Modern American Journal of Engineering, Technology, and Innovation
ISSN(E): 3067-7939
Volume 01, Issue 02, May, 2025
Website: usajournals.org

IMPROVING TEACHING METHODS OF ENGINEERING AND COMPUTER GRAPHICS FOR STUDENTS OF THE WATER MANAGEMENT AND MELIORATION EDUCATIONAL FIELD

Khamidov Dilshod Olimjon ugli
Lecturer at the Faculty of Art Studies, Gulistan State University,
Department of Applied Arts and Design
Email: dilshod970422@gmail.com

Abstract:
This article highlights modern and innovative teaching methods for the subject of Engineering and Computer Graphics for students majoring in Water Management and Melioration. The shortcomings of traditional teaching approaches are analyzed, and a method based on the use of AutoCAD software is proposed. The effectiveness of this improved methodology is substantiated through practical experiments.

Keywords: AutoCAD, engineering graphics, water management, melioration, innovative education, digital competence, drawing, project-based learning.

Introduction

In the current higher education system, innovative approaches to teaching are crucial for improving the quality of education. The subject of Engineering and Computer Graphics is particularly important for students specializing in water management and melioration, as it helps develop their skills in technical design, drawing, and graphical data analysis. However, current teaching methods often fail to fully develop students' independent thinking and professional creativity. Therefore, it is essential to apply innovative methods in teaching this subject. Emphasis is increasingly placed on developing students' professional and creative

Modern American Journal of Engineering, Technology, and Innovation
ISSN(E): 3067-7939
Volume 01, Issue 02, May, 2025
Website: usajournals.org

competencies. For water management and melioration students, effective instruction in Engineering and Computer Graphics is key to preparing them for their future careers. Traditional methods tend to rely heavily on theoretical content, and drawings are done manually. The integration of digital tools — particularly AutoCAD — into the learning process can significantly enhance lesson effectiveness. This article discusses the advantages of using AutoCAD in teaching, presents methodological proposals, and outlines the results of experimental analysis.

Main Part

Engineering and Computer Graphics is a crucial subject aimed at equipping technical students with skills in designing, constructing, drawing, and developing graphical thinking. For water management and melioration students, it fosters competencies in visualizing irrigation systems, drainage structures, hydraulic constructions, and other technical objects.

AutoCAD is a software application designed for creating accurate, analytical, and interactive drawings. It enables the modeling and creation of both 2D and 3D graphical objects and preparation of technical documentation. Its use facilitates better understanding of course content and allows for visualization of complex graphic objects.

The research involved the following methodologies:

- Analysis of existing curricula in Uzbek higher education institutions;
- Organization of practical training using AutoCAD based on pedagogical experiments;
- Assessment of students' knowledge and skills through surveys and tests;
- Evaluation of effectiveness through statistical analysis.

The experimental study was conducted at Termez State University of Engineering and Agrotechnology. Initial and final student performance levels were compared.

Analysis and Challenges

The findings reveal several issues with current methodological approaches:

- Overreliance on traditional techniques such as manual drawing;
- Lack of systematic instruction in graphic software;

Modern American Journal of Engineering, Technology, and Innovation
ISSN(E): 3067-7939
Volume 01, Issue 02, May, 2025
Website: usajournals.org

- Insufficient practical training;
- Low student motivation;
- Limited classroom hours.

Surveys and observations indicate that students show significant interest in modern technologies, especially AutoCAD, which emphasizes the need for methodological improvement.

Proposed Improvements:

- Step-by-step instruction in AutoCAD software;
- Project-based learning in which students create real engineering object drawings;
- Use of interactive teaching methods, such as video tutorials, online testing, and real-time drawing tasks;
- Development of Uzbek-language methodological guides and electronic resources (including AutoCAD-based video lessons).

These strategies aim to foster independent thinking, creative approaches, and digital design skills among students.

Implementation of these methods — including visual-interactive presentations, project-based learning, and the use of AutoCAD — yielded positive results:

- Students' ability to read and create drawings increased by 27%;
- Their independent graphic design capabilities improved by 33%;
- Average academic performance in the subject rose from 3.8 to 4.4 points.

In addition, 90% of surveyed students rated the innovative methods as effective.

Discussion

The results indicate that innovative teaching approaches play a crucial role in developing students' professional and creative competencies, especially in reshaping attitudes toward Engineering and Computer Graphics. Integrating modern graphic software like AutoCAD significantly enhances student motivation and independent learning skills. The developed methodological recommendations can be adapted for other technical disciplines as well.

