Iranian Journal of Educational Sociology
Journal Website

Article history:
Received 01 January 2026
Revised 01 April 2026
Accepted 07 April 2026
Published 01 May 2026

Iranian Journal of Educational Sociology

Volume 9, Issue 3, pp 1-13

Quarterly
Iranian Journal of Educational Sociology

E-ISSN: 2645-3460

Modeling the Mediating Role of Self-Efficacy in the Relationship Between Teachers' Attitudes Toward Artificial Intelligence and Their Readiness to Teach It

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A r t i c l e I n f o

Article type:
Original Research

How to cite this article:
Doodman, P. (2026). Modeling the Mediating Role of Self-Efficacy in the Relationship Between Teachers' Attitudes Toward Artificial Intelligence and Their Readiness to Teach It. *Iranian Journal of Educational Sociology, 9*(3), 1-13.
https://doi.org/10.61838/kman.ijes.1456

A B S T R A C T

Purpose: The present study aimed to model the mediating role of self-efficacy in the relationship between teachers' inclination toward artificial intelligence (AI) and their readiness to teach AI in educational settings.
Methods and Materials: This study employed a correlational design using Partial Least Squares Structural Equation Modeling (PLS-SEM). The statistical population consisted of 872 elementary, lower secondary, and upper secondary school teachers in Lamerd County, from whom 270 participants were selected using stratified proportional sampling based on the Krejcie and Morgan table. Data were collected using the Teachers' Inclination and Readiness Toward Artificial Intelligence Questionnaire adapted from Ayanwale et al. (2022) and the Self-Efficacy in Using Artificial Intelligence Tools Questionnaire based on Montag et al. (2023). Reliability and validity were assessed through Cronbach's alpha, composite reliability, and Average Variance Extracted (AVE). Structural relationships among the variables were examined using path analysis and model fit indices including SRMR, d_ULS, and d_G.
Findings: The results demonstrated that confidence in teaching AI ($\beta = 0.200$, $p < .01$), behavioral intention ($\beta = 0.204$, $p < .01$), AI relevance ($\beta = 0.168$, $p < .01$), perceived usefulness ($\beta = 0.175$, $p < .01$), and attitude toward AI use ($\beta = 0.188$, $p < .01$) had positive and significant effects on self-efficacy. Furthermore, self-efficacy had a strong direct effect on AI readiness ($\beta = 0.621$, $p < .001$). The indirect effects of confidence, behavioral intention, relevance, usefulness, and attitude on readiness through self-efficacy were also significant, confirming the mediating role of self-efficacy in the structural model. Model fit indices indicated acceptable model fit (SRMR = 0.091).
Conclusion: The findings indicate that teachers' positive attitudes and motivational tendencies toward AI are transformed into actual readiness for AI instruction primarily through self-efficacy beliefs. Self-efficacy serves as a critical psychological mechanism linking teachers' perceptions and intentions to practical readiness for AI integration.
Keywords: *Artificial intelligence, self-efficacy, instructional readiness, teachers' attitudes, structural equation modeling.*

1. Introduction

Artificial intelligence has become one of the most influential technological developments shaping contemporary education, educational management, and instructional decision-making. In schools, AI is no longer limited to technical or computer science domains; rather, it has increasingly entered curriculum design, classroom management, learning analytics, personalized instruction, assessment, educational support systems, and teacher professional development. This transformation has made teachers' readiness to understand, use, and teach AI a central concern for educational systems seeking to prepare students for technologically mediated futures. In this context, readiness for AI instruction is not merely a technical matter; it is a multidimensional construct that depends on teachers' attitudes, perceived usefulness, confidence, behavioral intention, technological preparedness, and psychological beliefs about their own instructional capabilities. Recent studies have shown that the successful integration of AI into education requires attention not only to infrastructure and policy but also to teachers' beliefs, competencies, and willingness to engage with AI-based teaching environments (Rahsepar et al., 2025; Rajabian Deh-Zireh, 2024; Sheikh Shoaei, 2021). Therefore, examining the psychological and perceptual mechanisms through which teachers' inclination toward AI is translated into actual readiness for teaching AI is essential for educational planning and management.

The increasing use of AI in education has created new opportunities for improving instructional quality, learner engagement, adaptive feedback, and personalized educational experiences. AI-based tools can support teachers by automating repetitive tasks, assisting in content generation, analyzing learning patterns, and providing individualized learning pathways. Studies in different educational contexts have indicated that AI can enhance students' motivation, learning outcomes, academic engagement, and higher-order thinking skills when it is implemented through purposeful pedagogical design (Hosseini, 2025; Paykari & Esfahani, 2025; Rasouli et al., 2025). In addition, AI applications in specific domains such as mathematics, history education, robotics-based learning, and digital technology integration show that AI can expand the scope of teaching and learning beyond conventional instructional models (Hanifehzadeh Noudehi, 2023; Mokhtari & Rezvani, 2022; Samiei-Rad & Shahraki, 2023; Zeinivandnejad, 2020). However, the pedagogical value of AI depends heavily on teachers' ability to understand its relevance, trust its educational potential, and integrate it into classroom practice in ways that are aligned with curriculum objectives and students' developmental needs.

