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Digital Competencies and Attitudes Toward Artificial Intelligence in K-12 Education

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Abstract

Integration of AI in learning environments is fast becoming an avenue for personalized learning, intelligent testing, and instructional support using technology. However, successful implementation of AI in such settings depends on elementary school children's digital skills and readiness when interacting with AI technology tools. The current study explores the predictability of digital competencies in relation to attitudes towards AI among elementary pupils. The quantitative, non-experimental, and correlational research designs were used where 598 pupils participated in the study. Information was collected using the Digital Competencies Scale, which had 50 items measuring five constructs, that is, skills, attitudes, emotions, knowledge, and information search and creation. Additionally, the Attitudes Toward AI Scale, with 22 items measuring cognitive, affective, and behavioral constructs, was used. Data collected were analyzed using IBM SPSS Statistics 29.0 by means of descriptive analysis, reliability, and ordinal regression analysis. Results on reliability revealed internal consistency to be high for the two scales, with Cronbach's alpha values of 0.866 for digital competencies and 0.894 for attitudes towards AI. The results revealed that 51.0% of the students had medium digital competency, while 40.1% of the students reported fair attitudes towards AI. The ordinal regression analysis was found to be statistically significant ($\chi^2 = 557.799$, $p < 0.001$), with the Nagelkerke pseudo-R^2 value being 0.687, meaning that digital competencies account for 68.7% of the variance in AI attitudes of the students. Moreover, digital competencies accounted for 43.9% of cognitive attitudes, 64.2% of affective attitudes, and 69.6% of behavioral attitudes towards AI. This study concludes that improving digital competencies of elementary school students helps enhance awareness and acceptance of AI. The findings have great implications for both educators and policymakers regarding K-12 education on digital literacy and AI.

Keywords: Digital Competencies, AI, AI Attitudes, K-12 Education, Digital Literacy, Elementary Students.

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Introduction

Currently, AI has become an innovative tool used in modern education, revolutionizing the learning process with the help of intelligent tutoring systems, automated testing, personalized learning systems, and chatbots. However, to adopt such technologies, learners need to have certain digital competencies that will allow them to interact with these technologies safely and efficiently. Digital competencies include not only technical skills but also digital knowledge, digital confidence, digital attitude, emotional preparedness, and effective management of digital information. Such competencies must be developed at the K-12 level since early digital experiences affect the learner's ability to use digital technologies in learning environments.

As there is continuous advancement in the integration of AI in the process of learning, it becomes imperative to assess how students perceive these technologies. Their level of cognition, emotions, and behavior are highly important in relation to whether they will use AI technology. Some previous studies show that high digital skills and technical confidence of individuals contribute to high acceptance levels, whereas lack of awareness is likely to hinder efficient use (Galindo-Domínguez et al., 2024). Moreover, it was also stressed that the process of acquiring AI literacy is an essential part of preparation for comprehending capabilities and limitations of AI (Long et al., 2021). However, despite the research on digital competence and AI attitude of teachers and higher education students, little has been done regarding elementary school students (Katsantonis & Katsantonis, 2024; Kasinidou et al., 2025).

Thus, the present study attempts to establish the predictive connection between digital competencies and attitudes toward AI among elementary school children. The aim of the research is to find out whether different aspects of digital competencies influence variance in general attitudes towards AI and particular aspects of those attitudes such as cognitive, affective, and behavioral ones. The importance of the investigation lies in the fact that it contributes to developing digital literacy and AI education programs (Vitezić & Perić, 2024; Sagar & Reddy, 2026).

Research Questions

The following research questions guide this study:

RQ1: What is the level of digital competence of elementary school students?

RQ2: What is the attitude of elementary school students towards AI?

RQ3: Is there any significant relationship between digital competence and students' attitudes towards AI?

RQ4: How does digital competence predict cognitive, affective, and behavioral attitudes toward AI?

Objectives of the Study

The main objective of the research is to investigate the relationship between digital skills and the attitudes of elementary school students towards AI in a predictive way.

The specific objectives are:

1. Measuring the degree of digital skills of elementary school students.
2. Investigating students' attitudes towards AI by using cognitive, affective, and behavioral dimensions.
3. Determining the predictive relationship between digital skills and the general attitude towards AI.
4. Analyzing how digital skills predict different dimensions of the AI attitudes of elementary school students.

