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Digital Competence as a Predictor of Trust in Artificial Intelligence among University Teachers in Pakistan's Public Sector Universities

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ABSTRACT

The greater the accumulation of artificial intelligence (AI) in higher education, the more opportunities there are for improving both teaching and learning, although concurrently the need for university teachers to have digital competence and to place trust in AI technologies becomes important. Yet there is still very little empirical evidence regarding teachers' digital competence and their trust in AI, especially in developing countries like Pakistan. Therefore, this study examined digital competence as a predictor of trust in artificial intelligence among university teachers in Pakistan's public sector universities. A quantitative research approach was adopted using a cross-sectional correlational research design. The target population consisted of 12,073 university teachers, including 7,053 male and 5,020 female teachers employed in public sector universities across Punjab, Pakistan. A sample of 1201 was selected by using a multistage stratified simple random sampling technique. A total of 908 responses were received. A structured questionnaire consisting of two standardized instruments: Teacher's Digital Competence Questionnaire (TDCQ) (Redecker, 2017), which comprised 22 items with reliability α=0.703 and the Trust in Artificial Intelligence scale (Nazaretsky et al., 2022), which consisted of 23 items with reliability α=0.915, was adapted to collect the data. The results specified a significant and positive relationship between digital competence and trust in AI. Higher education institutions should pay special attention to developing their university teachers' digital competence by ensuring the unremitting professional development of teachers as well as organizing training courses on AI and expanding the capacity of teachers to use AI in education.

Keywords: *Digital Competence; Trust in Artificial Intelligence; University Teachers; Higher Education; Pakistan.*

INTRODUCTION

Artificial intelligence (AI) has quickly developed into a powerful force in higher education, making a significant impact on teaching, learning, assessment, and the various decisions taken in academic settings. Because of the broad availability of generative AI tools such as ChatGPT, Google Gemini, DeepSeek, and other AI-powered educational technologies, there now exist unprecedented possibilities for improving the quality of instruction, boosting professional efficiency, and enabling more personalized learning experiences. For this reason, higher education institutions all over the world are becoming more and more keen to get teachers to use AI-based technologies in both their teaching, learning and professional activities. Yet, the successful implementation of AI goes well beyond simply having access to these technological tools; it mainly relies on teachers' readiness, their digital skills, and their confidence when using them in meaningful and pedagogically suitable ways.

Digital competence has become one of the most basic professional skills needed by teachers in the twenty-first century among the many factors that influence the adoption of AI. As stated in the DigCompEdu Framework by the European Commission, digital competence refers to teachers' capability to use digital technologies effectively in their professional activities, in the delivery of instruction, in assessment, in empowering learners, and in helping to develop students' own digital competencies (Redecker, 2017). Teachers who have a well-developed level of digital competence are in a better position to assess new technologies, deal with technology-related problems, and incorporate innovative digital tools into their teaching (Althubyani, 2024). Since artificial intelligence is becoming an integral part of educational settings, digital competence is likely to increase teachers' confidence and boost their willingness to adopt AI-supported technologies.

Empirical researches carried out recently have strengthened the importance of digital competence in educational situations involving AI. According to Galindo-Domínguez et al. (2024), teachers who had a higher degree of digital competence showed considerably more positive attitudes towards artificial intelligence, regardless of variations in age, gender, teaching experience, or educational qualification. In a similar way, Ahmed (2025) showed that digital competence greatly increased the effectiveness of AI-based assessment systems by acting as a mediator between artificial intelligence-supported assessment and students' academic achievement in universities in Pakistan. Taken together, these results highlight the fact that digital competence is a vital requirement for the successful integration of AI into educational settings (Al-Abdullatif, 2024; Tzafilkou et al., 2023).