Despite these opportunities, the integration of AI into school education is accompanied by several challenges. Teachers may experience uncertainty, anxiety, limited confidence, lack of technical competence, insufficient institutional support, or ambiguity regarding the pedagogical relevance of AI. Research has emphasized that the challenges of using AI in elementary and secondary education are not limited to access to tools; rather, they include teachers' perceptions, ethical concerns, curriculum readiness, professional training, and organizational preparedness (Rahsepar et al., 2025; Rajabian Deh-Zireh, 2024; Zare-Nasab & Jameh-Bozorg, 2025). These challenges are particularly important in school systems where AI literacy is still emerging and teachers have not yet received systematic preparation for AI-based instruction. Accordingly, teachers' readiness to teach AI must be understood as the outcome of both external conditions, such as infrastructure and professional development, and internal conditions, such as attitudes, beliefs, confidence, and self-efficacy.

Among the most important determinants of technology integration is teachers' attitude toward the technology. Positive attitudes toward AI can strengthen teachers' willingness to use AI tools, explore AI-based instructional strategies, and accept the pedagogical relevance of emerging technologies. The Technology Acceptance Model and its extensions have repeatedly shown that perceived usefulness, perceived ease of use, trust, anxiety, teaching efficacy, and goal orientation influence teachers' willingness to adopt AI-based teaching systems (Liu, 2025; Q. Wang et al., 2025; Zanganeh et al., 2025). In this regard, perceived usefulness is a key construct because teachers are more likely to engage with AI when they believe that it can improve instructional efficiency, support teaching tasks, and enhance learning outcomes. Similarly, behavioral intention reflects teachers' motivational commitment to learn, use, and apply AI in future teaching practice. Studies on teachers' readiness and intention to teach AI have demonstrated that readiness is shaped by a combination of attitudinal, cognitive, technological, and motivational factors (Ayanwale et al., 2022; Rajapakse et al., 2024). Therefore, teachers' inclination toward AI may be considered a necessary but insufficient condition for AI teaching readiness.

Self-efficacy provides a strong theoretical foundation for explaining why positive attitudes toward AI do not

Iranian Journal of Educational Sociology
E-ISSN: 2645-3460

automatically lead to readiness for teaching AI. In educational psychology and educational management, self-efficacy refers to individuals' beliefs about their capability to organize and perform the actions required to achieve specific outcomes. Teachers with high self-efficacy are more likely to adopt innovative instructional strategies, persist in challenging conditions, manage classroom demands effectively, and translate professional knowledge into instructional action. Previous research in educational management has shown that teachers' self-efficacy can mediate the relationship between psychological, managerial, and instructional variables, including emotional intelligence, burnout, classroom management, and students' metacognitive development (Barari & Jamshidi, 2015; Mohammadi Ahmadabadi & Arabi, 2020). When applied to AI education, self-efficacy refers to teachers' belief that they can understand AI tools, use them in teaching, explain AI-related content, and support students' learning in AI-enhanced environments.

The relevance of self-efficacy becomes even more evident in AI-based educational contexts because AI tools often require teachers to deal with unfamiliar interfaces, rapidly changing technologies, ethical issues, and new pedagogical roles. Studies have shown that AI self-efficacy is closely related to teachers' AI attitudes, AI technological pedagogical content knowledge, technology acceptance, and intention to use AI in instruction (Erol et al., 2025; Ismaniati et al., 2025; Mustafa et al., 2025). Teachers who believe that they can use AI tools effectively are more likely to develop positive AI-related attitudes and to transform their intentions into practical readiness. Conversely, when teachers perceive AI as complex, unpredictable, or beyond their competence, even positive general attitudes may not result in actual instructional readiness. Therefore, self-efficacy may operate as a psychological bridge between teachers' inclination toward AI and their preparedness to teach it.

Recent studies provide empirical support for the mediating role of self-efficacy in AI-related educational behavior. Research on AI learning intentions among mathematics teachers has shown that digital literacy influences AI learning intentions through AI use, highlighting the importance of teachers' active engagement with AI-related technologies (Kurdal & Kaplan, 2026). Similarly, research on AI adoption among university teachers has indicated that confidence and AI readiness mediate the relationship between adoption-related factors and willingness to use AI technologies (Liu, 2025). In teacher education, AI-related self-efficacy has also been found to mediate the relationship between technological competence and AI integration, indicating that teachers' readiness depends not only on skills but also on their belief that they can successfully apply those skills in educational settings (M. Wang et al., 2025; Xu et al., 2025). These findings suggest that self-efficacy is not a peripheral variable but a central mechanism through which technological attitudes are converted into instructional readiness.