From the structure of the manuscript "Digital Competencies and Attitudes Toward AI in K-12 Education", there are six main sections in the paper. Section 1 is where the research background, importance, research questions, and goals are stated. Section 2 is about the literature review regarding digital competencies and attitudes towards AI. Section 3 describes the method of the study, which covers research design, participants, data collection methods, instruments, and statistics. Section 4 presents the results and statistics. Section 5 discusses the implications and suggestions, as well as future directions. Section 6 is the conclusion of the study.

Literature Review

Increased use of digital tools in education has brought attention to the necessity of developing digital competences among students. Digital competences include technological skills, knowledge, attitudes, emotional readiness, and the capacity to search, assess, and generate digital information. Studies focused on digital competence measurement have underlined the necessity of applying a multidimensional approach to the assessment of students' skills in primary education settings (Soriano-Alcantara et al., 2025). Digital competence models created specifically for school

education have stated that learners must have the necessary technological literacy, critical thinking, and responsible use of digital tools to be able to function efficiently in the technology-enhanced learning environment (Guitert et al., 2021). The connection between digital skills and general 21st-century competences shows that the former are needed for lifelong learning, collaboration, and problem-solving in contemporary education (Van Laar et al., 2017). The findings obtained from educational research have shown that a digital learning environment necessitates the use of adequate pedagogy to allow students to develop their digital competences constantly (Pöntinen & Räty-Záborszky, 2020).

There has been a revolution in educational practices by means of data-driven learning, personalized education and intelligent learning systems (Gašević et al., 2015). Learning analytics approaches prove the necessity of the use of digital data for the study of learning processes and making educational decisions (Gašević et al., 2015). The development of digital skills has turned out to be an important precondition for the integration of information and communication technologies into educational processes (Levano-Francia et al., 2019). Learning theories related to the digital environment show the significance of technology-assisted interactions in flexible and connected learning (Siemens, 2019). Research methodologies should be applied systematically in order to assess relationships between learners' traits, technological skills, and educational outcomes (Kashif et al., 2025). This situation allows for the creation of a background for studying the influence of students' digital competences on their perception and adoption of innovative technologies such as AI. AI technology has presented new opportunities in the field of education in the form of automatic tutoring, intelligent testing, adaptive learning, and effective instruction design. AI-based educational applications need learners to possess enough knowledge and confidence to work effectively with intelligent systems (Holmes & Culver, 2019). The interaction between humans and intelligent systems is largely affected by factors like trust, transparency, and the perception about the reliability of the technology (Hu et al., 2018). AI system acceptance relies on the learners' awareness, perceived usefulness, and the readiness to accept the AI-based solutions in real-life situations (Gesk & Leyer, 2022). The research studies on the application of AI technology in the field of education have revealed both opportunities and challenges faced by such solutions (Ocaña-Fernández et al., 2019). AI literacy efforts in informal and formal settings have shown the importance of AI literacy for learners (Long et al., 2021).

New studies also pay special attention to the interrelation between digital competencies and AI attitudes. It has been proved that better-developed digital skills lead to higher self-confidence and positive views of AI technologies by learners and teachers (Galindo-Domínguez et al., 2024). In regard to AI attitudes, the cognitive, emotional, and behavioral aspects are mentioned among key predictors of acceptance and further adoption of technologies (Katsantonis & Katsantonis, 2024). There is an interconnection between digital literacy and attitudes towards AI as well; technological awareness is important for enhancing readiness to AI in learners (Sim et al., 2024). Teachers' digital skills and attitudes to AI also prove the importance of digital competence for AI integration (Kasinidou et al., 2025). Validation of AI attitudes assessment measures has been used to reliably measure learners' attitudes toward AI (Derinalp & Ozyurt, 2025). In addition, digital competencies have been identified as an important influence on the acceptance of AI in various settings (Vitezić & Perić, 2024). Current systematic studies on the implementation of AI in K-12 education highlight the importance of developing teachers' readiness and skills for the implementation of AI (Sagar & Reddy, 2026). Thus, this research aims to fill the gap by investigating the role of digital competencies in predicting attitudes toward AI among elementary students.

