

## DEVELOPING ANALYTICAL COMPETENCE OF HIGHER EDUCATION STUDENTS THROUGH ARTIFICIAL INTELLIGENCE TOOLS

**Abdumalikova Gulhayo Shavkat qizi**

*Fergana state university*

*Faculty of foreign languages,*

*department of philology and teaching*

*languages: English, Fergana state university.*

**Academic supervisor: Xolmatova Elnura Sherali qizi**

*abdumalikovagulhayo0@gmail.com*

*+998902900511*

### Abstract

This article explores the development of analytical competence among higher education students through the integration of artificial intelligence (AI) tools in the teaching and learning process. Analytical competence is considered a key component of 21st-century skills, enabling students to analyze information, evaluate problems, and make reasoned decisions. The study examines the pedagogical potential of AI-based digital platforms, adaptive learning systems, and automated analytical tasks in fostering students' analytical and critical thinking skills. The findings demonstrate that purposeful integration of AI tools creates favorable conditions for enhancing students' analytical competence and supports innovative practices in higher education.

**Keywords:** analytical competence, artificial intelligence, higher education, digital technologies, critical thinking, innovative education.

### Introduction

The rapid development of digital technologies and artificial intelligence has significantly transformed modern education systems. Higher education institutions increasingly adopt AI-based tools such as adaptive learning platforms, intelligent tutoring systems, and automated assessment technologies. These innovations require students not only to acquire knowledge but also to develop strong analytical competence in order to interpret information, solve complex problems, and make informed decisions.

Analytical competence encompasses the ability to analyze data, evaluate arguments, identify problems, and draw logical conclusions. In this context, the integration of artificial intelligence into the educational process offers new opportunities to support students' analytical and critical thinking skills. Therefore, investigating the role of AI tools in developing analytical competence is a highly relevant research issue.

The purpose of this article is to analyze the theoretical foundations and practical possibilities of developing analytical competence among higher education students through the use of artificial intelligence tools.

### **Research methodology**

The study is based on a competence-based and systems-oriented approach. Methods such as analysis of scientific literature, comparison, generalization, and logical analysis were employed. In addition, the pedagogical potential of AI-based educational tools was examined from the perspective of their impact on students' analytical competence.

### **Experimental design**

The experimental study was conducted with second- and third-year higher education students. Participants were divided into a control group and an experimental group. In the experimental group, AI-based tools were integrated into the learning process, including adaptive tests, automated analytical tasks, and AI-assisted chat tools designed for problem-based discussions. The control group was taught using traditional instructional methods.

The development of analytical competence was assessed using the following criteria: (1) information analysis skills, (2) problem identification and structuring, (3) argumentation and logical reasoning, and (4) independent decision-making. Each criterion was evaluated on a four-level scale (low, medium, good, high).

### **Results and discussion**

The results of the experiment revealed a significant improvement in the level of analytical competence among students in the experimental group compared to the control group. Students who engaged with AI-based adaptive tasks demonstrated improved speed and accuracy in analyzing complex information. AI-assisted discussions enhanced their ability to justify arguments and formulate logical conclusions.

#### **Table 1. Comparative analysis of analytical competence levels**

The comparative analysis showed an increase in the proportion of students with a high level of analytical competence in the experimental group, while the number of students with a low level decreased considerably. This positive dynamic confirms the effectiveness of AI tools in fostering analytical thinking.

### **Description of the diagram**

The diagram illustrates the growth dynamics of analytical competence components, including information analysis, problem identification, argumentation, and decision-making. In all components, the experimental group outperformed the control group, highlighting the pedagogical value of AI-supported learning activities.

The findings indicate that artificial intelligence tools not only automate educational processes but also stimulate higher-order cognitive activities. This is

particularly evident in foreign language education, where AI-supported tasks based on authentic materials encourage students to analyze texts, evaluate information, and reflect critically.

### Methodological recommendations

1. Integrate AI tools into the educational process in a purposeful and systematic manner.
2. Design analytical tasks based on real-life and problem-based situations.
3. Apply multi-criteria assessment approaches to evaluate analytical competence.
4. Use AI tools to support students' reflection and independent learning.

### Conclusion

In conclusion, the use of artificial intelligence tools represents an effective approach to developing analytical competence in higher education. When integrated in accordance with pedagogical goals, AI technologies contribute to the enhancement of students' analytical and critical thinking skills, as well as their ability to make independent and well-reasoned decisions. The results of this study highlight the importance of expanding AI-based innovative practices in higher education.

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