The relationship between AI attitudes, AI self-efficacy, and pedagogical competence has also been emphasized in studies focusing on AI-TPACK. The AI-TPACK framework extends the traditional technological pedagogical content knowledge model by incorporating teachers' capacity to integrate AI knowledge with pedagogy and subject content. Research has shown that teachers' AI attitudes and AI self-efficacy are strongly associated with AI-TPACK, suggesting that teachers need both positive beliefs and confidence in their ability to use AI pedagogically (Erol et al., 2025; Xu et al., 2025). This is particularly important because teaching AI is different from merely using AI as a classroom tool. Teachers must be able to explain AI concepts, select appropriate AI resources, evaluate AI-generated outputs, address ethical and social implications, and create meaningful learning activities. Accordingly, readiness for teaching AI requires a combination of technological awareness, pedagogical judgment, content understanding, and self-efficacy.

In addition to teacher-focused studies, learner-focused research also supports the importance of self-efficacy in AI-enhanced education. Studies on students' interaction with generative AI have shown that self-efficacy and cognitive engagement can mediate the relationship between AI interaction and learning achievement (Liang et al., 2023). Similarly, AI literacy has been shown to influence learners' willingness to communicate through AI learning self-efficacy and classroom anxiety, indicating that confidence in AI-related learning plays a decisive role in educational outcomes (Zhang et al., 2025). These findings are relevant to teachers because teachers are not only users of AI but also facilitators of students' AI learning experiences. If teachers lack self-efficacy, they may be less capable of creating learning environments in which students can engage confidently and critically with AI technologies.

The construct of trust is also closely connected to AI self-efficacy and readiness. In technology-mediated environments, trust in automated systems can influence the acceptance or rejection of AI tools. Research has shown that trust in automated technology mediates the relationship between technology self-efficacy, fear, and acceptance of AI (Montag et al., 2023). In educational settings, this means that teachers who feel competent in using AI tools may be more likely to trust AI systems and perceive them as useful rather than threatening. Trust, however, should not be interpreted as uncritical dependence on AI; rather, it should be understood as informed confidence in the appropriate and ethical use of AI tools. Teacher readiness for AI instruction therefore requires a balanced combination of confidence, critical awareness, and pedagogical responsibility.

The growing body of empirical literature also indicates that AI readiness is influenced by technological readiness, self-efficacy, and attitudes across different educational populations. Research among undergraduates has demonstrated that technological readiness, self-efficacy, and attitudes are structurally related in explaining AI tool usage (Falebita & Kok, 2025). Although this study focused on students, its implications are relevant for teachers because the same psychological mechanisms may influence educators' adoption of AI tools. In teaching environments, educator-centric digital integration models have also identified self-efficacy, technological readiness, and AI trust as predictors of technology acceptance (Mustafa et al., 2025). Thus, readiness for AI teaching should be approached through an integrated model that includes attitudinal orientation, perceived usefulness, behavioral intention, relevance, confidence, and self-efficacy.

From an educational management perspective, the issue of teacher readiness for AI instruction is also connected to organizational policy, curriculum planning, and professional development. Integrating AI into schools requires more than introducing new technologies; it requires systematic planning to develop teachers' AI literacy, pedagogical competence, and professional confidence. Studies on AI in education have emphasized the need for policy-making, curriculum integration, teacher training, and institutional support to address challenges and maximize opportunities (Rahsepar et al., 2025; Sheikh Shoaei, 2021; Zare-Nasab & Jameh-Bozorg, 2025). Without such support, teachers may maintain positive attitudes toward AI but remain practically unprepared to teach it. This gap between attitude and readiness is particularly important because educational reforms often fail when teachers' psychological preparedness and professional capacity are overlooked.

The Iranian educational context further highlights the importance of studying teachers' readiness for AI instruction. National and local studies have examined AI literacy, AI-assisted teaching, AI in elementary education, digital technology use, and the challenges of educational AI integration, demonstrating increasing scholarly attention to this field (Hosseini, 2025; Paykari & Esfahani, 2025; Rasouli et al., 2025; Zanganeh et al., 2025). However, many of these studies focus on the effects, challenges, or acceptance of AI, while fewer studies examine the mediating psychological mechanisms that explain how teachers' inclination toward AI becomes readiness for teaching AI. Given the rapid movement toward AI-enhanced learning environments, there is a need for empirical models that clarify the internal pathways through which teachers' attitudes and perceptions influence their instructional readiness.

