AMERICAN JOURNAL OF EDUCATION AND LEARNING
ISSN: 2996-5128 (online) | ResearchBib (IF) = 10.91 IMPACT FACTOR
Volume-4| Issue-6| 2026 Published: |30-06-2026|

METHODOLOGY FOR DEVELOPING SPECIAL COMPETENCES OF FUTURE TECHNOLOGY TEACHERS BASED ON MODERN GRAPHIC PROGRAMS.

https://doi.org/10.5281/zenodo.20583499

Independent researcher: **Sattarov Shavkat Yuldashevich.**
Termez State University Barkamol Avlod Street, 190111, Termez, Uzbekistan E-mail: shsattoriv@tersu.uz
Scientific advisor: **Turaev Khumoyiddin Abdugafforovich**
Associate Professor, Ph.D., TerSU.
Termez State University Barkamol Avlod Street, 190111, Termez, Uzbekistan E-mail: turayev@tersu.uz

Abstract

This article analyzes the pedagogical possibilities and importance of using modern graphic programs in the process of developing special competencies of future teachers of technology. The issues of forming students' creative approach, technical thinking and professional and practical skills using graphic programs are highlighted. Also, effective ways to increase the effectiveness of teaching by integrating innovative pedagogical technologies into the educational process are shown.

Key words

graphic programs, special competencies, technological education, computer graphics, AutoCAD, 3D modeling, professional training, design activities, digital technologies, innovative education.

Аннотация

В данной статье анализируются педагогические возможности и важность использования современных графических программ в процессе формирования специальных компетенций будущих учителей технологии. Вопросы формирования творческого подхода, технического мышления и профессионально-практических навыков студентов освещаются средствами графических программ. Также показаны эффективные пути повышения эффективности обучения за счет интеграции инновационных педагогических технологий в учебный процесс..

Ключевые слова

графические программы, специальные компетенции, технологическое образование, компьютерная графика, AutoCAD, 3D-моделирование,

AMERICAN JOURNAL OF EDUCATION AND LEARNING
ISSN: 2996-5128 (online) | ResearchBib (IF) = 10.91 IMPACT FACTOR
Volume-4| Issue-6| 2026 Published: |30-06-2026|

профессиональная подготовка, проектная деятельность, цифровые технологии, инновационное образование.

Annotatsiya

Ushbu maqolada bo‘lajak texnologiya fani o‘qituvchilarining maxsus kompetensiyalarini rivojlantirish jarayonida zamonaviy grafik dasturlardan foydalanishning pedagogik imkoniyatlari hamda ahamiyati tahlil etilgan. Grafik dasturlar vositasida talabalarning ijodiy yondashuvi, texnik tafakkuri va kasbiy-amaliy ko‘nikmalarini shakllantirish masalalari yoritilgan. Shuningdek, ta’lim jarayoniga innovatsion pedagogik texnologiyalarni integratsiya qilish orqali o‘qitish samaradorligini oshirishning samarali yo‘llari ko‘rsatib berilgan.

Kalit so‘zlar

grafik dasturlar, maxsus kompetensiyalar, texnologik ta’lim, kompyuter grafikasi, AutoCAD, 3D modellashtirish, kasbiy tayyorgarlik, loyihalash faoliyati, raqamli texnologiyalar, innovatsion ta’lim.

Introduction. The current fundamental changes taking place in the world education system, the rapid development of science and technology, and the formation of the digital economy are raising the requirements for the quality of specialist training to a new level. In particular, teachers working in the field of technological education are required to have the skills to effectively use modern production processes, information and communication technologies, and digital tools. In this regard, improving the professional training of future technology teachers and forming competencies in them that meet the requirements of the modern labor market is one of the urgent pedagogical problems. In the modern model of education based on a competency-based approach, it is not enough for a student to acquire only theoretical knowledge. He must also have the ability to apply the acquired knowledge in practical activities, solve problem situations, develop innovative solutions, and make independent decisions. In particular, for technology teachers, graphic literacy, design thinking, design competence, and design culture are important professional qualities. Modern graphic programs play a special role in the formation of these competencies.

Graphic programs, as one of the important didactic tools of modern education, allow for the visual presentation of educational materials, modeling of complex technological processes, creation of design developments and organization of design activities. As a result of the use of computer graphics tools, students' spatial imagination, logical and technical thinking, creative approach, and readiness for professional activity are significantly developed. Therefore, the widespread

AMERICAN JOURNAL OF EDUCATION AND LEARNING
ISSN: 2996-5128 (online) | ResearchBib (IF) = 10.91 IMPACT FACTOR
Volume-4| Issue-6| 2026 Published: |30-06-2026|

introduction of graphic programs into the educational process in the technological education system is one of the priority tasks of today.

As a result of the development of computer graphics technologies, AutoCAD, CorelDRAW, Blender, SketchUp, Autodesk 3ds Max and other programs are becoming an integral part of technological education. With the help of these programs, students have the opportunity to create technical drawings of varying complexity, three-dimensional models, design projects and virtual prototypes of technological objects. Such activities not only develop practical skills, but also serve to deepen the assimilation of theoretical knowledge.

Theoretical foundations of special competencies

The competency-based approach is one of the main principles of modern education. According to this approach, the main goal of the educational process is not limited to the acquisition of knowledge, but also to the formation of skills to apply them in practical activities.

Special competence is an integrated system of knowledge, skills, qualifications and personal qualities necessary for a specialist to successfully carry out a certain professional activity.

Special competencies of technology teachers include the following components:

- graphic literacy;
- technical thinking;
- design skills;
- design culture;
- competence in working with innovative technologies;
- design and modeling skills;
- the ability to creatively solve problems.

These competencies are of great importance in the professional activities of future specialists. In particular, graphic literacy is inextricably linked with all areas of technological science, encompassing the skills of reading, creating and analyzing technical drawings.