The reviewed research shows that digital literacy strongly influences learners' perceptions and understanding of AI. Nevertheless, it is difficult to identify the connection between digital competencies and attitudes toward AI among primary school learners.

Methodology

Fig. 1 depicts the conceptual framework of the link between digital competencies and attitudes towards AI in elementary school learners. The predictor variables are represented by digital competencies, which include skills, attitudes, emotions, knowledge, as well as searching and creation of information. Attitudes towards AI consist of cognitive, affective, and behavioral aspects.

The research utilized a quantitative approach and used the design that was non-experimental and correlational to explore the correlation between the digital skills and the attitude towards AI in elementary school students. Although the results reveal predictive relationships in the variables under investigation, are regarded as statistical relationships and not causal relationship since the research design is not experimental. In this respect, the study looked at the influence of the digital competencies on attitudes towards AI.

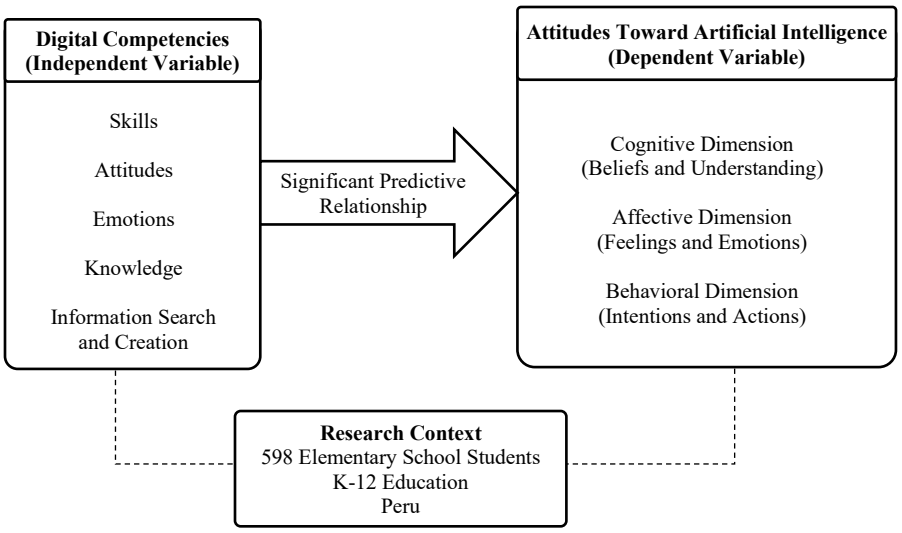

Fig. 1: Conceptual Framework of Digital Competencies and Attitudes Toward AI in K-12 Education

The digital competencies scale contained 50 items, which were split into five dimensions: Dimension 1 – skills; Dimension 2 – attitude; Dimension 3 – emotions; Dimension 4 – knowledge; and Dimension 5 – information search and creation. The Attitudes Towards AI scale had 22 items and was split into three dimensions: Dimension 1 – Cognitive; Dimension 2 – Affective; and Dimension 3 – Behavioral.

The reliability coefficient of Cronbach's alpha for the digital competencies scale was 0.866, while for the attitudes towards AI scale it was 0.894; both results imply that the variables have high reliability.

Sampling Procedure and Participants

This is because the sample used for the study comprised of elementary school learners undertaking K-12 education. A purposive sampling method was used to select participants who had some experience with a digital learning environment and technology. Some of the criteria used in the selection process involved participants who were currently enrolled in elementary education, had some experience with digital gadgets, and were willing to be part of the research. Those students who failed to fill in the questionnaires were considered ineligible for the study.

There were 598 learners who were finally selected for the study. These learners were selected from elementary education institutions, thus fitting well with the target context of the research. There was representation of participants from varied educational levels in order to achieve diversity in terms of learning experiences and level of digital competence. The demographics of the participants, such as age, gender, level of education, and experience with digital technologies, were obtained during the survey process**.**

School Selection Criteria and Geographic Distribution

The selected schools were chosen due to ease of access, willingness of the institution to be involved in the study, and digital learning experiences provided by the educational institution. The research was carried out in Peru with regard to educational settings connected to the research institutions that operated in the regions of Lima and Ica.