Overall, the literature suggests that teachers' readiness to teach AI is a complex construct shaped by attitudes toward AI use, perceived usefulness, behavioral intention, perceived relevance, confidence in teaching AI, technological readiness, and self-efficacy. While positive attitudes and perceived usefulness may encourage teachers to engage with AI, self-efficacy appears to be a decisive factor that enables teachers to convert favorable perceptions into practical readiness. Accordingly, examining self-efficacy as a mediator can provide a more precise understanding of the psychological process through which teachers become prepared to teach AI. This understanding is important for educational managers, curriculum planners, teacher educators, and policymakers who seek to design effective AI-related professional development programs and support structures. Therefore, the aim of the present study was to model the mediating role of self-efficacy in the relationship between teachers' inclination toward artificial intelligence and their readiness to teach it.

2. Methods and Materials

2.1. Study Design and Participants

This study employed a correlational design using Partial Least Squares Structural Equation Modeling (PLS-SEM) to investigate the mediating role of self-efficacy in the relationship between teachers' inclination toward using artificial intelligence (AI) and their readiness to teach it. The research adopted a descriptive–analytical approach, and the relationships among the constructs were evaluated through path analysis and structural modeling.

The statistical population consisted of 872 teachers employed in elementary, lower secondary, and upper secondary schools in Lamerd County. The sample size was determined to be 270 participants based on the Krejcie and

Morgan (1970) table, considering a 95% confidence level and a 5% sampling error. Participants were selected using stratified proportional sampling to ensure appropriate representation of educational levels and gender within the final sample. In this method, the number of participants selected from each stratum was proportional to its share in the statistical population so that the final sample accurately reflected the actual distribution of teachers.

2.2. Data Collection Tools

Data were collected using two standardized questionnaires. The first instrument, the Teachers' Inclination and Readiness Toward Artificial Intelligence Questionnaire, was adapted from the study conducted by Ayanwale et al. (2022) and consisted of 30 items measuring eight major constructs. The items were designed based on a five-point Likert scale ranging from "strongly disagree" (1) to "strongly agree" (5). The composite reliability (CR) values of the constructs demonstrated the reliability and stability of the instrument in measuring the relevant dimensions and were as follows: AI anxiety (Items 1–2), CR = 0.858; perceived usefulness (Items 3–5), CR = 0.949; AI for social good (Items 6–9), CR = 0.876; attitude toward AI use (Items 10–12), CR = 0.932; confidence in teaching AI (Items 13–16), CR = 0.916; behavioral intention (Items 17–21), CR = 0.946; AI relevance (Items 22–25), CR = 0.912; and AI readiness (Items 26–30), CR = 0.890.

The second instrument, the Self-Efficacy in Using AI Tools Questionnaire, was adapted from Montag et al. (2023) and included five items designed to assess teachers' beliefs regarding their capability to use AI tools in instruction. The reliability of this questionnaire was reported with a Cronbach's alpha coefficient of 0.90, indicating excellent internal consistency.

In the present study, the reliability and validity of the constructs were also examined, and the results indicated that all constructs possessed acceptable reliability and sufficient validity for use in the structural model.

2.3. Data Analysis

To analyze the relationships among the constructs and examine the mediating role of self-efficacy, Partial Least Squares Structural Equation Modeling (PLS-SEM) was employed. Prior to path analysis, the reliability and validity of the constructs were assessed using Cronbach's alpha, composite reliability, and Average Variance Extracted (AVE). Items with low factor loadings or weak reliability were removed to improve the clarity and stability of the final model. Direct and indirect paths and mediating effects were examined by calculating path coefficients, t-statistics, and significance levels (p-values). In addition, model fit indices including SRMR, d_ULS, and d_G were calculated, all of which indicated an adequate fit between the proposed model and the observed data.

3. Findings and Results

In this study, data obtained from 270 teachers were analyzed. Descriptive statistics related to the demographic characteristics of the respondents are presented in Table 1.

Table 1

Descriptive Statistics of Teachers' Demographic Characteristics

Variable	Category	Frequency	Percentage
Gender	Male	136	50.4
	Female	134	49.6
Age	Under 25 years	12	4.4
	26–35 years	102	37.8
	36–45 years	75	27.8
	46–55 years	68	25.2
	Above 56 years	13	4.8
Education	Diploma	7	2.6
	Associate degree	57	21.1
	Bachelor's degree	92	34.1
	Master's degree and above	114	42.2
Teaching Level	Elementary school	106	39.3
	Lower secondary school	68	25.2
	Upper secondary school	96	35.6

According to the results presented in Table 1, 136 teachers (50.4%) were male and 134 teachers (49.6%) were female. The largest age group consisted of teachers aged 26–35 years with 102 participants (37.8%), followed by the 36–45-year age group with 75 participants (27.8%) and the 46–55-year age group with 68 participants (25.2%). In terms of educational attainment, 114 teachers (42.2%) held a master's degree or higher, while 92 teachers (34.1%) possessed a bachelor's degree. Furthermore, the largest proportion of teachers worked at the elementary school level with 106 participants (39.3%), followed by upper secondary school teachers with 96 participants (35.6%) and lower secondary school teachers with 68 participants (25.2%), indicating an appropriate diversity within the research sample.

