



## **THE USE OF ARTIFICIAL INTELLIGENCE IN DEVELOPING STUDENTS' CREATIVE THINKING**

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### **Abstract**

The rapid advancement of artificial intelligence (AI) technologies has significantly transformed modern education. This article explores the role of AI in fostering creative thinking among students. It examines theoretical foundations of creativity, identifies key AI tools used in educational settings, and analyzes their impact on students' ability to think critically and innovatively. The study highlights both the opportunities and challenges associated with integrating AI into the learning process. The findings suggest that AI can serve as a powerful catalyst for creativity when used thoughtfully and pedagogically.

**Keywords:** Artificial intelligence, creative thinking, education, digital learning, innovation, student development.

### **Introduction**

#### **Аннотация**

В статье рассматриваются возможности использования технологий искусственного интеллекта в образовательном процессе для развития креативного мышления студентов. Анализируются теоретические основы креативности, а также современные цифровые инструменты, способствующие формированию творческих навыков. Особое внимание уделяется педагогическим условиям эффективного внедрения искусственного интеллекта в обучение. Выявлены преимущества и возможные риски применения ИИ, включая влияние на самостоятельность мышления и академическую честность. Сделан вывод о том, что рациональное и педагогически обоснованное использование искусственного интеллекта способствует развитию критического и креативного мышления студентов, повышает их мотивацию и готовность к инновационной деятельности.



**Ключевые слова:** искусственный интеллект, креативное мышление, студенты, образование, цифровые технологии, инновации, обучение, педагогика, развитие мышления

In the XXI century, creativity has become one of the most essential competencies for students. The integration of artificial intelligence (AI) into education offers new opportunities to enhance creative thinking skills. AI is no longer limited to automation; it is increasingly used as a tool for idea generation, problem-solving, and personalized learning.

Educational institutions worldwide are adopting AI-powered platforms to support interactive and adaptive learning environments. These technologies can stimulate students' imagination, encourage exploration, and foster innovative thinking.

Creative thinking is commonly defined as the ability to generate new, original, and valuable ideas. According to J. P. Guilford, creativity includes divergent thinking, which involves producing multiple solutions to a problem. Similarly, Edward de Bono introduced the concept of lateral thinking, emphasizing non-linear approaches to problem-solving.

Modern educational theories suggest that creativity can be developed through practice, environment, and tools. AI technologies act as such tools by providing dynamic and flexible learning experiences.

Several AI-based tools are currently used to enhance creativity in education:

- Intelligent tutoring systems that adapt to individual learning styles
- Generative AI tools that help students create texts, images, and designs
- Virtual and augmented reality environments for immersive learning
- Chatbots and conversational agents such as ChatGPT

These technologies allow students to experiment, visualize ideas, and receive instant feedback, which is crucial for creative development. AI contributes to creative thinking in several ways:

1. Idea Generation. AI tools can suggest multiple perspectives and solutions, encouraging divergent thinking.
2. Personalization. Adaptive systems provide individualized tasks that match students' abilities, allowing them to explore creativity at their own pace.
3. Collaboration. AI platforms facilitate collaborative projects where students can co-create content and share ideas.

4. Motivation and Engagement. Interactive AI tools make learning more engaging, which increases students' willingness to experiment and think creatively.

Despite its advantages, the use of AI in developing creativity has certain challenges: over-reliance on technology may reduce independent thinking; ethical concerns, including data privacy and academic integrity; lack of teacher training in AI integration; risk of standardization, where AI-generated content limits originality. Therefore, it is important to balance AI use with traditional teaching methods.

