and motion of an object by representing it in a drawing.
2. When interdisciplinary integration is applied in lessons (drawing + mathematics + computer science), students demonstrate greater thinking skills, graphical analysis, collaborative work, and solution development.
3. In the experimental group with the enrichment of drawing lessons by teachers with elements of mathematics and physics, the level of independent problem-solving of students increased by 30-35% (according to the survey results).
4. Working with digital technologies (AutoCAD, Compass, SolidWorks) in drawing lessons significantly activates students' analytical thinking.

Discussion: The obtained results indicate that the subject of drawing should be taught not independently, but in an integrated approach. Lessons conducted in combination with elements of mathematics, computer science, geometry create connections in the thinking of students, which stimulates logical thinking.

Also, through the development of graphic thinking, students' abilities to analyze, imagine, and propose solutions to spatial problems are strengthened. This serves as an important foundation for their future development as engineers, architects, designers, and technologists.

Such integrated approaches in education should be implemented through the involvement of more practical exercises, interactive teaching methods, and digital technologies.

Compared to the drawing shown in Figure 1, we can form three different logical ideas.

- Understanding the relationships between shapes and dimensions in engineering graphics drawings requires logical thinking. This skill teaches the student to analyze any complex design step by step, as a result of which errors are reduced and efficiency is increased.
- logical thinking guides students to solve creative problems. In drawing, it is important not only to follow the instructions, but also to search for new solutions, to try alternative options. Logical thinking helps students analyze problems, find cause-and-effect relationships, and make effective decisions.
- The science of drawing serves as an interactive and practical basis in the formation of logical thinking. With the help of drawings, students learn to see, imagine, and clearly express abstract concepts. This strengthens logical thinking skills and develops independent thinking.

pISSN:2349-5707 Volume:12,Issue 09,September-2025 eISSN:2349-5715

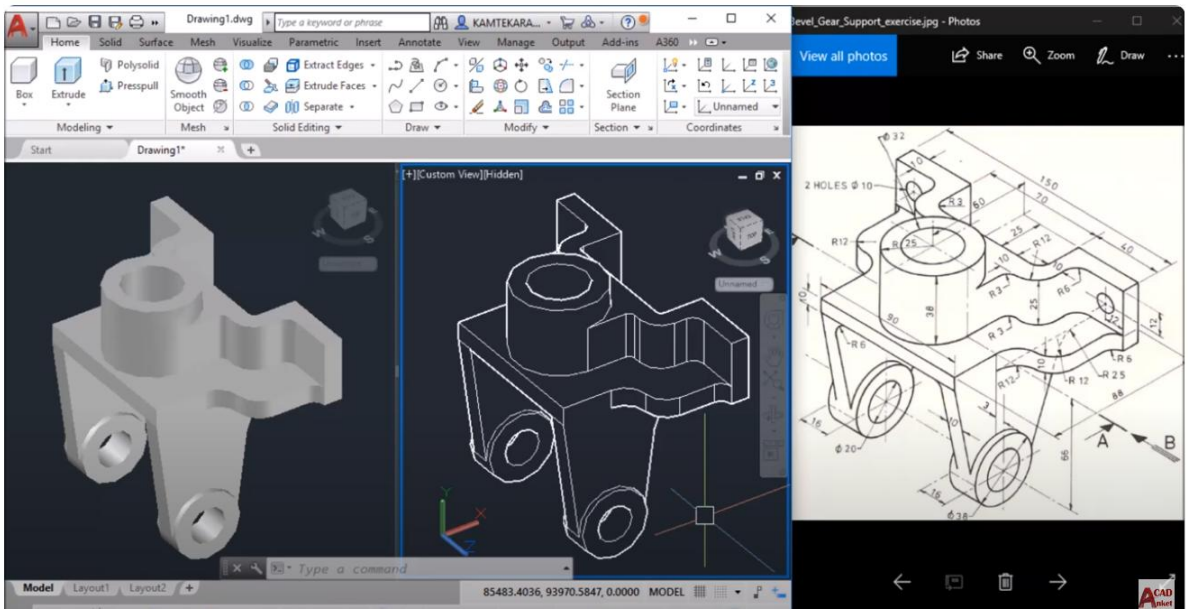

Figure 1. Creating a 3D virtual model based on a given technical drawing or model is the process of creating a three-dimensional (3D) view of an object using a computer, taking into account the shape, dimensions, and geometry specified in the drawing..