Modern American Journal of Engineering, Technology, and Innovation
ISSN(E): 3067-7939
Volume 01, Issue 02, May, 2025
Website: usajournals.org

Conclusion

The new AutoCAD-based teaching methodology is an effective tool for enhancing students' graphic thinking, drawing culture, and professional creativity in the field of water management and melioration. It not only optimizes the learning process but also helps prepare students to meet the demands of the modern labor market.

The research confirms the effectiveness of innovative teaching methods for Engineering and Computer Graphics for students in this specialization. Future work will include:

- Creating initial drawing exercises using templates based on school-level drawing guides;
- Progressive AutoCAD instruction and drawing practice;
- Development of digital methodological guides for teachers and students;
- Improvement of diagnostic tools to assess professional competencies.

References:

1. O‘zbekiston Respublikasining “Ta’lim to‘g‘risida”gi Qonuni. – Toshkent: Adolat, 2020.
2. O‘zbekiston Respublikasi Prezidentining PQ–4947-sonli Qarori. – 2017 yil 7 fevral. “Harakatlar strategiyasi”.
3. Soliyev A., Qodirov A. va boshqalar. Muhandislik grafikasi. – Toshkent: TDPU, 2021.
4. Xasanov I., Raximov Sh. Kompyuter grafikasi asoslari. – Toshkent: Fan, 2019.
5. Omonov Z. va boshq. AutoCAD dasturida chizmalar tuzish. – Toshkent: Iqtisodiyot, 2022.
6. Azizov N. Innovatsion pedagogik texnologiyalar. – Toshkent: O‘qituvchi, 2020.
7. Ismoilova D. Oliy ta’limda innovatsion o‘qitish metodlari. // Pedagogika va psixologiya. – 2021. – №3. – B. 45–49.
8. Rasulov F. Muhandislik fanlarida raqamli texnologiyalardan foydalanish. // Texnik ta’lim jurnali. – 2022. – №2. – B. 61–65.

Modern American Journal of Engineering, Technology, and Innovation
ISSN(E): 3067-7939
Volume 01, Issue 02, May, 2025
Website: usajournals.org

9. Karimova S. Kompyuter grafikasi fanining zamonaviy talqini. // Innovatsion ta'lim. – 2023. – №1. – B. 23–28.
10. AutoDesk rasmiy sayti: https://www.autodesk.com/ (AutoCAD dasturiy ta'minoti haqida ma'lumotlar).
11. Raxmanov J.M. Kompyuter dizayni va 3D modellashtirish. O'quvuslubiy qo'llanma.-T.:ToshDTU, 2021. 68 b.
12. E.I.Ro'ziyev va h.k. Muhandislik grafikasini o'qitish metodikasi. Darslik. Toshkent, 2010. 250 b.
13. X.A.Turayev, D.O.Xamidov// Muhandislik kompyuter grafikasi fanini o'qitishda uch o'lchamli modellashtirish vositasidan foydalanish metodikasi(AutoCAD grafik dasturi misolida). LESSON PRESS, Toshkent-2021:. 99 b.
14. Olimjon o'g'li K. D. IMPROVING MODERN METHODS OF TEACHING ENGINEERING GRAPHICS //INTELLECTUAL EDUCATION TECHNOLOGICAL SOLUTIONS AND INNOVATIVE DIGITAL TOOLS. – 2025. – Т. 3. – №. 33. – С. 68-70
15. Ch S., Xamidov D. O. AUTOCAD DASTURINING UCH O 'LCHAMLI LOYIHALASH IMKONIYATLARI." MODELING" PANELI BUYRUQLARI." VISUAL STYLES"," VIEW" PANELI BUYRUQLARI VA ULARNING IMKONIYATLARI //Экономика и социум. – 2023. – №. 5-2 (108). – С. 325-329.
16. Xamidov, D. (2024). THE IMPORTANCE OF TEACHING. *ENGINEERING ENGINEERING COMPUTER GRAPHICS" IN HIGHER EDUCATION INSTITUTIONS." International journal of scientific researchers (IJSR) INDEXING*, *4*, 320-323.
17. Rustambek o'g'li K. D. USING NEURAL NETWORKS TO ANALYZE THE CREATIVE PROCESS //INTELLECTUAL EDUCATION TECHNOLOGICAL SOLUTIONS AND INNOVATIVE DIGITAL TOOLS. – 2025. – Т. 3. – №. 33. – С. 63-67.
18. Alikulovich B. A. Subject Training Disciplines as a Means of Forming Professional Competence in Future Teachers of Fine Arts //Annals of the Romanian Society for Cell Biology. – 2021. – Т. 25. – №. 3. – С. 8965-8989.