In total, 598 elementary students took part in the research. The involvement of these students in the research allowed analyzing differences in digital competence and attitude to AI of elementary students with various degrees of contact with digital technologies.

Data Collection Procedure

The data were gathered from April to June 2025 using a well-defined questionnaire administered to elementary students. Prior to the process of gathering data, consent was sought from the schools in which the research would be conducted. The aim of the research was discussed and the respondents were instructed about the questionnaire.

The two measurement scales used in the research included the 50-item Digital Competencies Scale comprising five dimensions and the 22-item Attitudes Toward AI Scale that includes three dimensions: cognitive, affective, and behavioral.

Ethical Considerations

This research adhered to ethical principles when conducting research on human subjects. Participation in the research was voluntary and participants were aware of the purpose of the research and the procedures before answering the questionnaires. Students and/or their guardians provided proper consent as per the institution's guidelines. The confidentiality and anonymity of participants were preserved during the whole process of research and the information collected was solely used for academic purposes.

Statistical Analysis Procedure

The collected data have been analyzed through the use of the statistical program IBM SPSS Statistics 29.0. First of all, descriptive analysis has been used in order to define the distribution levels of digital skills and attitudes towards AI. Reliability analysis has been performed based on Cronbach's alpha coefficient.

Afterward, ordinal regression analysis has been used in order to check whether there is any prediction between digital skills and attitudes towards AI. The model fit has been assessed based on the likelihood ratio test and pseudo R^2, such as Cox and Snell, Nagelkerke, and McFadden coefficients. The significance level was defined as 95% with $p < 0.05$.

Results

Reliability Analysis of Measurement Instruments

Reliability of the research instruments was measured through the Cronbach's alpha coefficient test to establish their internal consistency. The Digital Competency Scale scored a Cronbach's alpha value of 0.866, whereas the Attitudes Towards AI Scale got a reliability coefficient of 0.894. These high scores show the high internal consistency of the instruments, which made them reliable for measuring digital competency and attitude towards AI among elementary school children.

Descriptive Analysis of Digital Competencies

Analysis of the distribution of digital competency among the students was done on two levels – the digital competency level of the total score and its five dimensions, which were skills, attitude, emotion, knowledge, and information search and creation. The distribution of the students' digital competency is presented in table 1.

Table 1: Overall Digital Competencies Level and Dimension-wise Distribution Among Students

Levels	Low		Medium		High		Total	
	f	%	f	%	f	%	f	%
Digital Competencies Level (Overall)	231	38.6	305	51.0	62	10.4	598	100
Skills Dimension	268	44.8	278	46.5	52	8.7	598	100
Attitudes Dimension	205	34.4	281	47.0	112	18.7	598	100
Emotions Dimension	230	38.5	269	45.0	99	16.6	598	100
Knowledge Dimension	236	39.5	250	41.8	112	18.7	598	100
Information Search and Creation Dimension	215	36.0	309	51.7	74	12.4	598	100

Table 1 contains both the overall level of digital competency and individual dimensions of digital competency. Overall, 51.0% of students possessed medium digital competency, whereas 38.6% possessed low digital competency and 10.4% possessed high digital competency. Information search and creation had the largest share of medium digital competency (51.7%), followed by skills (46.5%), attitudes (47.0%), emotions (45.0%), and knowledge (41.8%) among the individual dimensions. It can be concluded from the above results that students have average digital competencies, but their further development is necessary.

Descriptive Analysis of Attitudes Toward AI

Students' perceptions about AI were determined by three categories of perceptions, namely cognitive, affective, and behavioral perceptions. Distribution of AI perceptions is given in table 2.

Table 2: Attitudes Toward AI and Its Dimensions

Levels	Unfavorable		Fair		Favorable		Total	
	f	%	f	%	f	%	f	%
Attitudes Toward AI	218	36.5	240	40.1	140	23.4	598	100
Cognitive	201	33.6	384	64.2	13	2.2	598	100
Emocional	185	30.9	275	46.0	138	23.1	598	100
Behavioral	238	39.8	242	40.5	118	19.7	598	100

As shown in table 2, the attitudes of the students toward AI were mostly fair. While 40.1% had fair attitudes, 36.5% showed Unfavorable attitudes, and 23.4% had favorable attitudes.

