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THE USE OF ARTIFICIAL INTELLIGENCE IN DEVELOPING CRITICAL INFORMATION ANALYSIS SKILLS AMONG PRE-SERVICE TEACHERS

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ABSTRACT. This article explores the potential of using artificial intelligence tools to develop critical information analysis skills among pre-service teachers. The purpose of the study is to determine the pedagogical significance of artificial intelligence technologies in the processes of information selection, evaluation, and analysis. The research was conducted using the IMRAD approach and employed theoretical analysis, observation, and practical experimentation methods. The findings revealed that the use of artificial intelligence tools significantly enhances pre-service teachers' abilities to critically evaluate information sources, verify evidence, and draw reasoned conclusions. Based on the results, recommendations were developed for integrating artificial intelligence technologies into teacher education programs.

Keywords: artificial intelligence, critical thinking, information analysis, pre-service teacher, teacher education, digital competence.

АННОТАЦИЯ. В данной статье исследуются возможности использования инструментов искусственного интеллекта для развития навыков критического анализа информации у будущих учителей. Цель исследования заключается в определении педагогической значимости технологий искусственного интеллекта в процессах отбора, оценки и анализа информации. Исследование проведено на основе подхода IMRAD с применением методов теоретического анализа, наблюдения и педагогического эксперимента. Полученные результаты показали, что использование инструментов искусственного интеллекта способствует развитию у будущих учителей навыков критической оценки информационных источников, проверки достоверности фактов и формирования обоснованных выводов. По итогам исследования разработаны рекомендации по интеграции технологий искусственного интеллекта в систему педагогического образования.

Ключевые слова: искусственный интеллект, критическое мышление, анализ информации, будущий учитель, педагогическое образование, цифровая компетентность.

Introduction: The rapid advancement of digital transformation processes in the global education system has led to the emergence of new requirements for teacher education and training. In particular, the ability of pre-service teachers to operate independently within the information environment, critically evaluate information obtained from various sources, and distinguish reliable information from false, misleading, and manipulative content is recognized as one of the essential professional competencies of a modern educator. Such competencies are becoming increasingly important in the context of the growing volume of digital information and the widespread integration of innovative technologies into educational practice. In this regard, the development of critical thinking, media literacy, and information culture has become one of the priority areas of contemporary pedagogical research. Through the observation and analysis of existing studies, it is possible to examine, compare, and reinterpret various research findings, thereby generating new insights into educational practices and learning processes.Furthermore, in the studies conducted by

Bahodir Suropov, the use of digital technologies and innovative approaches in the modern educational environment is interpreted as a significant factor in enhancing teachers' professional competence. According to the scholar, the professional preparation of pedagogical personnel should encompass not only the mastery of subject knowledge but also the ability to apply emerging technologies within the information space through an analytical and critical approach. Such competencies contribute directly to the development of critical information analysis skills among pre-service teachers.In recent years, the rapid advancement of artificial intelligence technologies has created new opportunities within the education system. These technologies have expanded the possibilities for accessing, processing, analyzing, and interpreting information, thereby transforming traditional teaching and learning practices. As a result, artificial intelligence has become an important educational tool for fostering higher-order thinking skills, including critical analysis, problem-solving, and evidence-based decision-making among future educators. In particular, generative artificial intelligence tools such as ChatGPT, Gemini, and Copilot enable users to process large volumes of information, generate summaries, and provide analytical recommendations within a short period of time. These technologies significantly enhance the efficiency of information retrieval and knowledge management processes in educational settings.At the same time, research has shown that artificial intelligence systems may occasionally generate inaccurate, incomplete, or unverified information. Therefore, when using such technologies, it is essential to critically evaluate the reliability, validity, and credibility of the information provided. Consequently, the ability to verify information sources, assess evidence, and critically analyze AI-generated content has become an increasingly important competency for pre-service teachers in the digital age.