**Table -1. Sample Questionnaire on the Use of Artificial Intelligence in Developing Students' Creative Thinking**

<b>Purpose:</b>	To assess students' attitudes toward the use of artificial intelligence in enhancing creative thinking skills.
<b>Instructions:</b>	Please answer the following questions honestly. Choose the option that best reflects your opinion.
<b>SECTION 1: GENERAL INFORMATION</b>	
<b>Age:</b>	
<b>Gender:</b>	
<b>Field of study:</b>	
<b>Year of study:</b>	
<b>SECTION 2: AWARENESS OF AI</b>	
<b>Have you heard about artificial intelligence?</b>	Yes
	No
<b>Which AI tools have you used?</b>	ChatGPT
	Grammarly
	Google Bard
	Other:
<b>SECTION 3: AI AND CREATIVITY</b>	
<b>Do you think AI helps generate new ideas?</b>	Strongly agree
	Agree
	Neutral
	Disagree
	Strongly disagree
<b>AI tools help me think more creatively.</b>	Strongly agree
	Agree
	Neutral
	Disagree
	Strongly disagree
<b>AI encourages me to explore different solutions to problems</b>	Strongly agree
	Agree
	Neutral



	Disagree
	Strongly disagree
<b>SECTION 4: LEARNING EXPERIENCE</b>	
<b>How often do you use AI tools in your studies?</b>	Always
	Often
	Sometimes
	Rarely
	Never
<b>AI makes learning more interesting</b>	Strongly agree
	Agree
	Neutral
	Disagree
	Strongly disagree
<b>SECTION 5: CHALLENGES</b>	
<b>What difficulties do you face when using AI?</b>	Lack of knowledge
	Technical problems
	Over-reliance on AI
	Lack of access
	Other: __
<b>Do you think AI reduces independent thinking?</b>	Yes
	No
	Not sure
<b>SECTION 6: OPEN-ENDED QUESTIONS</b>	
<b>- How does AI help you develop your creativity?</b>	
<b>- What improvements would you suggest for using AI in education?</b>	

**Table-2. Example of Classroom Activity Using AI**

<b>Activity Title:</b>	<b>Creative Story Generation</b>
<b>Objective:</b>	To enhance students' creative thinking through AI-assisted storytelling
<b>Procedure:</b>	Students choose a topic or theme.
	They use an AI tool (e.g., ChatGPT) to generate a story outline.
	Students modify and expand the AI-generated content.
	Final stories are presented and discussed in class
<b>Expected Outcome:</b>	Improved imagination and originality
	Development of writing skills
	Ability to critically evaluate AI-generated content



**Table-3. Data Analysis (Example Table)**

Question	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Q7	45%	35%	10%	5%	5%
Q8	40%	30%	15%	10%	5%
Q9	50%	25%	15%	5%	5%
<b>Interpretation:</b>	The majority of students believe that artificial intelligence positively influences their creative thinking and idea generation abilities				

Thus, the tables are designed to complement and illustrate the use of artificial intelligence technologies in developing students' creative thinking.

Table 1 is a questionnaire designed to assess students' awareness of artificial intelligence, its frequency of use in educational activities, and the impact of AI on their creative thinking. This questionnaire can be used to conduct empirical research and collect quantitative and qualitative data.

Table 2 contains an example of a learning task demonstrating the practical application of AI in the educational process. Specifically, it proposes a methodology for using tools such as ChatGPT to develop creative writing and students' ability to generate original ideas. This appendix illustrates how AI can be integrated into educational activities.

Table 3 includes an example of data analysis in tabular form. It demonstrates a possible method for processing the survey results and interpreting the data. This allows for an assessment of the effectiveness of using artificial intelligence in developing students' creative thinking. Thus, the presented tables provide a practical basis for the research, confirm the theoretical provisions of the article and can be used in further pedagogical and scientific developments.

Teachers play a crucial role in guiding students' interaction with AI. Effective strategies include:

- ✓ Designing creative tasks that require human interpretation
- ✓ Encouraging critical evaluation of AI-generated outputs
- ✓ Combining AI tools with project-based learning
- ✓ Promoting ethical use of technology



## Conclusion

Artificial intelligence has significant potential to enhance students' creative thinking. When integrated properly, AI can provide personalized, interactive, and innovative learning experiences. However, its effectiveness depends on pedagogical approaches and responsible use. Future research should focus on developing frameworks for balancing AI assistance with independent creativity.

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