The cognitive aspect exhibited the largest number of fair attitudes (64.2%), reflecting a relatively high level of understanding of the concepts of AI. Nevertheless, the percentage of favorable attitudes in the cognitive aspect is as low as 2.2%. Meanwhile, the percentage of favorable attitudes in the affective and behavioral aspects was 23.1% and 19.7%, respectively.

Ordinal Regression Analysis of Digital Competencies Predicting AI Attitudes

Ordinal Regression Analysis was performed to assess if digital competencies are significant predictors of attitude variations among students towards AI. The output for goodness of fit and Pseudo R^2 is provided in fig. 2(a & b).

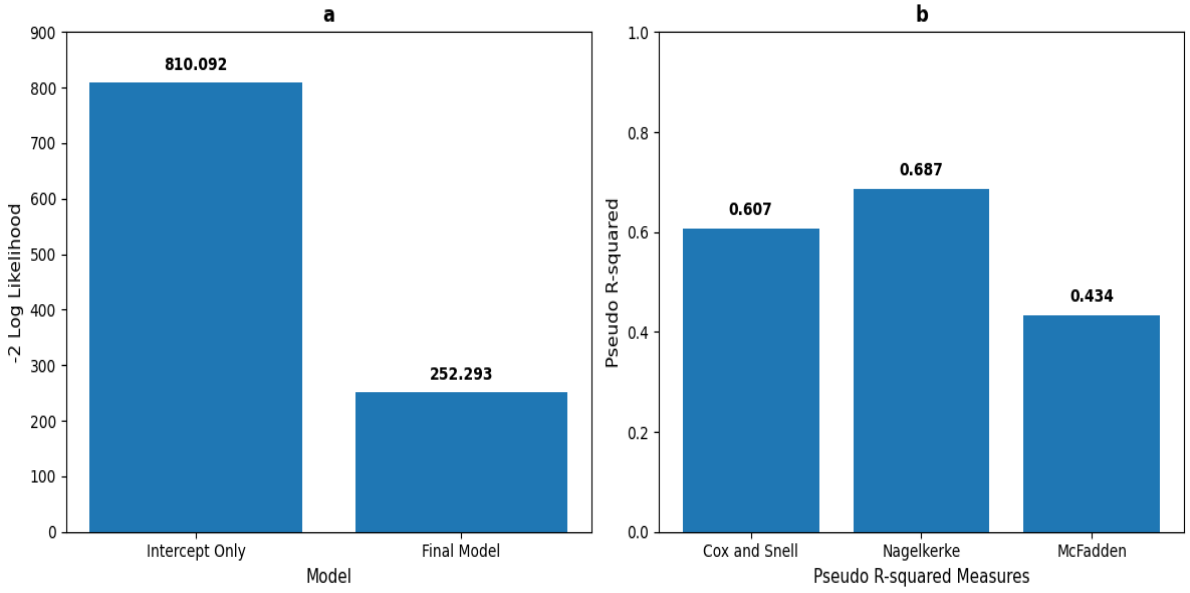

Fig. 2(a & b): Model Fit and Pseudo R-Squared Values for Digital Competencies Predicting AI Attitudes

Fig. 2(a & b) shows that the final regression model is statistically significant ($\chi^2 = 557.799$, $p < 0.001$). The significant likelihood ratio test clearly demonstrates that the digital competence variables enhance the prediction of the attitude toward AI compared to the intercept-only model.

The Nagelkerke pseudo R^2 of 0.687 reveals that digital competencies account for 68.7% of the variance in students' attitudes towards AI. Thus, digital competence is an essential determinant of students' attitudes towards AI.

Parameter Estimates of Digital Competencies Predicting AI Attitudes

Analysis of individual digital competence dimensions' contributions was done through parameter estimation. The regression estimates, Wald test statistics, and levels of significance are given in table 3.

