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IMPROVEMENT OF INNOVATIVE METHODS OF TEACHING ENGINEERING AND COMPUTER GRAPHICS TO STUDENTS OF WATER MANAGEMENT AND MELIORATION

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Abstract
This article presents modern, innovative methods of teaching engineering and computer graphics to students studying in the field of water management and land reclamation. The shortcomings of traditional methods are analyzed and an improved teaching methodology based on the use of AutoCAD graphics software is proposed. The effectiveness of this method is proven on the basis of practical experience.

Keywords: AutoCAD, engineering graphics, water management, land reclamation, innovative education, digital competence, drawing, project-based training.

Introduction

Currently, innovative approaches to teaching subjects in the system of higher education play an important role in improving the quality of education. The practical value of engineering and computer graphics is especially high for students of water management and land reclamation. Students through this subject gain skills of technical design, drawing up drawings and analysis of graphic information. However, existing teaching methods sometimes do not fully develop students' independent thinking and professional-creative competence. In this regard, the application of modern innovative methods in the teaching of engineering and computer graphics is an urgent task. In the system of higher education, special attention is paid to the formation of professional and creative competencies. Effective training of engineering and computer graphics is an

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important factor in preparing students for their future professional career, especially for students studying in the field of water management and land reclamation. In traditional teaching methods, theoretical concepts prevail, and drawings are made by students manually. However, the use of modern digital tools, in particular the use of AutoCAD software as an innovative approach to education, increases the effectiveness of the lessons. This article describes the advantages of training through this particular program, methodological proposals and experimental analysis.

Main part:

Engineering and computer graphics is one of the most important disciplines aimed at designing, constructing, drawing and forming graphic thinking for students studying in technical fields. Especially in the field of water management and melioration through this subject, students will gain the skills of creating a graphic view of irrigation systems, drainage installations, hydraulic structures and other objects.

AutoCAD is a program designed to draw drawings in clear, analytical, interactive form, with which you can create two- and three-dimensional graphical objects, model, and prepare technical documentation. The use of this program allows you to more easily absorb the content of science and create complex graphical objects in visual form.

The following methods were used during the study:

• Analyze curricula in higher education institutions of Uzbekistan;

Innovative methods based on pedagogical experience - practical lessons based on the AutoCAD program;

assessment of students' knowledge and skills development through questionnaires and tests;

Determining effectiveness based on statistical analysis.

Experimental experiments were conducted at Termez State University of Engineering and Agrotechnology. The indicators of initial and final knowledge of students were compared.

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Analysis and problems:

The results of the analysis showed that existing methodological approaches have the following problems:

1. excessive reliance on traditional techniques, that is, a lot of emphasis on drawing a sketch in the pen;
2. Lack of a systematic approach to teaching graphic programs;
3. Insufficient practical training;
4. Low student motivation;
5. Low class hours.

Surveys and observations show that students are very interested in using modern technology, especially AutoCAD software. This creates the need to update and improve the methodology.

Suggested methods, taking into account the situation:

1. step-by-step training of AutoCAD software;
2. Project-based learning: students describe real engineering objects as a drawing (based on the direction of study);
3. Use of interactive lesson methods: video tutorials, online tests, drawing work in real time;
4. Creation of electronic science manuals and electronic resources in Uzbek language (video lessons with AutoCAD software).

This approach serves to develop students' independent thinking, creative approach and digital design skills.

Effective results were demonstrated by the course processes based on the proposed methods, innovative methods such as visual and interactive presentations, project-based learning, and the use of AutoCAD software. Including:

Students' drawing reading and creation skills increased by 27%;

The ability to prepare independent graphic projects was improved by 33%;

The average rating scores in the subject increased from 3.8 to 4.4.

Also, innovative methods were highly appreciated in a survey of students (90% of students commented about the effectiveness of the lessons).

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Discussion

The results obtained show that innovative approaches to teaching to change students' disinterest and perception of engineering and computer graphics are an important factor in the formation of students' professional and creative competencies. In particular, the integration of modern graphic programs into the educational process, such as AutoCAD, significantly increases the student's learning motivation and skills of independent work. On the basis of this experience, the methodological recommendations can be adapted for other technical directions as well.

Conclusion

The new methodology based on the AutoCAD program provides an effective tool for the development of graphic thinking of students in the field of water management and melioration technology, improving the culture of drawing and the formation of professional and creative competencies. This method not only optimizes the educational process, but also contributes to training personnel corresponding to the requirements of the modern labor market.

According to the results of the study, the effectiveness of teaching engineering and computer graphics based on innovative methods has been proven for students studying in the field of water management and land reclamation.

In the future, further work will be continued in the following areas:

Drawing primary drawings on drawing papers for students to memorize drawing skills (based on school textbooks);

Step by step teaching AutoCAD software and drawing drawings;

Development of electronic teaching aids for teachers and students;

Improving the diagnostic tools for assessing professional competence.

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