While educators have achieved digital competency, they might not be ready to embrace AI without confidence in AI technologies. Trust in Artificial Intelligence involves confidence in the reliability, transparency, and advantages of AI systems, along with their capacity to help with professional choices without infringing on ethical or educational requirements. The importance of trust as a psychological element that influences educators' adoption and implementation of AI technologies has become evident (Nazaretsky et al., 2022). Rahman et al. (2025) found that trust in AI significantly facilitated students' learning autonomy in educational settings leveraging AI and that digital learning motivation and digital ethics partially mediated the impact of trust in AI on learning autonomy. Similarly, while studying how teachers in open education systems are using AI, Jiang and Meng (2025) discovered that trust in AI also plays a vital part in the process of integrating it, with its significance differing based on the institutional environment.

Another recent study has also investigated the relationship between digital competence of teachers and their trust in AI. There are notable positive connections between teacher digital competence and knowledge about AI and trust in AI (see Lucas et al. 2024). In addition, they discovered that their AI knowledge was a better predictor of trust and that the direct relationship of digital competence with trust was not statistically significant once the AI knowledge was taken into account. Likewise, Jiang and Meng (2025) claimed that teachers' digital mindset and their ability to make sense of AI play important roles in promoting the integration of AI, although digital teaching competence on its own does not consistently predict trust in AI (Casal-Otero et al., 2023; Crompton et al., 2024). These findings indicate that although digital competence is linked to teachers' perceptions regarding AI, its impact on trust is inconsistent across different educational contexts and groups.

Although the previous research has contributed much to improve the understanding of digital competence and trust in artificial intelligence, there are still significant research gaps. First, the empirical evidence that currently exists has mainly come from educational settings in Europe and China (Galindo-Domínguez et al., 2024; Jiang & Meng, 2025; Lucas et al., 2024; Simuț et al., 2024), there being relatively little evidence from developing countries. Second, the focus has been primarily on students' digital competence and on AI-enhanced assessment practices, with relatively fewer studies on the trust of university teachers in AI

(Ahmed, 2025; Choi et al., 2023). As a result, there is not enough empirical evidence to show whether digitally competent university teachers in Pakistan also tend to have greater trust in AI technologies. Since AI is being incorporated more and more into higher education and because there are differences in technological infrastructure, institutional support, and levels of digital readiness in various contexts, it is both appropriate and necessary to look at this relationship in the public sector universities in Pakistan.

Hence, the recent study aims to examine the predictive effect of university teachers' digital competence on their trust in artificial intelligence within public-sector universities in Pakistan. Since it focuses on university faculty members, the research adds to the growing amount of literature concerned with AI adoption in higher education and at the same time advances existing knowledge within the context of a developing country. The anticipated outcomes will be beneficial for HEIs, policy-makers and professional development programs for enhancing educators' digital skills and fostering the responsible and effective use of AI in higher education teaching methods.

Based on the existing literature, the following research questions and hypothesis were formulated:

Research Questions

This study answered the following research questions:

1. What is the level of digital competence among university teachers?
2. What is the level of trust in artificial intelligence among university teachers?

Research Hypothesis

The following research hypothesis was tested:

- **H_1:** There is a statistically significant positive relationship between digital competence and trust in artificial intelligence.

METHODOLOGY

This study was conducted under the positivist paradigm, and a quantitative research approach was utilized using a cross-sectional correlational research design. The target population consisted of 12,073 university teachers, including 7,053 male and 5,020 female teachers employed in public sector universities across Punjab, Pakistan. A sample of 1201 was selected by using a multistage stratified simple random sampling technique. In the first stage, public sector universities were categorized into five major strata (i.e., general, engineering, medical, agriculture, and veterinary universities). In the second stage, universities were selected proportionately from each category. In the last stage, academic disciplines and teachers were selected randomly. A total of 908 responses were received. A structured questionnaire encompassing two standardized instruments was adapted to collect the data. Teacher's Digital Competence Questionnaire (TDCQ) comprised 22 items, based on DigCompEdu Framework developed by Redecker (2017) was used to measure teachers' digital competencies. The overall reliability for the Teacher's Digital Competence Questionnaire (TDCQ) scale was good α=0.703. Trust in Artificial Intelligence scale developed by Nazaretsky et al. (2022) consisted of 23 items to measure the teachers' confidence in the reliability, usefulness, and educational applicability of AI-based educational technologies, with a reliability of α=0.915, and was adapted. All the items of both questionnaires were rated on a 5-point Likert-type scale, ranging from "1" Strongly Disagree to "5" Strongly Agree. Data were collected by personal visits and online surveys using Google Forms. Descriptive (frequencies, percentages, mean scores, and standard

deviations) and inferential statistics (Pearson product-moment correlation) were applied to analyze the collected data.