Table 3: Parameter Estimates for Digital Competency Dimensions Predicting AI Attitudes

Predictor	Estimate	Standard Error	Wald	Sig.	95% Confidence Interval
Attitudes Level 1	-2.796	0.416	45.241	<0.001	-3.610 to -1.981
Attitudes Level 2	-1.819	0.330	30.471	<0.001	-2.465 to -1.173
Emotions Level 1	-2.164	0.416	27.113	<0.001	-2.979 to -1.350
Emotions Level 2	-1.531	0.345	19.630	<0.001	-2.208 to -0.853
Knowledge Level 1	-2.997	0.385	60.446	<0.001	-3.753 to -2.241
Knowledge Level 2	-0.953	0.314	9.189	0.002	-1.569 to -0.337
Information Search and Creation	-1.060	0.413	6.570	0.010	-1.870 to -0.249

Table 3 reveals that the competency dimensions predict AI attitudes. It is clear from the Wald statistics and significance values that most of the competency dimensions have a significant statistical contribution towards predicting variations in AI attitudes among students. The dimensions of knowledge, attitude, emotion, and information

search and creation were found to have a significant statistical contribution in order of their strength. This reveals that digital knowledge and technological confidence can improve AI acceptance and perception among students.

Predictive Relationship Between Digital Competencies and AI Attitude Dimensions

To examine the predictive capability of digital competencies across different AI attitude dimensions, separate ordinal regression models were developed for cognitive, affective, and behavioral attitudes. The results are shown in fig.3.

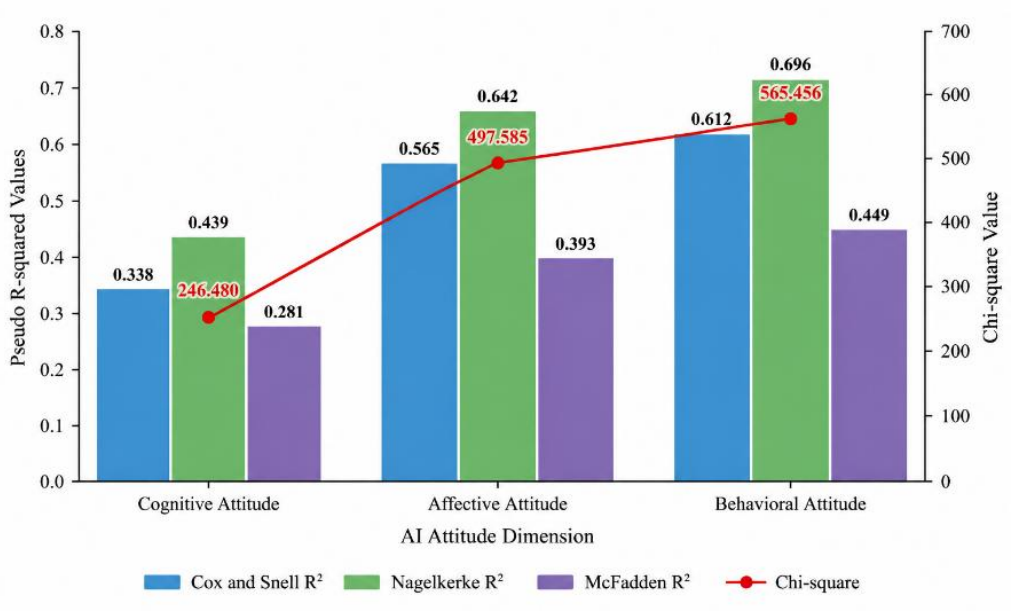

Fig. 3: Model Fit and Pseudo R-Squared Values for AI Attitude Dimensions

As fig. 3 clearly indicates, digital competencies were found to be a strong predictor for all three dimensions of attitudes towards AI ($p < 0.001$). Digital competencies predicted 43.9% of the variance in cognitive attitudes according to Nagelkerke pseudo-R^2. The same variable predicted 64.2% of the variance in affective attitudes, and the largest prediction was observed for behavioral attitudes, where digital competencies explained 69.6% of the variance. In general, the results indicated that higher levels of digital competencies are associated with higher cognitive understanding, emotional acceptance, and behavioral preparedness towards AI.