Table 2 presents the descriptive statistics of the constructs related to teachers' inclination and readiness toward AI instruction, as well as self-efficacy. The mean values of the variables ranged from 3.55 to 3.78, indicating that teachers' levels of inclination, attitudes, readiness, and self-efficacy toward AI instruction were evaluated as moderate to relatively high.

The highest mean scores belonged to perceived usefulness (M = 3.78) and behavioral intention (M = 3.75), reflecting teachers' positive beliefs regarding the effectiveness of AI and their willingness to use and learn this technology. The lowest mean score was related to AI readiness (M = 3.55), which may indicate limitations in access to resources, infrastructure, or organizational support. The skewness and kurtosis values of all variables fell within the acceptable range of ±2, indicating normal data distribution and suitability for parametric analyses and structural equation modeling.

Table 2

Descriptive Statistics of the Research Constructs

Construct	Mean	Standard Deviation	Skewness	Kurtosis
AI Anxiety	3.57	0.93	-0.63	0.13
Perceived Usefulness	3.78	0.78	-0.63	0.05
AI for Social Good	3.74	0.69	-0.40	-0.24
Attitude Toward AI Use	3.70	0.83	-0.68	0.06
Confidence in Teaching AI	3.59	0.80	-0.31	-0.47
Behavioral Intention	3.75	0.71	-0.50	-0.11
AI Relevance	3.69	0.73	-0.49	-0.02
AI Readiness	3.55	0.80	-0.42	-0.51
Self-Efficacy	3.70	0.72	-0.39	-0.36

To analyze the relationships among the research constructs and examine the effects of predictive variables on teachers' inclination and readiness for AI instruction, Partial Least Squares Structural Equation Modeling (PLS-SEM) was employed.

The initial model included several major constructs, each measured through multiple items. Prior to path analysis, the reliability and validity of the constructs were examined to ensure the transparency and validity of the measurement instruments. At this stage, several items and constructs with low factor loadings or weak reliability were removed, including the constructs "AI Anxiety," "AI for Social Good," and Item R12. These modifications improved the clarity, stability, and suitability of the final model for path analysis.

Path analysis of the final model was conducted through the calculation of factor loadings, reliability and validity indices (Cronbach's alpha, composite reliability, and AVE), standardized path coefficients, and t-statistics for each relationship to scientifically evaluate the significance of direct and indirect effects among the constructs.

Table 3 presents the final factor loadings of the questionnaire items for each research construct. Factor loading represents the strength of the correlation between each item and its corresponding construct and is considered an indicator of convergent validity. As shown, all items demonstrated factor loadings above 0.50, and their significance levels ($p < .001$) confirmed that each item significantly represented its intended construct.

Table 3

Factor Loadings and T-Test Results for Questionnaire Items

Model Indicator	Item	Original Sample (O)	Standard Deviation	T-Statistic	P-Value
R10	Using AI technology is enjoyable.	0.904	0.015	62.210	0.000
R11	Using AI technology is a positive experience for me.	0.815	0.041	19.992	0.000
R13	I am confident that I can introduce the most complex AI topics in the classroom.	0.653	0.051	12.694	0.000
R14	I believe that if I try, I can simplify AI concepts for students.	0.640	0.059	10.897	0.000
R15	I am confident that I can support students' AI learning in the classroom.	0.766	0.036	21.198	0.000
R16	I am confident that I can teach basic AI concepts in the classroom.	0.732	0.039	18.732	0.000
R17	I will continue learning AI knowledge.	0.636	0.057	11.156	0.000
R18	I will keep myself updated on the latest AI applications.	0.769	0.035	22.140	0.000
R19	I intend to devote time to learning AI technology in the future.	0.655	0.053	12.351	0.000
R20	I will pay greater attention to emerging AI applications.	0.551	0.062	8.954	0.000
R21	I intend to use AI to support teaching.	0.547	0.069	7.968	0.000
R22	Learning AI in the classroom would be beneficial.	0.598	0.068	8.800	0.000
R23	AI content is related to things I have seen, done, or thought about in my life.	0.596	0.076	7.843	0.000
R24	It is clear to me how AI content relates to my lifestyle.	0.668	0.058	11.471	0.000
R25	AI content would be useful for effective conceptual learning.	0.796	0.037	21.691	0.000
R26	I possess relevant knowledge for teaching AI in the classroom.	0.701	0.041	16.890	0.000
R27	I have access to appropriate hardware for teaching AI in the classroom.	0.749	0.037	20.486	0.000
R28	I have access to appropriate software for teaching AI in the classroom.	0.700	0.042	16.569	0.000
R29	I have access to relevant content for teaching AI in the classroom.	0.693	0.041	17.028	0.000
R30	School management will support AI instruction in the classroom.	0.676	0.069	9.764	0.000
R3	Using AI technology helps me complete tasks more quickly.	0.617	0.054	11.432	0.000
R4	Using AI technology increases my efficiency.	0.703	0.052	13.528	0.000
R5	Using AI technology increases my productivity.	0.770	0.036	21.408	0.000
SE1	Using AI tools in teaching is easy for me.	0.682	0.040	17.021	0.000
SE2	I am confident in my abilities to work with AI tools.	0.696	0.041	16.890	0.000
SE3	Learning how to use AI tools is simple for me.	0.593	0.065	9.063	0.000
SE4	I am highly confident in my abilities to use AI tools in teaching.	0.681	0.045	15.081	0.000
SE5	AI tools are understandable and practical for me in teaching.	0.747	0.031	24.254	0.000

