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TEACHING EXPERIENCE AND AI ADOPTION: EXPLORING THE DIGITAL COMPETENCE OF PRIVATE SCHOOL TEACHERS

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Abstract

Artificial Intelligence (AI) has become a significant part of modern education and is helping teachers with lesson planning, creation of teaching materials, assessment, feedback, student empowerment and classroom activities. But teachers' digital competence and professional experience are

crucial in the effective use of the AI-based tools. In the present study the teaching experience and Artificial Intelligence Adoption is explored and the role of Digital Competence among Private School Teachers of Vellore District, Tamilnadu is analysed. The study was quantitative, cross-sectional and explanatory research design. The empirical analysis was carried out on 80 valid responses to the Google Forms survey. Digital Competence was assessed by six items, and Artificial Intelligence Adoption was operationalised by 30 items related to 5 aspects of AI in education: Teacher management, Teaching-material creation, Student assessment, Student empowerment, Attention to diversity and Student motivation. The descriptive statistics, independent-samples t-test, one-way ANOVA, Pearson correlation and simple linear regression were used. The Pearson correlation coefficient calculated the weak positive correlation between Digital Competence and Artificial Intelligence Adoption. Regression analysis also showed that Digital Competence accounted for about 1.5% of the variance in the adoption of Artificial Intelligence. Based on these results, it can be concluded that teaching experience and digital competency should be taken into account in the context of the other factors related to AI, such as knowledge, training, organisational support, infrastructure, and perceived usefulness. The study emphasizes the need for ongoing PD to build teachers' capacity to effectively and ethically incorporate AI into their teaching practices. The study concludes that the use of AI in education is gaining momentum, particularly in private schools, while teachers have expressed a keen interest in adopting the technology. The study finds that the use of AI in education is becoming more ubiquitous, especially in private schools, and that teachers are interested in using the technology in their schools.

Introduction

The education sector is undergoing significant transformation as digital technologies and Artificial Intelligence become increasingly integrated into teaching and professional activities. Teachers are expected to perform a wide range of responsibilities, including lesson

preparation, development of teaching materials, classroom instruction, student assessment, feedback, learner support and administrative activities. Digital competence is thus a factor of teachers' professional competence, which is growing because of the increasing dependence on technology. Artificial Intelligence is breaking new ground in technology, giving teachers a greater

array of tools to use in the classroom. Artificial Intelligence (AI) can support teachers in lesson preparation, writing examples, designing teaching content, designing learning resources, assessment review, and differentiated teaching.

Celik et al. (2022) pointed out the opportunities and challenges that teachers face with AI tools, and they noted the need to grasp how AI can be used effectively in teaching. Digital competence is not just about operating computer or digital applications. According to the European Framework for the Digital Competence of Educators (DigCompEdu), professional engagement, digital resources, teaching and learning, assessment, empowering learners and facilitating learners' digital competence are important aspects of educator competence (Redecker, 2017). Teachers' interactions with emerging technologies can also be related to their teaching experience. Some teachers have more pedagogical content knowledge and experience in managing the classroom while others have less experience and more knowledge of new digital technologies. Thus, the research on the use of AI in teaching is informed by this context, as teaching experience offers an essential foundation for understanding the context of teachers' use of AI. The impact of teachers' digital competence on teachers' attitudes towards AI has been explored in recent research. For instance,

Galindo-Domínguez et al. (2024) found positive relationships between teachers' digital competence and their attitudes towards AI in education. But it's not just positive attitudes that indicate teachers are using AI in their everyday classroom.

Xue et al. (2025) conducted a systematic review study of teacher AI adoption studies to uncover some of the factors that were linked to the adoption of AI, such as perceived usefulness, perceived ease of use, and individual and contextual characteristics. It means that the adoption of AI should not be considered a one-dimensional approach or a single factor. The present study tries to analyse the impact of teaching experience and investigates the correlation between Digital Competence and Artificial Intelligence Adoption of the teachers in the private schools of the Vellore District, the study is based on the factors in this context, the study tries to analyse the impact of teaching experience and investigates the correlation between Digital Competence and Artificial Intelligence Adoption among private school

teachers of the Vellore district.