Discussion

Results of the study demonstrate how crucial the factor of digital competencies is for influencing the attitudes of elementary students towards AI. As a result, it is possible to see how more competent students in terms of digital competencies have a higher level of cognitive, emotional, and behavioral attitude towards AI technologies. As one can see from the results, the significant ordinal regression model ($\chi^2 = 557.799$, $p < 0.001$) demonstrates high explanatory capability (Nagelkerke $R^2 = 0.687$). It proves that digital competencies can be seen as one of the predictors of AI attitudes. Thus, the development of digital knowledge, self-efficacy, information literacy, and ethical use of technology can help students feel better prepared for an AI-assisted learning environment. In view of these results, schools should include digital competency and AI literacy programs in their K-12 curricula in order to enhance students' awareness, knowledge, and ethical use of AI. Appropriate training should be provided for teachers to ensure that students learn how to apply AI technologies in an effective and ethical way. Policies should be implemented that would allow the creation of appropriate educational strategies to ensure that students have equal access to digital information and can learn through technology. Further research may adopt a longitudinal design to assess students' development of digital competencies and attitudes towards AI in the long term. Other variables, such as socio-economic background, prior exposure to AI, family support, and learning context, could also be studied.

Conclusions

The research has analyzed the predictive relationship between digital competencies and attitudes towards AI in elementary school children in K-12 education. It is shown that digital competencies significantly influence the students' perception, acceptance, and preparedness for AI. The research has proved that the majority of students have

a moderate level of digital competencies, as 51.0% of students were identified as medium level in terms of digital competencies, whereas 10.4% of students were considered high-level in digital competencies, which shows the necessity for improving their advanced digital skills, knowledge and information management. Likewise, students demonstrated predominantly fair attitudes towards AI, namely 40.1% of students had a fair attitude, 36.5% of students had an unfavorable attitude, and 23.4% of students had a favorable attitude towards AI. The results of the reliability test proved the consistency of the measurement tools through the Cronbach's alpha score of 0.866 for digital competencies and 0.894 for attitudes towards AI. In addition, the ordinal regression model demonstrated that digital competencies were significantly predictive of the students' attitudes toward AI. In particular, the final regression model was statistically significant ($\chi^2 = 557.799$, $p < 0.001$), and it yielded a Nagelkerke pseudo-R^2 of 0.687, which indicated that digital competencies explained 68.7% of the variance in attitudes toward AI. Moreover, digital competencies were shown to explain 43.9% of cognitive attitudes, 64.2% of affective attitudes, and 69.6% of behavioral attitudes. This research has made a contribution to the area of educational technology, as it has provided empirical evidence regarding the importance of digital competencies in preparing young elementary school students to AI-enabled learning environments. The findings of this study imply that it is essential to improve the digital literacy of children, along with developing their self-confidence and responsibility while using technology in K-12 schools. Some potential directions for future research might be the longitudinal studies conducted in different educational contexts.

References

Soriano-Alcantara, J. M., Guillén-Gámez, F. D., & Ruiz-Palmero, J. (2025). Exploring digital competencies: Validation and reliability of an instrument for the educational community and for all educational stages. *Technology, Knowledge and Learning*, *30*(1), 307-326. https://doi.org/10.1007/s10758-024-09741-6

Galindo-Domínguez, H., Delgado, N., Campo, L., & Losada, D. (2024). Relationship between teachers' digital competence and attitudes towards artificial intelligence in education. *International Journal of Educational Research*, *126*, 102381. https://doi.org/10.1016/j.ijer.2024.102381

Guitert, M., Romeu, T., & Baztán, P. (2021). The digital competence framework for primary and secondary schools in Europe. *European Journal of Education*, *56*(1), 133-149. https://doi.org/10.1111/ejed.12430

Gašević, D., Dawson, S., & Siemens, G. (2015). Let's not forget: Learning analytics are about learning. *TechTrends*, *59*(1), 64-71. https://doi.org/10.1007/s11528-014-0822-x

Gesk, T. S., & Leyer, M. (2022). Artificial intelligence in public services: When and why citizens accept its usage. *Government Information Quarterly*, *39*(3), 101704. https://doi.org/10.1016/j.giq.2022.101704