To evaluate the reliability and validity of the research constructs, AVE (Average Variance Extracted), composite reliability, and Cronbach's alpha coefficients were calculated. AVE reflects the ability of constructs to explain the variance of their related indicators, and values above 0.50 generally indicate acceptable convergent validity. Composite reliability indicates the internal reliability of constructs, and values above 0.70 demonstrate acceptable consistency and reliability. Cronbach's alpha was also reported as a classical measure of reliability.

Table 4

Reliability and Validity of the Research Constructs

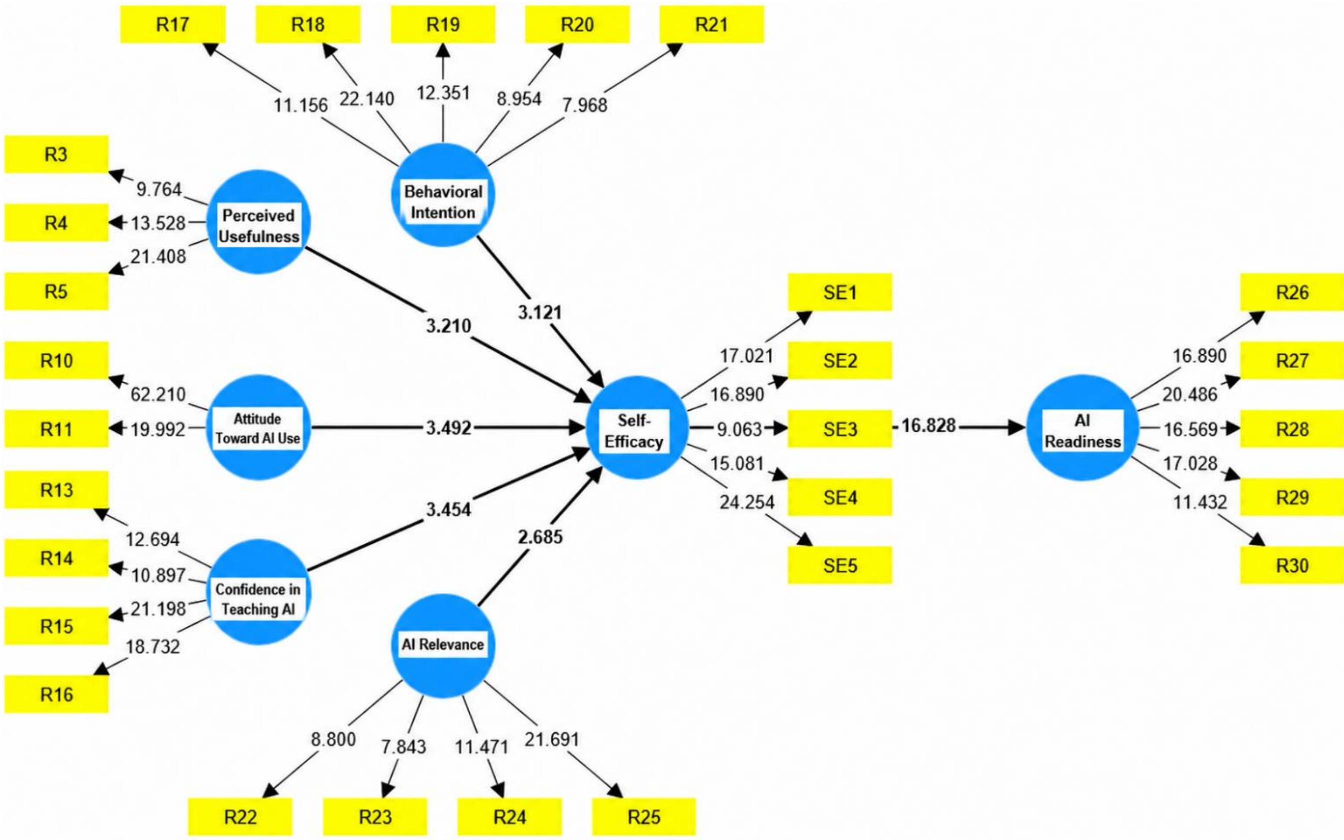
Construct	AVE	Composite Reliability	Cronbach's Alpha
Readiness	0.480	0.822	0.729
Confidence	0.489	0.792	0.651
Self-Efficacy	0.465	0.812	0.712
Behavioral Intention	0.405	0.770	0.630
Relevance	0.448	0.762	0.586
Usefulness	0.515	0.760	0.531
Attitude	0.741	0.851	0.658