Statement of the Problem

The increasing availability of AI applications provides teachers with new opportunities to improve lesson preparation, teaching materials, assessment and student support. But the use of AI tools doesn't necessarily lead to meaningful adoption. There are a variety of factors that makes teachers' digital competence vary from person to person, such as their teaching experience, confidence, exposure to AI, training opportunities, and institutional support. These differences may affect the extent to which AI is incorporated into actual teaching activities. The empirical study on which this paper is based reported a small direct relationship between Digital Competence and Artificial Intelligence Adoption for the sampled private school teachers. Thus, the present paper takes the teaching experience as an important characteristic of a profession and discusses Digital Competence and Artificial Intelligence Adoption.

Research Gap

Existing research has examined teacher digital competence, technology acceptance, AI attitudes and AI adoption. But the connections between teachers' professional attributes and actual usage of AI in teaching vary according to context. Most of the research literature on AI concentrates on attitudes and intentions of teachers and students, and on their acceptance of AI, instead of on actual AI tasks that teachers do. In their study, Xue et al. (2025) pointed to the need for more research specific to the field of education on teachers' use of AI. Also, Galindo-Domínguez et al. (2024) studied the connection between the digital competence of teachers and attitudes towards AI, but attitudes do not necessarily reflect the actual implementation of AI in the classroom. The present study is informative as it targets the private school teachers at Vellore District and as it takes teaching experience as another variable along with Digital Competence and Artificial Intelligence Adoption.

Research Objectives

- To identify the teaching-experience profile of private school teachers.
- To assess the level of Digital Competence among private school teachers.

- To assess the level of Artificial Intelligence Adoption among private school teachers.
- To examine the relationship between Digital Competence and Artificial Intelligence Adoption. To determine whether Digital Competence significantly predicts Artificial Intelligence Adoption.
- To examine the implications of teaching experience for professional development in AI adoption.

Research Hypotheses

H₁: Digital Competence has a significant positive relationship with Artificial Intelligence Adoption among private school teachers.

H₀: There is no significant positive correlation between Digital Competence and An AI with the teachers of private schools.

CONCEPTUAL FRAMEWORK

Teaching Experience → Digital Competence → Artificial Intelligence Adoption

Professional background variables are teaching experience, and the explanatory variable is Digital Competence, with the outcome variable being Artificial Intelligence Adoption. The underlying argument is that the professional practice experience might influence the exposure to teaching practices and professional learning needs of teachers and that digital competence can help them engage with technologies that are AI-based.

Review of Literature

Digital Competence of Teachers

Digital competence has been a now integral part of modern teaching professionalism. It includes the capacity to select, evaluate, create and use digital resources for professional and pedagogical purposes. In his article Redecker (2017), using the DigCompEdu framework, identified six major competence areas of teachers: Professional engagement, Digital resources, Teaching and learning, Assessment, Empowering learners, Facilitating learners' digital competence.

Artificial Intelligence in Teaching

AI offers opportunities to teachers to assist in lesson preparation, materials, assessment, feedback and differentiated learning. Celik et al. (2022) discussed in their study the promises and challenges of AI for teachers and emphasized the importance of having proper teacher knowledge and pedagogical consideration.

Digital competence and the use of AI.

Digital competence can potentially support the use of AI for some teachers as they may feel more confident in using digital technologies, which can lead to experimentation with and testing of AI applications. Galindo-Domínguez et al. (2024) found a positive relationship between teachers' digital competence and attitudes towards AI in education. But there is a difference between having a positive attitude towards AI and actually adopting AI.

Teaching Experience and AI Adoption

Technology uptake can be affected in various ways by teaching experience. Experienced teachers might have more pedagogical knowledge and classroom-management experience, as well as knowledge of student needs. Concurrently, inexperienced teachers might be more familiar with the latest digital technologies. Thus, there is no guarantee that teaching experience leads to greater or lower AI usage.

Recent Research on Teacher AI Adoption

Xue et al. (2025) examined the studies on teachers' adoption of AI, and they concluded that the perceived usefulness, perceived ease of use, and other factors related to teachers and the context of their situation were important. Another grounded meta-analysis (Prasad et al., 2025) also suggests that individual, technological and contextual factors need to be considered when understanding the process of adopting AI.

Research Methodology

Research Design

The research employed a quantitative, cross sectional and explanatory type of study. The design was deemed appropriate for the time and place for the study of Digital Competence and Artificial Intelligence Adoption.