Kashif, M., Ammar, M., Sellami, A., Chiu, T. K., Abbasi, S. A., & Ahmad, Z. (2025). Teachers' perspectives on AI integration in K-12 education: challenges, opportunities, and preliminary assessment model–a systematic review. *Computers in the Schools*, 1-27. https://doi.org/10.1080/07380569.2025.2602507

Holmes, W., & Culver, J. (2019, June). Automating the categorization of learning activities, to help improve learning design. In *International Conference on Artificial Intelligence in Education* (pp. 105-109). Cham: Springer International Publishing. https://doi.org/10.1007/978-3-030-23207-8_20

Hu, W. L., Akash, K., Reid, T., & Jain, N. (2018). Computational modeling of the dynamics of human trust during human–machine interactions. *IEEE Transactions on Human-Machine Systems*, *49*(6), 485-497. https://doi.org/10.1109/THMS.2018.2874188

Sim, S. J., Kim, J. H., Hong, M. H., Hong, S. M., & Lee, M. J. (2024). Study on the attitudes toward artificial intelligence and digital literacy of dental hygiene students. *Journal of Dental Hygiene Science*, *24*(3), 171-180. https://doi.org/10.17135/jdhs.2024.24.3.171

Katsantonis, A., & Katsantonis, I. G. (2024). University students' attitudes toward artificial intelligence: An exploratory study of the cognitive, emotional, and behavioural dimensions of AI attitudes. *Education Sciences*, *14*(9), 988. https://doi.org/10.3390/educsci14090988

Kasinidou, M., Kleanthoys, S., & Otterbacher, J. (2025). Cypriot teachers' digital skills and attitudes towards AI. *Discover Education*, *4*(1), 1. https://doi.org/10.1007/s44217-024-00390-6

Levano-Francia, L., Sanchez Diaz, S., Guillén-Aparicio, P., Tello-Cabello, S., Herrera-Paico, N., & Collantes-Inga, Z. (2019). Digital Competences and Education. *Journal of Educational Psychology-Propositos y Representaciones*, *7*(2), 579-588. https://doi.org/10.20511/pyr2019.v7n2.329

Long, D., Blunt, T., & Magerko, B. (2021). Co-designing AI literacy exhibits for informal learning spaces. *Proceedings of the ACM on Human-Computer Interaction*, *5*(CSCW2), 1-35. https://doi.org/10.1145/3476034

Pöntinen, S., & Räty-Záborszky, S. (2020). Pedagogical aspects to support students' evolving digital competence at school. *European Early Childhood Education Research Journal*, *28*(2), 182-196. https://doi.org/10.1080/1350293X.2020.1735736

Ocaña-Fernández, Y., Valenzuela-Fernández, L. A., & Garro-Aburto, L. L. (2019). Artificial Intelligence and Its Implications in Higher Education. *Journal of Educational Psychology-Propositos y Representaciones*, *7*(2), 553-568.http://dx.doi.org/10.20511/pyr2019.v7n2.274

Derinalp, P., & Ozyurt, M. (2025). Adaptation of the student attitudes toward artificial intelligence scale to the Turkish context: Validity and reliability study. *International Journal of Human–Computer Interaction*, *41*(8), 4653-4667. https://doi.org/10.1080/10447318.2024.2352921

Siemens, G. (2019). Learning analytics and open, flexible, and distance learning. *Distance Education*, *40*(3), 414-418. https://doi.org/10.1080/01587919.2019.1656153

Van Laar, E., Van Deursen, A. J., Van Dijk, J. A., & De Haan, J. (2017). The relation between 21st-century skills and digital skills: A systematic literature review. *Computers in human behavior*, *72*, 577-588. https://doi.org/10.1016/j.chb.2017.03.010

Vitezić, V., & Perić, M. (2024). The role of digital skills in the acceptance of artificial intelligence. *Journal of business & industrial marketing*, *39*(7), 1546-1566. https://doi.org/10.1108/JBIM-04-2023-0210

Sagar, G. J., & Reddy, P. K. K. (2026). Structural Performance evaluation of flood light poles in Cricket stadium to Wind Force. *Bridge: Journal of Multidisciplinary Explorations*, 50-55.