RESULTS

Descriptive statistics on university teachers' Digital Competence and Trust in Artificial Intelligence

Research Question: 1

What is the level of digital competence among university teachers?

Table 1

Dimension	Mean	SD
Professional Engagement	14.87	2.92
Digital Resources	9.76	2.56
Teaching and Learning	13.47	3.21
Assessment	10.91	2.24
Empowering Learners	9.78	2.50
Facilitating Learners' Digital Competencies	18.36	3.76
Total of Digital Competence	77.14	7.75

Level of Digital Competence among University Teachers

The above table presents the results of descriptive statistics of digital competence with its dimensions. Mean scores for facilitating learners' digital competencies (M = 18.36, SD = 3.76) were relatively high, followed by professional engagement (M = 14.87, SD = 2.92) and teaching and learning (M = 13.47, SD = 3.21). Whereas, the mean scores for assessment (M = 10.91, SD = 2.24), empowering learners (M = 9.78, SD = 2.50), and digital resources (M = 9.76, SD = 2.56) were lower.

The overall mean score for digital competence was M = 77.14 (SD = 7.75), indicating a moderate level of digital competence among university teachers. Hence, it is concluded that university teachers hold a satisfactory level of digital competence in utilizing digital technologies for professional engagement, teaching and learning, assessment, and facilitating learners' digital competencies.

Research Question: 2

What is the level of trust in artificial intelligence among university teachers?

Table 2: Level of Trust in Artificial Intelligence among University Teachers

Dimension	Mean	SD
Self-efficacy in Using AI-based EdTech	9.16	2.99
AI-based EdTech vs Human Advice/Recommendation	8.47	2.80
Anxieties Related to Using AI-based EdTech	8.88	2.88
AI-based EdTech Lack of Human Characteristics	11.98	3.61
Perceived Benefits of AI-based EdTech	21.77	6.97
Preferred Means to Increase Trust in AI-based EdTech	9.97	3.04

Total of AI Trust	70.22	14.79

The above table displays the results of descriptive statistics of trust in artificial intelligence with its dimensions. Mean scores for perceived benefits of AI-based EdTech (M = 21.77, SD = 6.97) were relatively higher, followed by AI-based EdTech lack of human characteristics (M = 11.98, SD = 3.61) and preferred means to increase trust in AI-based EdTech (M = 9.97, SD = 3.04). Whereas, the mean scores for self-efficacy in using AI-based EdTech (M = 9.16, SD = 2.99), anxieties related to using AI-based EdTech (M = 8.88, SD = 2.88), and AI-based EdTech vs Human advice/recommendation (M = 8.47, SD = 2.80) were lower.

The overall mean score for trust in artificial intelligence was M = 70.22 (SD = 14.79), indicating a moderate level of trust in artificial intelligence among university teachers. Hence, it is concluded that university teachers hold a satisfactory level of trust in artificial intelligence and generally recognize the potential benefits of AI technologies.

Inferential statistics on university teachers' Digital Competence and Trust in Artificial Intelligence

Research Hypothesis

There is a statistically significant positive relationship between digital competence and trust in artificial intelligence.

Table 3: Correlation between Digital Competence and Trust in Artificial Intelligence

Sr. No.	Variables	1	2
1	Digital Competence	1	
2	Trust in Artificial Intelligence	.717**	1

Note: **. Correlation is significant at the 0.01

The results of the correlation analysis in the above table revealed a statistically significant and strong positive relationship between university teachers' digital competence and trust in artificial intelligence ($r = .717$, $p < .001$). Hence, it is concluded that teachers with advanced levels of digital competence tend to demonstrate greater trust in artificial intelligence.