E-ISSN: 2645-3460

As shown in Table 4, all reliability and validity indices of the constructs were within acceptable ranges. Composite reliability values above 0.70 indicate that the constructs were stable and reliable. In addition, the Cronbach's alpha coefficients for all constructs demonstrated acceptable internal consistency among the items. Although some AVE values, such as those for behavioral intention and relevance, were slightly below 0.50, the overall results indicate acceptable convergent validity and the ability of the constructs to explain the variance of their corresponding indicators. These findings support the suitability of the constructs for inclusion in the structural model and demonstrate the acceptable quality of the study's measurement model.

Figure 1

Structural Model of the Research



The results demonstrated that self-efficacy played a key role in the proposed model. The path coefficients indicated that confidence ($\beta = 0.200$), behavioral intention ($\beta = 0.204$), relevance ($\beta = 0.168$), usefulness ($\beta = 0.175$), and attitude ($\beta = 0.188$) had positive and significant effects on self-efficacy. These findings suggest that teachers' cognitive and attitudinal factors can significantly enhance their level of self-efficacy.

The results also revealed that self-efficacy had a strong positive effect on readiness ($\beta = 0.621$, $p < .001$). Furthermore, the indirect effects of confidence, behavioral intention, relevance, usefulness, and attitude on readiness through self-efficacy were also significant, confirming the mediating role of self-efficacy in the proposed model. Therefore, it can be concluded that self-efficacy, as a mediating variable, plays a fundamental role in transmitting the effects of individual and perceptual variables to readiness for AI instruction. Figure 1 illustrates the structural model of the study.

The standardized path coefficients are also reported in Table 5.

Iranian Journal of Educational Sociology
E-ISSN: 2645-3460

Table 5

Path Coefficients and Hypothesis Testing Results of the Structural Model

Path	Path Coefficient (β)	T-Statistic	Significance Level (p)	Result
Confidence → Self-Efficacy	0.200	3.454	0.001	Supported
Behavioral Intention → Self-Efficacy	0.204	3.121	0.002	Supported
Relevance → Self-Efficacy	0.168	2.685	0.007	Supported
Usefulness → Self-Efficacy	0.175	3.210	0.001	Supported
Attitude → Self-Efficacy	0.188	3.492	0.000	Supported
Self-Efficacy → Readiness	0.621	16.828	0.000	Supported

The fit of the structural model was evaluated using the SRMR, d_ULS, and d_G indices. The SRMR index, which reflects the discrepancy between the observed correlation matrix and the model-implied correlation matrix, was calculated as 0.091 for the estimated model and 0.087 for the saturated model. These values were close to the recommended threshold range (0.08–0.10), indicating an acceptable model fit. Furthermore, the d_ULS (squared Euclidean distance) value for the estimated model was 3.357, and the d_G (geodesic distance) value was 0.940. The mean sample values and their 95% and 99% confidence intervals demonstrated an adequate fit between the model and the observed data. Therefore, the model fit indices indicate that the proposed model adequately represents the relationships among the constructs and that the path analyses are reliable. The detailed model fit indices are presented in Table 6.

Table 6

Model Fit Indices

Index	Saturated Model	Estimated Model	Mean Sample	95%	99%
SRMR	0.087	0.091	0.060	0.066	0.068
d_ULS	3.096	3.357	1.477	1.744	1.877
d_G	0.920	0.940	0.487	0.581	0.626

4. Discussion and Conclusion

The present study aimed to model the mediating role of self-efficacy in the relationship between teachers' inclination toward artificial intelligence and their readiness to teach it. The findings demonstrated that teachers generally exhibited moderate-to-high levels of positive attitudes, perceived usefulness, behavioral intention, relevance, and self-efficacy regarding AI-based education. However, AI readiness was lower than the other constructs, indicating that although teachers tend to hold favorable views toward AI, they may still face practical, infrastructural, pedagogical, or organizational barriers that limit their actual preparedness for AI instruction. This finding is consistent with studies emphasizing that teachers' acceptance of AI technologies does not necessarily guarantee operational readiness for implementation in educational settings (Ayanwale et al., 2022; Rajabian Deh-Zireh, 2024; Zare-Nasab & Jameh-Bozorg, 2025). Many educational systems are currently experiencing a transitional phase in which enthusiasm toward AI is growing faster than institutional preparedness, curriculum adaptation, and teacher professional development. Consequently, teachers may conceptually value AI while simultaneously lacking the confidence, resources, or technical support needed for effective classroom integration.