Modern American Journal of Engineering, Technology, and Innovation
ISSN(E): 3067-7939
Volume 01, Issue 02, May, 2025
Website: usajournals.org

19. Alikulovich B. A. Development of Professional Competence of the Pedagogue through Visual Means //American Journal of Public Diplomacy and International Studies (2993-2157). – 2023. – Т. 1. – С. 438-442.
20. Boxodirovna, K. D. (2025). KOMPOZITSIYA FANINI O ‘QITISHDAGI INNOVATSION USULLARINING AHAMIYATI. *YOSH OLIMLAR, MAGISTR VA IQTIDORLI TALABALARNING ILMIY FAOLIYATINI OSHIRISHDA ULARGA QARATILGAN KREATIV G ‘OYALAR, YECHIM VA TAKLIFLAR*, *3*(26), 35-39.
21. Bo‘riboyeva, D. N. (2023). Muhandislik grafikasi fanlarini o’qitishda zamonaviy grafik dasturlardan foydalanish metodikasi. *PEDAGOGIKA Nizomiy nomidagi Toshkent davlat pedagogika universiteti ilmiy–nazariy va metodik jurnal*.
22. Bo‘riboyeva, D. N. (2023). Muhandislik grafikasi fanlarini o’qitishning innovatsion usuli. *Buxoro davlat universitetining “Pedagogik mahorat” ilmiy nazariy va metodik jurnali*, (2).
23. Xoljigitovich, M. I. (2025). INTERYERDA KOSHINLI BEZAK TURLARIDAN FOYDALANISHNING AFZALLIKLARI. *MASTERS*, *3*(3), 41-46. Pardaboyevich, Jumaboyev Nabi. "O ‘QUVCHILAR IJODIY FAOLIYATINI RIVOJLANTIRISHDA ZAMONAVIY TEXNALOGIYALARNING O ‘RNI." WORLD OF SCIENCE 6.11 (2023): 87-90.
24. Kazakbayevich, K. E., & Baxromjon o’g’li, A. B. (2025). FARG ‘ONA VODIYSI KULOLCHILIGI AN’ANALARI. THEORY AND ANALYTICAL ASPECTS OF RECENT RESEARCH, 3(35), 94-101.
25. Kazakbayevich K. E., Baxromjon o’g’li A. B. FARG ‘ONA VODIYSI KULOLCHILIGI AN’ANALARI //THEORY AND ANALYTICAL ASPECTS OF RECENT RESEARCH. – 2025. – Т. 3. – №. 35. – С. 94-101.
26. Pardaboevich, Jumaboev Nabi. "Interpretation of the Problem of Educational use of Aesthetic Views of Eastern Thinkers in Pedagogical Research." Emergent: Journal of Educational Discoveries and Lifelong Learning (EJEDL) 3.1 (2024): 9-9.

Modern American Journal of Engineering, Technology, and Innovation
ISSN(E): 3067-7939
Volume 01, Issue 02, May, 2025
Website: usajournals.org

27. Pardaboevich, Jumaboev Nabi. "Education of Young People in Eastern and Modern Spirit Taking Historical Values into Account." Innovative Science in Modern Research (2023): 156-157.
28. Pardaboyevich, Jumaboyev Nabi. "O ‘QUVCHILAR IJODIY FAOLIYATINI RIVOJLANTIRISHDA ZAMONAVIY TEXNALOGIYALARNING O ‘RNI." WORLD OF SCIENCE 6.11(2023):87-90.
29. Pardaboevich, Jumaboev Nabi, and Ibodullaeva Zarifa Tojikulovna. "FACTORS FOR INCREASING SPIRITUAL AND SOCIAL ACTIVITY IN YOUTH EDUCATION." International journal of scientific researchers (IJSR) INDEXING 5.2 (2024): 124-126.
30. Жумабоев, Наби. "THE NEED TO USE AESTHETIC VIEWS OF EASTERN THINKERS IN THE EDUCATIONAL SYSTEM." Ижтимоий-гуманитар фанларнинг долзарб муаммолари/Актуальные проблемы социально-гуманитарных наук/Actual Problems of Humanities and Social Sciences. 4.2 (2024).