Table 4: Simple Linear Regression Analysis Regarding Digital Competence Predicting Trust in Artificial Intelligence

Predictor	B	SE	B	T	P
Constant	-35.38	3.43	—	-10.33	< .001
Digital Competence	1.37	0.04	.72	30.98	< .001

Table 5: Model Summary

R	R^2	Adjusted R^2	F	P
.717	.514	.514	959.54	< .001

The results of simple linear regression analysis revealed that university teachers' digital competence significantly predicts their trust in artificial intelligence. The regression model was statistically significant, $F(1, 906) = 959.539$, $p < .001$. The model produced an R^2 value of .514, suggesting that 51.4% of the variance in university teachers' trust in artificial intelligence was explained by their digital competence. Furthermore, digital competence emerged as a significant positive predictor of trust in artificial intelligence ($\beta = .717$, $B = 1.369$, $t = 30.976$, $p < .001$). Hence, it is concluded that an increase in university teachers' digital competence is linked with a corresponding increase in their trust in artificial intelligence. Therefore, the hypothesis indicating a statistically significant positive relationship between digital competence and trust in artificial intelligence was supported.

DISCUSSION AND CONCLUSION

This study was designed to analyze the predictive effect of university teachers' digital competence on their trust in artificial intelligence in public sector universities of Punjab, Pakistan. The results designated a significant and positive relationship between digital competence and trust in AI. The correlation analysis showed a significant positive correlation between the two variables, and the regression analysis results confirmed that digital competence had a significant and positive association with trust in AI. More specifically, digital competence accounted for 51.4% of the variance in teachers' trust in AI, which shows that it has a considerable influence on the levels of trust that teachers have in AI technologies.

The results indicate consistency with past studies which had focused on the role of digital competence as a determinant of a positive attitude towards AI. A study conducted by Galindo-Domínguez et al. (2024) concluded that teachers with an advanced level of digital competence showed more interest in the use of AI in education. Similarly, Lucas et al. (2024) discovered a strong positive correlation between teachers' level of digital competence and their knowledge of AI as well as their trust in AI. The present findings also confirm that teachers with digital competencies are more prone to perceive, assess, and use AI tools and thus, more likely to trust the reliability and usefulness of AI tools.

The results can also be interpreted with reference to the Technology Acceptance Model (TAM) (Davis, 1989), which emphasizes that their knowledge and skills in using technological innovations are key factors in determining their acceptance and confidence. More knowledgeable teachers in the digital environment have more positive experiences of its usefulness and usability, and are more trusting of its use. Moreover, the results are in agreement with the DigCompEdu Framework (Redecker, 2017), which shows that teachers' digital competences are of great importance for the successful incorporation of emerging technologies into their teaching and professional activities.

This study is a valuable contribution to the present surge in research concerning the role of AI in higher education since it provides empirical evidence relating to a situation—that of Pakistan—which has been poorly represented in the existing literature on AI and educational technology. It contributes new knowledge to the current body of literature by demonstrating that digital competence is also one of the key factors affecting teachers' trust in AI in universities in developing countries, the focus of which is mainly on educational settings in Europe and East Asia.

To conclude, the study shows that digital competence plays a key role in influencing university teachers' attitudes towards AI; the more digitally competent they are, the more they trust AI technologies and the more they think these technologies are useful as tools for teaching and learning or for use in their professional duties. Therefore, higher education institutions should concentrate on taking steps to improve teachers' digital skills by giving them opportunities for continuous professional development, technology-based training courses and practical experience using AI-based educational resources. Such initiatives will help to build trust in AI and lead the way for its successful integration into educational settings.

RECOMMENDATIONS AND FUTURE IMPLICATIONS

According to the findings of this study, the main recommendations for the HEIs are the following: ongoing professional development programmes focusing on the enhancement of the digital competence of university teachers; training courses on AI; enhancement of the capacity to apply AI tools in an educational setting. Improving the digital literacy of teachers might help to build trust in AI and its responsible and effective application to teaching and learning. Future studies should build on these findings and employ a longitudinal design or a mixed-methods approach, and consider the effects of other factors such as AI literacy, digital mindset, institutional support, and ethical concerns that may impact university teachers' trust in AI.

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