

**DEVELOPING STUDENTS' CREATIVITY USING ARTIFICIAL  
INTELLIGENCE IN THE PROCESS OF TEACHING DESIGN PROBLEMS  
(On the Example of Construction Drawing)**

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**ABSTRACT**

This article highlights the pedagogical capabilities of using artificial intelligence technologies in the process of teaching design problems in construction drawing. Furthermore, it analyzes the methodology for developing students' creative thinking, visual imagination, and professional competencies through AI. **Keywords:** artificial intelligence, construction drawing, design, creativity, pedagogical technologies, digital model, visual representation.

**INTRODUCTION.** In the current era of rapid development in the construction sector, introducing modern information-communication and artificial intelligence technologies into engineering education is one of the most pressing issues. Specifically, in accordance with the Decree of the President of the Republic of Uzbekistan No. PQ-358 "On Approval of the Strategy for the Development of Artificial Intelligence Technologies until 2030," the goals, tasks, and priority directions for the widespread implementation and rapid development of artificial intelligence in our country are defined, taking into account the current state of AI technology development and advanced foreign experiences. This decree pays special attention to the wide implementation of digital technologies in the education system and developing young people's skills in using modern information technologies effectively. This further increases the relevance of using artificial intelligence in higher education institutions, especially in engineering and construction fields.

Integrating artificial intelligence (AI) technologies—which are already becoming a modern requirement in construction drawing education—transforms students' design activities from mechanical drawing into intellectual creativity. Artificial intelligence algorithms allow students to experiment with complex geometric shapes and structural solutions. In this process, the teacher's task is not to provide a ready-made solution, but rather to guide the student toward creating the most creative

and cost-effective project in collaboration with artificial intelligence. Artificial intelligence is an integral part of information and communication technologies, enabling information processing and analysis within the educational process. The utilization of artificial intelligence technologies holds significant importance in teaching the science of drawing, particularly in mastering construction drawing. Additionally, it enhances the quality of education, ensuring that students acquire professional competencies that meet the demands of modern production.

*Benefits of Artificial Intelligence (AI).* Artificial intelligence assists humanity in numerous fields: it increases efficiency, solves complex problems, and creates new opportunities.

<b>Efficiency</b>	<b>Problem solving</b>	<b>Innovation</b>
Automation and acceleration of work processes	Analyzing complex tasks and finding solutions	Creating new technologies and opportunities

### **Methodology for Developing Creativity Through AI in Construction Drawing**

**Essence of the Methodology:** Utilizing AI technologies in teaching design within construction drawing is a process that elevates a student's basic graphic imagination into high-level visual and creative solutions. In other words, the thinking capacity expands through the sequence of: Hand-drawn sketch → Digital model → Realistic rendering.

#### ***Stages of Application in the lesson process:***

*Stage 1:* Sketch (Traditional Approach). The student draws an interior or object sketch by hand (Figure 1, a).

*Stage 2:* Transformation via AI. The sketch is uploaded into an AI program (Flow, ArchiVinci, Midjourney, etc.), a prompt is written, and the result is generated (Figure 1, b).

*Stage 3:* Analysis and Comparison. Students compare their sketches with the AI results, identify deficiencies, and generate new ideas.

*Stage 4:* Redesign (Creative Stage). Inspired by the AI results, the student modifies the design and adds new elements, thereby creating an alternative variant.

#### ***Methodological Recommendations for the Teacher:***

Do not give the student a ready-made result; instead, provide guidance. Present AI strictly as an auxiliary tool. Discuss and evaluate each result thoroughly.



a)



b)

Figure 1.

Now, let us examine several works completed with the help of AI. Students draw a clauzura (sketch-design) in the construction drawing course. A clauzura is an independently executed, rapid sketch-design project composition. By utilizing AI, a render (visual representation) and animation of this student-drawn clauzura can be generated within just 5–6 minutes (Figure 2).



Figure 2

By approaching the lesson process in a more interesting and creative manner, the educator can also stylize details drawn either by hand or within CAD software using



various

AI

tools

(Figure

3).



Rhino



SI



Figure 3

In addition, Archimedean solids studied in modeling and descriptive geometry classes can also be stylized using AI (Figure 4).

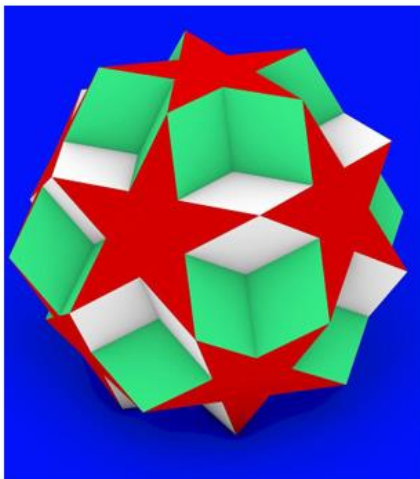


Figure 4

Complex drawings and models can be created in a short period of time using AI. For instance, drawings created in software such as AutoCAD, SolidWorks, or Rhino can be transformed into 3D visual representations using AI. This significantly increases the overall efficiency of the lesson process (Figure 5).



Figure 5

**CONCLUSION.** The use of artificial intelligence in teaching construction drawing elevates traditional drafting to a modern level and significantly enhances students' creative thinking. Furthermore, it accelerates the design process and increases productivity. As a result, the innovative thinking capacity of future specialists is developed, achieving the preparation of competitive personnel tailored for the modern construction sector.

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