Literature Review and Methods: Analysis of the existing literature indicates that although numerous studies have been conducted on the development of critical thinking, media literacy, and information culture among pre-service teachers, the pedagogical mechanisms for fostering critical information analysis skills through the use of artificial intelligence tools have not been sufficiently explored. This gap in the literature highlights the relevance and significance of the present research problem.To address this issue, the study employed a combination of literature analysis, pedagogical observation, questionnaires, interviews, and experimental methods. Relevant national and international studies on critical thinking, media literacy, digital competence, and artificial intelligence in education were systematically reviewed and analyzed. The collected data were examined using comparative and analytical approaches to identify the potential of artificial intelligence tools in developing critical information analysis skills among pre-service teachers. The findings obtained through these methods served as the basis for evaluating the effectiveness of AI-supported learning activities and formulating practical recommendations for teacher education programs. Accordingly, the purpose of this study is to identify the pedagogical potential of artificial intelligence tools in developing critical information analysis skills among pre-service teachers and to provide a scientific justification for their effectiveness.The study is based on the assumption that the integration of artificial intelligence tools into the educational process through specially designed analytical tasks positively influences the development of pre-service teachers' competencies in evaluating information sources, verifying facts, analyzing evidence, and drawing well-reasoned conclusions. Furthermore, the purposeful and methodologically grounded use of AI technologies is expected to enhance students' critical thinking abilities, information literacy, and independent decision-making skills, which are essential for effective professional practice in the modern educational environment. The methodological foundation of the study was based on competency-based, activity-oriented, and learner-centered approaches. During the research process, pedagogical

observation, questionnaire surveys, interviews, tests, and pedagogical experiment methods were employed. Throughout one semester, students in the experimental group completed specially designed tasks using artificial intelligence tools such as ChatGPT, Gemini, and Copilot. The tasks covered the following areas:



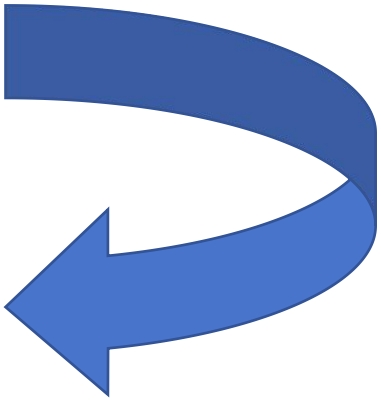
- Fact-checking information provided by artificial intelligence systems;
- Comparing information obtained from different sources;
- Critically analyzing scientific and popular texts;
- Drawing conclusions based on evidence.

In contrast, instruction in the control group was conducted using traditional teaching methods.
To assess the critical information analysis skills of pre-service teachers, the following criteria were developed:

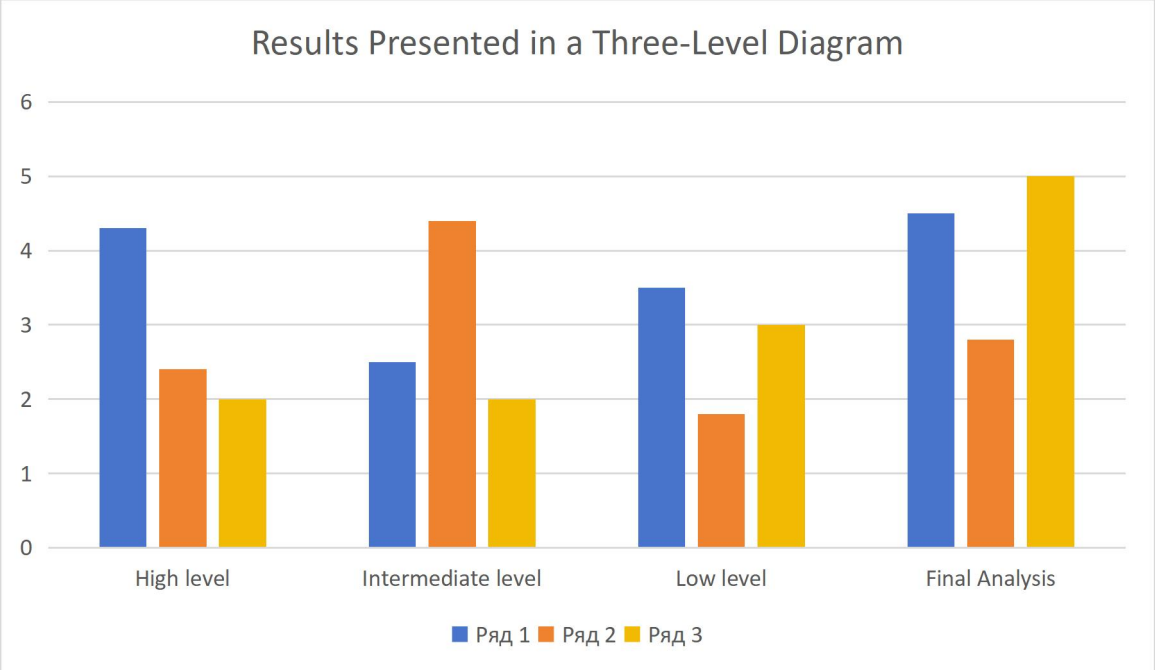
Ability to evaluate information sources;

Skill in verifying and validating facts;

Level of analytical thinking; Ability to draw independentconclusions.