Population and Sample

The respondents for the study were the teachers who teach in private schools in Vellore District, Tamil Nadu. Google Forms were used to deliver the questionnaire. The empirical analysis took into account 80 valid responses.

Measurement

A five point response scale was employed. The six items of Digital Competence were labelled G1 to G6. Artificial Intelligence Adoption comprises 30 items categorized into six dimensions: teacher management, creation of teaching materials, student assessment, student empowerment, attention to diversity and student motivation. Scores for the scores were composed by using the arithmetic mean of the relevant items.

Sampling Results and Analysis

Sampling & Analytical Procedure Of the responses in this survey, 80 valid responses were chosen for analysis with SPSS-style procedures (source study). Descriptive statistics, independent-samples t-test, one-way ANOVA, Pearson correlation and simple linear regression were used as analytical techniques.

Statistical Tools

Mean and standard deviation were used to describe the constructs. The independent-samples t-test was used to compare groups by marital status. Differences by age and by teaching experience were explored using one-way ANOVA. The correlation between Digital Competence and Artificial Intelligence Adoption was analysed by Pearson correlation and the predictive contribution of Digital Competence was tested by simple linear regression.

Table 1: Teaching Experience of Respondents

Teaching Experience	Frequency	Percentage
Less than 5 years	21	26.3
6–10 years	18	22.5
11–15 years	21	26.3
16–20 years	12	15.0
More than 20 years	8	10.0
Total	80	100.0

This distribution shows that 26.3% of the teachers in the sample had fewer than 5 years of experience. The number of teachers with experience of 11–15 years was also 26.3%. Twenty-two and one-fifth (22.5%) of the teachers had 6–10 years of experience, and 15.0% had 16–20 years. The ratio of teachers who had 21–25 years in teaching was 10.0%.

Table 2: Demographic Profile of Respondents

Variable	Category	Frequency	Percentage
Gender	Male	30	37.5
	Female	50	62.5
Age	Up to 25	7	8.8
	26–35	32	40.0
	36–45	25	31.3
	46–55	15	18.8
	Above 55	1	1.3
Marital Status	Married	55	68.8
	Single	22	27.5
	Other	3	3.8
Qualification	Undergraduate	14	17.5
	Postgraduate	34	42.5
	M.Phil	15	18.8
	Ph.D.	10	12.5
	Others	7	8.8
School Board	CBSE	47	58.8
	Matriculation	29	36.3

	ICSE	4	5.0
Location	Urban	44	55.0
	Semi-urban	20	25.0
	Rural	16	20.0

The sample was mainly female, that is, females made up 62.5% of the sample. The largest age group was 26–35 years (40.0%). The largest educational group was postgraduates with 42.5%. 58.8% respondents were CBSE teachers and 55.0% were from urban school.

Table 3: Descriptive Statistics of the Main Variables

Variable	Mean	Standard Deviation
Digital Competence	2.975	0.409
Artificial Intelligence Adoption	3.025	0.178

The average Digital Competence score was 2.975 with a standard deviation of 0.409. The average Artificial Intelligence Adoption score was 3.025 with a standard deviation of 0.178. Both variables were located around the middle of the five-point response scale.

Table 4: Independent-Samples t-Test

Variable	Married Mean	Unmarried/Other Mean	T	P
Artificial Intelligence Adoption	3.014	3.036	0.808	0.420
Digital Competence	2.946	2.950	0.063	0.950

The t-test results show that neither Artificial Intelligence Adoption nor Digital Competence differed significantly according to marital status. The p-values of 0.420 and 0.950 were greater than 0.05.

Table 5: One-Way ANOVA by Age Group

Variable	F Value	p Value
Digital Competence	1.986	0.117
Artificial Intelligence Adoption	0.518	0.670

There was no significant difference in the reported ANOVA scores for either Digital Competence or Artificial Intelligence Adoption for the age groups at the 5% level.

Table 6: One-Way ANOVA by Years of Experience

Variable	Less than 5	6–10	11–15	16–20	More than 20	F	p
Digital Competence	2.825	2.935	2.984	3.181	3.125	1.849	0.128
AI Adoption	3.010	3.030	3.010	3.056	3.046	0.190	0.943

The experience-wise results show that Digital Competence did not differ significantly across teaching-experience groups ($F = 1.849$, $p = 0.128$). There was no significant difference between teaching-experience groups ($F = 0.190$, $p = 0.943$) in terms of Artificial Intelligence Adoption. There were some differences in the mean values of the groups but these differences were not statistically significant at the 5% level.