Conclusion: in this study, the role of the subject of drawing and the interdisciplinary integration approach in the formation of logical thinking skills in students were analyzed. The obtained results showed that the subject of drawing is an effective tool not only for the development of technical knowledge, but also for the development of systematic and logical thinking. Interdisciplinary integration helps expand students' knowledge and increase their problem-solving abilities.

The harmony between 3D modeling and traditional technical drawings serves to deepen students' understanding of the topic, as well as the development of creative and critical thinking. At the same time, the use of interactive learning methods and modern programs plays an important role in strengthening logical thinking skills.

As a result, teaching the subject of drawing through interdisciplinary integration is recommended as an effective method for the formation of students' logical thinking. This is an important factor in improving the qualifications of future engineers and preparing them to work with modern technologies.

Bibliography:

1. Ro‘ziyev E. I., Sharipov Sh. S. Muhandislik grafikasi, arxitektura va qurilish chizmachiligidan tasvirli qisqacha ruscha-o‘zbekcha-inglizcha lug‘at. Toshkent: 2019. https://akbt.urspi.uz/uz/books/441.
2. Ro‘ziyev E. I., Ashirboyev A. Muhandislik grafikasini o‘qitish metodikasi. Toshkent: Yangi asr avlodi, 2010. https://akbt.urspi.uz/uz/books/815.
3. Turaqulov A. E. SHAXSNING BADIIY MADANIYATI VA MA’NAVIYATINI RIVOJLANISHIDA TASVIRIY SAN’ATNING O ‘RNI //Inter education & global study. – 2024. – №. 3. – C. 38-47.
4. Ergashevich T. A. DEVELOPMENT AND IMPROVEMENT OF A MODEL FOR THE DEVELOPMENT OF STUDENTS'DESIGN SKILLS //INTERNATIONAL JOURNAL OF SOCIAL SCIENCE & INTERDISCIPLINARY RESEARCH ISSN: 2277-3630 Impact factor: 8.036. – 2022. – T. 11. – №. 05. – C. 156-159.

pISSN:2349-5707 Volume:12,Issue 09,September-2025 eISSN:2349-5715

5. 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. – С. 21-26.
6. Тошпулатов Ф. У., Туропова Р. Б. Игры, которые развивают интерес детей к профессии на основе игровых технологий //Наука и образование. – 2021. – Т. 2. – С. 487-491.
7. Toshpulatov F. U. et al. Issues of Developing the Culture of Measurement in Drawing Lessons (In the Case of General Secondary Schools) //Vital Annex: International Journal of Novel Research in Advanced Sciences. – 2022. – Т. 1. – №. 5. – С. 111-119.
8. Dilrabo H. et al. Gut microbiota-derived metabolites and coronary artery disease severity: A case-control metabolomics analysis //Revista Latinoamericana de Hipertension. – 2025. – Т. 20. – №. 6.
9. Toshpulatov F. U. CHIZMACHILIK DARSLARIDA GEOMETRIK YASASHLAR ORQALI ESTETIK KO ‘NIKMALARINI REVOJLANTERISH //Inter education & global study. – 2025. – №. 4. – С. 38-45.
10. Karamatovich M. B. THE PLACE AND SIGNIFICANCE OF FINE ARTS TODAY //Zbiór artykułów naukowych recenzowanych. – С. 105.
11. Baxtiyor M., Ilxomjon M. GRAPHIC PROGRAMS USED IN THE LEARNING PROCESS, AS WELL AS THE CAPABILITIES OF AUTOCAD AND 3D MAX GRAPHICS PROGRAMS //Universum: технические науки. – 2021. – №. 11-5 (92). – С. 92-94.
12. Муминов Б. К. и др. RANGTASVIR MASHG’ULOTLARIDA O’QUVCHILARNI NATYURMORT ISHLASHGA O’RGATISH METODIKASI //Научная дискуссия: инновации в современном мире. – 2017. – №. 7. – С. 137-140.
13. 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. – С. 21-26.