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The percentage of participants demonstrating a high level of performance increased from 20% to 57 %

The proportion of participants at the low level decreased from 37% to 10 %

In the control group,the changes were relatively modest,with proportion of participants achieving a high level increasing from 23 % to 33%.

Results: The application of this method throughout the research process made it possible to observe and analyze a number of significant outcomes. The findings indicate that the use of artificial intelligence tools contributed positively to the development of critical information analysis skills among pre-service teachers. The results obtained from the study can be summarized as follows: The results of the study demonstrated that the use of artificial intelligence tools encouraged students to critically evaluate information, verify the accuracy and reliability of data, and conduct comparative analyses of information obtained from various sources. In particular, the use of platforms such as ChatGPT and Gemini contributed to the development of students' ability to compare AI-generated responses with scientific and academic sources. This process enhanced their critical thinking skills and strengthened their capacity to assess the credibility of information in an informed and analytical manner.

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Discussion: The findings of this study are consistent with the conclusions of international research in the field. Several studies have reported that the use of generative artificial intelligence technologies can enhance students' higher-order cognitive abilities, analytical thinking, and reflective learning approaches. At the same time, these studies emphasize the importance of verifying the reliability and accuracy of information generated by artificial intelligence systems and applying critical evaluation skills when using such technologies.Similarly, the results of the present study revealed that students developed the ability to assess the credibility of information by verifying AI-generated responses through multiple independent sources. This practice enabled them to identify accurate information, recognize potential inaccuracies, and make evidence-based judgments. Consequently, the integration of artificial intelligence tools into the learning process not only supported information acquisition but also contributed to the development of critical thinking and information evaluation skills among pre-service teachers.

Furthermore, the study revealed that some students initially accepted the responses generated by artificial intelligence systems as completely reliable and accurate. However, through practical activities and fact-checking tasks, they gradually developed a more critical attitude toward the information provided by AI tools. As a result, students became more aware of the need to verify information and evaluate its credibility before accepting it as valid.These findings highlight the importance of simultaneously developing media literacy and critical thinking competencies when integrating artificial intelligence tools into the educational process. Such an approach enables future teachers to use AI technologies more responsibly, effectively, and critically in both their academic and professional activities. The study found that artificial intelligence tools serve not only as instruments for information retrieval but also as effective pedagogical tools for fostering critical thinking skills. Their integration into the learning process encourages students to engage in deeper analysis, reflection, and evidence-based reasoning.

The results demonstrated that the purposeful and methodologically grounded use of artificial intelligence tools contributes significantly to the development of pre-service teachers' competencies in evaluating information sources, verifying evidence, and drawing independent conclusions. Therefore, AI-supported learning activities can play an important role in enhancing critical information analysis skills and preparing future teachers for effective professional practice in the digital age.

Conclusion: Overall, the findings of the study indicate that the methodologically grounded use of artificial intelligence tools serves as an important pedagogical resource for developing pre-service teachers' competencies in critical information analysis, evidence verification, source

evaluation, and drawing well-reasoned conclusions. The results demonstrate that AI-supported learning activities can effectively enhance critical thinking and information literacy skills required in contemporary educational environments.

At the same time, the study confirmed the necessity of verifying and evaluating information generated by artificial intelligence systems. Therefore, a critical approach to the use of AI technologies is essential to ensure the reliability, accuracy, and validity of information. These findings highlight the importance of integrating artificial intelligence tools into teacher education programs in a way that promotes both technological proficiency and critical thinking competencies among future educators.

Based on the findings of the study, the following recommendations are proposed:

- Integrate practical tasks focused on the use of artificial intelligence tools into the educational process of higher pedagogical education institutions;
- Develop specialized modules aimed at enhancing pre-service teachers' media literacy and information culture;
- Incorporate AI-assisted fact-checking and information verification methodologies into teaching and learning practices;
- Improve professional development and training programs designed to prepare educators for the effective use of artificial intelligence technologies in education. Implementing these recommendations can contribute to the development of critical information analysis skills, digital competence, and responsible use of artificial intelligence among future teachers. The results of the study demonstrated that the use of artificial intelligence tools is one of the effective pedagogical approaches for developing critical information analysis skills among pre-service teachers. During the pedagogical experiment, learning activities organized through artificial intelligence tools such as ChatGPT, Gemini, and Copilot had a positive impact on students' ability to critically evaluate information sources, verify facts, conduct comparative analyses of information, and draw evidence-based conclusions.The findings indicate that the integration of AI-powered technologies into the educational process can significantly contribute to the enhancement of critical thinking, analytical reasoning, and information literacy skills, which are essential competencies for future teachers in the digital era.

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