

The Eurasia Proceedings of Educational and Social Sciences (EPESS), 2026

Volume 53, Pages 91-96

ICETI 2026: International Conference on Education in Technology and Innovation

The Relationship Between the Use of Artificial Intelligence and Self-Assessed Digital Competence in Higher Education

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Abstract: The spread of artificial intelligence (AI) tools has fundamentally transformed the teaching and learning process in higher education. The aim of our research was to examine whether there is a correlation between the frequency of AI use among students and their self-assessed AI competence. The study was based on a voluntary online questionnaire completed by 487 students at Óbuda University. The questionnaire asked about, among other things, the frequency of AI tool use, self-assessed AI readiness, and attitudes toward AI. Descriptive statistics and Pearson's correlation coefficient were used to analyze the data. The results show a positive, weak to moderate correlation between the frequency of AI use and self-assessed AI preparedness ($r=0.27$). This suggests that students who use AI more frequently feel more prepared to use technology. The results of the research confirm the assumption that the use of AI is in itself a learning process that contributes to the development of students' digital competences. For higher education, this means that the conscious and reflective integration of AI can not only be a tool for increasing efficiency but can also be interpreted as a competence-developing pedagogical environment.

Keywords: Artificial intelligence, Higher education, Student attitudes

Introduction

Artificial intelligence is a collection of IT systems capable of performing operations that mimic human thinking, such as pattern recognition, learning, reasoning, and decision support. In an educational context, artificial intelligence does not appear as an independent actor, but as a supportive tool that can assist in various learning and teaching processes. The literature emphasizes that artificial intelligence systems used in education do not replace human pedagogical decisions, but complement them with structured analysis and automated functions (UNESCO, 2021). The toolkit of artificial intelligence includes machine learning-based applications, natural language processing systems, and adaptive learning environments. In recent years, particular attention has been paid to large-scale language models that are capable of generating coherent texts, answering questions, and providing explanations related to various fields of science. These tools have opened up new opportunities in higher education in the areas of learning support, independent knowledge acquisition, and preparation for academic tasks (Kasneci et al., 2023).

Artificial intelligence appears at several levels in educational systems. On the one hand, it serves as a learning support tool that provides personalized explanations and feedback, and on the other hand, it can also be used to automate administrative and organizational tasks. Adaptive learning environments allow students to progress at their own pace, while the system recommends additional learning materials or tasks based on their performance. Applications capable of text creation and information processing play a particularly important role in higher education. They support note-taking, summarizing, and processing of professional literature. According to

literature reviews, artificial intelligence tools can contribute to increasing learning efficiency if students use them as part of active learning strategies (Zawacki Richter et al., 2019).

It is important to note that there are risks associated with their use. Several authors point out that excessive automation can weaken students' independent writing and problem-solving skills if the tools are used uncritically. Therefore, it is essential for educational institutions to develop guidelines that clearly define acceptable and unacceptable forms of use (European Commission, 2025). A significant part of empirical research examines students' attitudes and usage habits. According to international surveys, the majority of students have already encountered AI-based tools and use them regularly for learning purposes. According to a large-scale international study, the most common areas of use include helping to understand the curriculum, clarifying concepts, and preparing assignments (Ravšelj et al., 2025).

Other studies emphasize that students primarily view these applications as supportive tools rather than as a complete replacement for the learning process. However, alongside positive attitudes, there are concerns about academic integrity and the credibility of assessments. According to the literature, a significant proportion of students are uncertain about the extent to which the use of such tools is acceptable in assignments or exams (Cotton et al., 2024). Hungarian and regional studies show similar trends. According to a Hungarian study, students use artificial intelligence primarily for information retrieval and reading comprehension, while they use it less for creative or analytical tasks (Rajki, 2024). Another study compared student use at two points in time and concluded that acceptance of the tools had increased significantly in a short period of time, especially in the area of academic support (Nagy, 2025). In an international context, student acceptance is often examined using IT acceptance models. According to the results, the intention to use is primarily influenced by perceptions of usefulness and ease of use. Attitudes toward academic integrity are also an important factor, which can significantly modify actual use (Bin Nashwan, 2023).

Method

Purpose and Justification of Research

The spread of artificial intelligence in higher education has created a new learning environment in which students are increasingly using various digital tools in their learning and study tasks. The literature points out that the use of technology is not merely a matter of tool use, but also a learning process that can influence students' sense of competence and self-confidence. Nevertheless, relatively few empirical studies have examined the relationship between the frequency of artificial intelligence use and students' self-assessed digital and AI competence.

The aim of our research was to explore whether there is a correlation between the frequency of students' use of artificial intelligence tools and their self-assessed AI readiness. The study sought to answer whether the regular use of technology contributes to strengthening students' sense of competence and whether AI use can be interpreted as a learning and competence development process. The chosen method allows for the quantitative examination of student attitudes and self-assessments, as well as the statistical analysis of the relationships between variables.