Table 7: Correlation between Digital Competence and Artificial Intelligence Adoption

Variables	Digital Competence	AI Adoption
Digital Competence	1.000	0.124
AI Adoption	0.124	1.000

Significance (2-tailed) = 0.271.

The Pearson correlation coefficient was calculated and the value $r = 0.124$ was obtained, reflecting a low positive correlation between Digital Competence and the use of Artificial Intelligence. The correlation was not significant at 5% level as $p > 0.05$ ($p > 0.271$). The coefficient of determination is $R^2 = 0.015$ which means 1.5% of the variance in Artificial Intelligence Adoption is accounted for by Digital Competence.

Table 8: Regression Model Summary

R	R Square	Adjusted R Square	Std. Error
0.124	0.015	0.003	0.178

The overall regression model was not significant at the 5% level, $F(1,78) = 1.227$, $p = 0.271$.

Table 10: Regression Coefficients

Predictor	B	Std. Error	Beta	T	Sig.
Constant	2.864	0.147	—	19.520	<0.001
Digital Competence	0.054	0.049	0.124	1.108	0.271

The regression equation obtained is: Artificial Intelligence Adoption = $2.864 + 0.054(\text{Digital Competence})$. The positive coefficient indicates that an increase in Digital Competence was associated with an increase in Artificial Intelligence Adoption. This coefficient, however, did not reach the 5% statistical level.

Discussion

The study offers a number of key insights on teaching experience, Digital Competence and Artificial Intelligence Adoption. The sample comprises teachers with varying years of experience. 26.3% of the teachers had fewer than 5 years experience while 11-15 years of experience were 26.3%. A total of 10.0% of the teachers had more than 20 years of experience. Based on the descriptive analysis, the experience-wise analysis demonstrated that the mean score of Digital Competence was higher among teachers with 16–20 years of experience (3.181) than among teachers with less than five years of experience (2.825). But overall difference was not significant ($p = 0.128$). Likewise, there was a slight, albeit not statistically significant ($p = 0.943$) difference between the genders on AI Adoption. It indicates that teaching experience is not enough to be considered as strong evidence of better AI adoption. The positive and weak relationship between Digital Competence and AI Adoption was observed. There was a correlation coefficient of 0.124 but the relationship was not statistically significant. This outcome contrasts with Galindo-Domínguez et al. (2024) who found a higher correlation between a person's digital competence and their attitudes towards AI.

A possible explanation is that positive attitudes towards AI are different phases of technology adoption: and that actual

implementation of AI is another. The results of the regression analysis revealed that Digital Competence accounts for 1.5% of the variance in the dependent variable, AI Adoption. This suggests that other factors may explain the actual adoption of AI by teachers to a greater extent, such as having knowledge of AI, undergoing AI training, having a sense of self-efficacy around technology, perceiving its usefulness, the technological infrastructure, organisational support, time, and access to the tools.

Findings

- The sample consisted of teachers with different teaching experiences.
- Twenty-six (26.3%) teachers were in their first 5 years of teaching. Twenty-six.3% were teachers with 11 to 15 years of experience.
- Twenty years or more of experience were held by 10.0% of teachers. The mean of the Digital Competence score was around 2.98.
- The overall average Artificial Intelligence Adoption was around 3.03.
- There were no significant differences between the levels of Digital Competence in the groups of teachers with varying experience years.
- There was no significant difference in the use of Artificial Intelligence between the groups based on the experience of teaching.
- There was a weak positive correlation found between Digital Competence and Artificial Intelligence Adoption.

- The correlation between Digital Competence and the Adoption of AI is $r = 0.124$.
- There was no statistical relationship at the 5% level between the relationship.
- Digital Competence accounted for about 1.5% of the variance of AI Adoption.
- The regression model was not statistically significant. Other individual and organisational factors should be taken into account alongside teaching experience, and not seen as an individual reason for the adoption of AI.