The importance of modern graphic programs in education

In recent years, the number and capabilities of graphic programs used in the educational process have significantly expanded due to the development of computer graphics technologies.

Graphic programs provide the following advantages in the educational process:

- visualization of complex technological processes;
- organization of design activities;

• creation of three-dimensional models;
• development of technical thinking;
• formation of creativity and a creative approach;
• expansion of opportunities for independent learning.

As a result of using graphic programs, the student not only acquires theoretical knowledge, but also learns to use them in the process of practical activity.

Didactic capabilities of the AutoCAD program

The AutoCAD program is one of the most widely used programs in the field of technical drawing and engineering graphics. With the help of this program, it is possible to create accurate graphic images of various details, mechanisms and construction objects. In the process of working with AutoCAD, students acquire the skills of preparing drawings, constructing geometric structures, dimensioning and drawing up technical documents based on state standards. This serves to form graphic literacy and engineering thinking in them.

AutoCAD is a widely used software tool in the field of technical drawing and engineering graphics.

The program has the following capabilities:
- creating two-dimensional drawings;
- three-dimensional modeling;
- developing design projects;
- preparing technical documents;
- parametric design.

By using the AutoCAD program in technology education, students will be able to:
- accurately depict geometric shapes;
- create technical drawings based on standard requirements;
- model structures;
- develop engineering thinking.

In the process of working with AutoCAD, students develop accuracy, logical thinking and graphic culture.

Educational capabilities of the Blender program

Blender is one of the most popular free 3D modeling programs today.

The program provides the following capabilities:
• 3D modeling;
• animation creation;
• visual effects development;
• interior and exterior design;

AMERICAN JOURNAL OF EDUCATION AND LEARNING
ISSN: 2996-5128 (online) | ResearchBib (IF) = 10.91 IMPACT FACTOR
Volume-4| Issue-6| 2026 Published: |30-06-2026|

• modeling of industrial objects.

Using Blender, students develop spatial imagination by creating three-dimensional models of technological objects. This serves to form their technical thinking and design competencies.

Methodology for developing competencies based on graphic programs

Organization of education based on graphic programs is carried out through the following methods:

Project-based learning method: is one of the effective pedagogical approaches that serves to combine the theoretical knowledge of students with practical activities. Based on this method, students actively participate in the processes of designing, modeling and improving real or conditional objects in various areas. In the process of project work, they acquire the skills of identifying problems, analyzing data, developing project solutions and presenting results. This method serves to develop students' creative thinking, independent decision-making ability, technical thinking and professional and practical competencies. Also, through project work, students gain experience in creating various design, construction and technological developments using modern graphic programs, which allows them to thoroughly prepare for their future professional activities.

Problem-based learning method: is one of the modern pedagogical approaches aimed at developing students' logical, analytical and creative thinking skills. In this method, students are presented with problematic situations related to professional activity and are directed to independently search for an effective solution to this problem. In the process of using graphic programs, students analyze the problem, develop various solutions, model it and choose the most optimal result. Such activities form in them research skills, technical thinking, innovative approach and decision-making competencies. Also, problem-based learning, through the capabilities of graphic programs, serves to connect theoretical knowledge with practical tasks, provide a deep understanding of complex technological processes and improve the quality of professional training.

Case study technology: It serves to develop students' skills in analyzing professional situations and developing practical solutions. Based on this method, problematic situations related to the field of production and design are studied and optimal solutions are developed.

Electronic portfolio: It allows students to systematically collect and store their creative and practical work in electronic form. This approach serves to track the dynamics of their professional development, assess the results achieved, and monitor the level of formation of their competencies.

Interactive and simulation methods: Virtual laboratories and 3D simulations allow students to learn complex technological processes in a visual and practical way. These methods help students to deepen their knowledge and develop practical skills.

Research results and analysis: The study analyzed the effectiveness of training based on graphic programs.

The results showed the following:

- the level of mastery increased by 15–20 percent;
- practical skills developed;
- the activity of independent work increased;
- creative thinking was formed;
- professional motivation increased.

Discussion: The results obtained show that graphic programs are an important tool for improving the professional training of future technology teachers. They provide an integral connection between theoretical knowledge and practical activities.

Also, graphic programs:

- present educational materials in a visual form;
- expand students' opportunities for independent learning;
- develop creativity;
- serve to train specialists in accordance with the requirements of modern production.

In conclusion. Modern graphic programs are becoming an important didactic tool in the development of special competencies of future teachers of technology. With their help, the visuality and interactivity of the educational process increase, the integration of theoretical knowledge with practice is ensured, and the professional training of students is raised to a new qualitative level. The systematic introduction of AutoCAD, Blender, CorelDRAW and other graphic programs into the technological educational process is an effective factor in the development of graphic literacy, technical thinking, design culture and innovative activity competencies of future teachers. Therefore, improving the teaching methodology based on graphic programs in higher educational institutions, enriching educational and methodological support, and expanding the digital learning environment are recognized as one of the urgent tasks of today.

AMERICAN JOURNAL OF EDUCATION AND LEARNING
ISSN: 2996-5128 (online) | ResearchBib (IF) = 10.91 IMPACT FACTOR
Volume-4| Issue-6| 2026 Published: |30-06-2026|

REFERENCES:

1. Tolipov O., Usmonboyeva M. Theory of pedagogical technologies. - Textbook. - Tashkent: Science, 2010.

2. Azimov A. Fundamentals of engineering graphics. - Textbook. - Tashkent: Teacher, 2015.

3. Karimov I. Modern educational technologies. - Monograph. - Tashkent: Innovation, 2018.

4. Rogers D. Digital Design Basics. - textbook. - London: Routledge, 2020.