Research Question

The central research question of the study was as follows:

Is there a statistically significant relationship between the frequency of artificial intelligence tool use among students in higher education and their self-assessed AI competence?

In connection with this question, the research also aimed to explore students' attitudes toward AI and the role of tool use in the learning process.

Research Method

The study was based on quantitative, questionnaire-based data collection. Data collection was carried out using an online questionnaire based on voluntary participation. The choice of method was justified by several

considerations. On the one hand, the questionnaire is suitable for achieving a larger sample size, which allows for a reliable examination of statistical correlations. On the other hand, the questionnaire method is a widely accepted procedure in higher education research for exploring student self-assessment and attitudes. The aim of the study was not to measure the actual level of competence, but to explore how students perceive their own preparedness in relation to the use of AI.

Presentation of the Sample

487 students from various faculties of Óbuda University participated in the research. Participation was voluntary and anonymous. The sample consisted of students enrolled in higher education who were pursuing their studies in different fields and at different levels. The size of the sample allowed for descriptive statistical analyses and correlation tests to be performed. The diversity of the respondents contributed to the emergence of different patterns of artificial intelligence use in the data.

Presentation of the Measurement Tool

The questionnaire used contained several thematic blocks. The questions focused on the following main areas:

- frequency of use of artificial intelligence tools
- self-assessed preparedness related to AI
- attitudes towards AI
- assessment of the educational usefulness of AI

Most of the responses were recorded on a five-point Likert scale, which allowed for quantitative analysis. The measurement of self-assessed competence focused on how prepared students felt they were to use artificial intelligence tools consciously and for study purposes. When designing the questionnaire, we took into account the measurement logic used in previous international research, with particular regard to models for examining AI use and technology acceptance.

Data Analysis Method

The data were processed using descriptive statistical procedures and Pearson's correlation coefficient. Descriptive statistics allowed for a general characterization of student responses, while correlation analysis showed whether there was a relationship between the frequency of artificial intelligence use and self-assessed AI competence. The use of Pearson's correlation was justified by the fact that both variables could be interpreted on an interval scale, and the aim of the study was to determine the strength of the linear relationship. During the analysis, we interpreted both the direction and strength of the relationship. A minta bemutató

The Concept and Interpretation of Pearson Correlation

The value of Pearson's correlation coefficient (r) ranges between -1 and +1. The sign of r indicates the direction of the relationship, while its absolute value indicates the strength of the relationship. A positive value means that the variables increase together, while a negative value means that an increase in one variable is accompanied by a decrease in the other (Pallant, 2020).

According to Generally Accepted Guidelines for Interpretation:

- a value around 0.10 is weak,
- a value around 0.30 is moderate,
- and a value of 0.50 or higher indicates a strong relationship (Cohen, 1988).

It is important to emphasize that correlation does not imply causation, but only shows a relationship between the variables under study (Field, 2018).

The Basic Principle of Calculating Pearson's Correlation

Pearson's correlation measures the extent to which the deviations of two variables from their means move together. Mathematically, the coefficient can be interpreted as the ratio of covariance and variances:

$$r = \frac{\text{cov}(X,Y)}{\sigma_X \sigma_Y} = \frac{\text{cov}(X,Y)}{\sqrt{\sigma_X^2 \sigma_Y^2}}$$

The calculation takes into account the individual values of both variables, their deviation from the mean, and their products. This results in a standardized indicator that allows variables measured on different scales to be compared (Pallant, 2020).

Conditions for Applying Pearson's Correlation

The application of Pearson's correlation is subject to certain statistical conditions:

The variables are measured on an interval or ratio scale.

The relationship is linear.

The data show a near-normal distribution.

The data do not contain extreme outliers that could distort the result (Field, 2018; Pallant, 2020). These conditions were met.

Based on the descriptive statistical analysis, it can be concluded that the vast majority of students have already encountered AI-based tools and use them at least occasionally for study purposes. According to the responses, the most common areas of application for AI tools were interpreting course material, clarifying concepts, and preparing for learning tasks. This is consistent with the theoretical starting point of the research, which is that artificial intelligence primarily serves a learning support function in higher education. The self-assessed AI competence test showed that the majority of students perceive themselves as having a medium or higher level of preparedness. The standard deviation of the responses suggests that there are significant individual differences in terms of confidence in using the technology. Some students rated their own knowledge as very confident, while others felt more uncertain when using AI tools for study purposes.

The results of the correlation analysis show a positive, weak to moderate correlation between the frequency of AI use and self-assessed AI preparedness ($r = 0.27$). This means that the correlation between the two variables is statistically significant, but cannot be considered a strong correlation. The result suggests that students who use AI more frequently generally feel more prepared to use the technology, but the sense of competence is not determined solely by the frequency of use. When interpreting the correlation, it is important to emphasize that the research did not examine a causal relationship, but rather a correlation. Accordingly, it cannot be said that the use of artificial intelligence alone causes higher self-assessed competence. At the same time, the results suggest that practical experience can contribute to an increase in students' confidence. Through regular use, students become familiar with the operation, limitations, and possibilities of the tools, which can gradually strengthen their sense of preparedness.