Implications of the Study

Summary of key findings and recommendations It's important to recognize that while some teachers may be more experienced with AI, it doesn't necessarily mean that they will be better at using it in their private classrooms. The results obtained from the experience showed that there was no significant difference established. This means that AI training should take place in all experience groups within the school. Involving students in a book club requires teacher professional development. Teacher PD is required for implementing a book club. Professional-development initiatives should concentrate on hands-on applications of AI, including AI support for lesson planning, creating teaching materials, assessment and feedback, differentiated learning, student engagement and interaction, creating prompts, evaluating AI-generated content, and using AI responsibly. Implications for Experienced Teachers Pedagogical knowledge possessed by experienced teachers is valuable and can be integrated with AI skills. The training should emphasize integrating AI technologies into the current pedagogical approach. The focus of the training should be on pairing up pedagogical practices with AI tools. The implications for beginning teachers are then explored. Finally, implications for beginning teachers are explored. Structured guidance should be given to beginning teachers to responsibly use AI. Pedagogical understanding should be developed together with familiarity with digital. Implications for School Policy Schools should establish clear guidelines on acceptable use of AI, student privacy, responsible use, verification of AI-generated information, academic integrity, teacher accountability and ethical use of AI.

Recommendations

“Private schools must add ongoing professional development to their curriculum on AI.” Training to be offered to teachers regardless of years of experience. AI specific skills should be part of the digital competence programmes. Teachers should learn to critically assess the information generated by AI. Schools are to have proper digital infrastructure. Teachers can be given opportunities to experiment with AI in their own practice. Experienced teachers should be urged to use AI with their educational expertise. NQT's must be mentored in the use of AI in a responsible manner. Institutional guidelines for the use of AI within school should be formulated by school management. Future research should incorporate the following factors: AI literacy, technological self-efficacy, perceived usefulness and organisational support. Larger samples should be used for the generalisability. Future research should be conducted on the comparison of government and private school teachers. Multiple district studies should be conducted. Research on real-life adoption of AI over time should be conducted through longitudinal studies to see if professional-development efforts lead to better adoption.

Limitations, Suggestions and Future Research Direction

The study has certain limitations that should be considered while interpreting its findings.

First, the study adopted a cross-sectional research design and therefore does not permit the establishment of causal relationships between teaching experience, Digital Competence and Artificial Intelligence Adoption.

Second, the study was confined to private school teachers in Vellore District, Tamil Nadu, and the sample size was limited to 80 valid responses, which may restrict the generalisability of the findings to teachers in other districts, school systems or educational contexts.

Third, the study relied on self-reported responses, which may be influenced by individual perceptions and response bias. The analysis also found that Digital Competence had only a weak and statistically non-significant relationship with Artificial Intelligence Adoption; therefore, digital competence alone may not adequately explain teachers' actual use of AI. Future studies should use larger and more diverse samples and include teachers from different types of schools and

geographical locations. Researchers may also examine additional factors such as AI knowledge, AI literacy, technological self-efficacy, perceived usefulness, perceived ease of use, organisational support, infrastructure, training exposure and responsible-AI awareness. Longitudinal and comparative studies may further determine how changes in teachers' digital and AI competencies influence actual AI adoption over time. Future research should also employ validated measurement scales and examine the reliability and validity of the constructs before undertaking advanced statistical analysis.

Conclusion

The study examined teaching experience and Artificial Intelligence Adoption while exploring the Digital Competence of private school teachers in Vellore District, Tamil Nadu. The findings indicate that teachers represented different levels of professional experience, but the differences in Digital Competence and Artificial Intelligence Adoption across teaching-experience groups were not statistically significant. The analysis further revealed a weak positive relationship between Digital Competence and Artificial Intelligence Adoption, but the relationship was not statistically significant at the 5% level. Digital Competence therefore cannot be considered a sufficient predictor of AI Adoption in the present sample. The findings suggest that teachers' actual adoption of AI may depend on a combination of factors including AI-specific knowledge, training, technological confidence, access to appropriate tools, organisational support, infrastructure and perceived usefulness. Teaching experience remains an important professional characteristic because experienced teachers possess valuable pedagogical knowledge, but experience needs to be complemented by appropriate digital and AI-related competencies. The study therefore concludes that private schools

should adopt a comprehensive professional-development approach that combines digital competence, AI literacy, pedagogical application and responsible use of AI. Such an approach can help teachers move beyond basic awareness of AI towards meaningful, effective and responsible integration of Artificial Intelligence into teaching and learning.

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