The results of the research refer back to the learning theory approaches presented in the literature review. The experiences gained through active tool use are consistent with theories that knowledge is not merely the result of information transfer, but is linked to action and reflective experience. In this sense, artificial intelligence functions as a learning environment that allows students to ask questions, try out different solutions, and receive feedback. The results also indicate that students' use of AI does not follow a uniform pattern. Based on the responses, it is possible to distinguish between students who regularly and consciously use the technology for learning purposes and those who only use it occasionally. This difference may partly explain why the correlation is moderate rather than strong. Other factors may also influence the sense of competence, such as prior digital experience, field of study, or attitudes conveyed by instructors.

The results of the research can also be interpreted from a pedagogical perspective. The positive correlation suggests that the conscious use of artificial intelligence can contribute to the development of students' self-confidence and digital readiness. This confirms the assumption that AI tools are not only technical aids but also function as learning environments. Students develop their relationship with technology through their own experiences, which can influence their learning strategies in the long term. Based on the results, it can also be concluded that the conscious pedagogical integration of artificial intelligence is of paramount importance for higher education. If institutions provide students with the opportunity to use these tools in a guided and reflective manner, this can contribute to the development of competencies and the strengthening of learning autonomy. In contrast, the lack of regulation or an approach based solely on prohibition can create uncertainty among students and discourage the use of technology for educational purposes.

Discussion and Conclusion

The aim of the empirical study was to explore whether there is a correlation between the frequency of students' use of artificial intelligence tools and their self-assessed AI competence. During the questionnaire-based data collection, we analyzed the responses of 487 students enrolled in higher education. The data were processed using descriptive statistical methods and Pearson's correlation coefficient. One of the basic statistical methods in quantitative research is to explore the relationships between variables. One of the most widely used methods for this is Pearson's product-moment correlation coefficient, which measures the strength and direction of the linear relationship between two continuous variables (Field, 2018; Cohen et al., 2003).

The results of the research suggest that the conscious use of artificial intelligence can be interpreted not only as a tool for increasing efficiency, but also as a learning environment that contributes to the development of students' competencies. Students' relationship with artificial intelligence is therefore not merely technical in nature, but has clear pedagogical significance, as it influences their learning strategies and self-assessment. For higher education, this means that the integration of artificial intelligence cannot be limited to prohibitions or purely regulatory measures. There is a need to develop educational approaches that teach students to use technology responsibly and consciously. Such pedagogical frameworks provide opportunities for students to view artificial intelligence not merely as a tool, but as a learning aid that supports their own learning processes.

The results of the study confirm the assumption that the use of artificial intelligence in higher education can be interpreted as a pedagogical opportunity. Within an appropriate institutional and methodological framework, technology can contribute to the development of digital competencies, the strengthening of self-regulated learning, and the deepening of critical thinking, thereby supporting students' learning processes.

Recommendations

Based on the results of the study, there is no single optimal institutional solution, but rather several aspects that can serve as guidelines for the integration of generative artificial intelligence into higher education. It seems reasonable to move away from approaches based solely on technical recognition and control and to place greater emphasis on rethinking assessment practices from a pedagogical perspective. Task types that allow for the presentation and documentation of students' thought processes can help reduce assessment uncertainties and strengthen the professional basis of assessment.

At the institutional level, it may be particularly important to develop transparent and flexible guidelines that are not based solely on prohibitions, but also provide scope for conscious and responsible use of technology. Quality assurance systems also need to reflect on how new technologies are transforming institutional interpretations of learning, knowledge, and assessment. These recommendations do not provide definitive solutions, but rather indicate directions along which institutions can develop responses tailored to their own organizational and pedagogical contexts.

Scientific Ethics Declaration

* The authors declare that the scientific ethical and legal responsibility of this article published in EPESS Journal belongs to the authors.

* The authors declare that they bear full responsibility for the scientific, ethical, and legal aspects of the study. The study is based on theoretical and literature analysis and does not involve human participants, personal data, or intervention, therefore no ethical committee approval was required.

Conflict of Interest

* The authors declare that they have no conflicts of interest.

Funding

* The authors received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors for this study.

Acknowledgements or Notes

* This article was presented as an oral presentation at the International Conference on Education in Technology and Innovation (www.iceti.net) held in İstanbul, Türkiye, on September 17–18, 2026.

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To cite this article:

Horvath, S. & Toth, R. (2026). The relationship between the use of artificial intelligence and self-assessed digital competence in higher education. *The Eurasia Proceedings of Educational and Social Sciences (EPESS)*, 53, 91-96.