One of the major findings of the study was that perceived usefulness significantly predicted self-efficacy. Teachers who perceived AI as beneficial for improving educational efficiency, productivity, and instructional quality demonstrated higher levels of confidence in their ability to use AI tools in teaching. This finding supports the assumptions of technology acceptance theories suggesting that perceived usefulness influences not only behavioral intention but also psychological confidence in technology-related tasks. Similar findings have been reported in studies examining AI acceptance among teachers and faculty members, where usefulness perceptions positively influenced confidence, readiness, and technology adoption (Liu, 2025; Q. Wang et al., 2025; Zanganeh et al., 2025). Teachers who perceive AI as a meaningful and effective educational tool are more likely to invest effort in learning

Iranian Journal of Educational Sociology
E-ISSN: 2645-3460

and experimenting with AI technologies, thereby strengthening their self-efficacy beliefs. In educational environments, perceived usefulness may reduce uncertainty and increase teachers' sense of control over technological innovations, making AI appear more manageable and pedagogically valuable.

The results also revealed that behavioral intention had a significant positive effect on self-efficacy. Teachers who intended to continue learning AI knowledge, remain updated about AI applications, and use AI for instructional purposes demonstrated higher levels of confidence in using AI technologies. This finding is important because it indicates that motivational orientation toward AI learning contributes to the development of technological self-beliefs. This result aligns with studies emphasizing the relationship between intention, digital engagement, and AI-related competence development (Falebita & Kok, 2025; Ismaniati et al., 2025; Kurdal & Kaplan, 2026). Teachers who actively seek AI-related knowledge are more likely to experience mastery experiences, which according to self-efficacy theory are among the strongest sources of efficacy beliefs. Behavioral intention therefore functions not only as an indicator of future behavior but also as a psychological mechanism that promotes confidence and persistence in technology-mediated educational environments.

Another important finding was the significant effect of AI relevance on self-efficacy. Teachers who perceived AI content as relevant to their personal experiences, professional needs, and teaching practices exhibited stronger beliefs in their capability to use AI in instruction. This result highlights the importance of contextual and practical relevance in technology adoption. When teachers perceive AI as aligned with their real-world instructional responsibilities and classroom experiences, they are more likely to internalize AI-related learning and develop confidence in applying it. This finding is consistent with research emphasizing that teachers' engagement with digital technologies depends heavily on contextual relevance and practical applicability (Rahsepar et al., 2025; Zeinivandnejad, 2020). AI technologies that appear abstract, disconnected from curriculum realities, or unrelated to teachers' instructional goals may fail to generate meaningful readiness even when teachers generally support technological innovation. Therefore, relevance plays a critical role in transforming AI from a theoretical concept into a practical educational resource.

The findings further demonstrated that attitudes toward AI use significantly predicted self-efficacy. Teachers with more positive attitudes toward AI reported stronger confidence in their ability to use AI tools in teaching. This finding supports previous research indicating strong associations between AI attitudes, AI technological pedagogical knowledge, and AI self-efficacy (Erol et al., 2025; Xu et al., 2025). Positive attitudes may reduce resistance, fear, and anxiety toward technological innovation and encourage teachers to engage more actively with AI-based instructional opportunities. Teachers who view AI positively are likely to interpret technological challenges as manageable and worthwhile rather than threatening or disruptive. In this context, attitudes operate as cognitive-emotional predispositions that shape teachers' willingness to invest effort in acquiring AI-related competencies. The result also aligns with studies showing that favorable attitudes toward educational technologies can strengthen instructional confidence and facilitate innovation-oriented teaching behaviors (Mustafa et al., 2025; Oran, 2023).

Confidence in teaching AI was another significant predictor of self-efficacy. Teachers who believed they could explain AI concepts, simplify AI content for students, and support AI learning in classrooms demonstrated higher self-efficacy. This finding appears theoretically consistent because instructional confidence and self-efficacy are conceptually interconnected constructs. However, the finding also suggests that AI-specific instructional confidence constitutes an important domain-specific component of teachers' broader efficacy beliefs regarding AI integration. Similar findings have been reported in studies on AI teaching readiness and AI pedagogical competence, where teaching efficacy played a central role in AI adoption and instructional willingness (Rajapakse et al., 2024; Q. Wang et al., 2025). Teachers who believe they can teach AI effectively are more likely to perceive themselves as capable of handling AI tools, managing classroom interactions involving AI, and facilitating students' understanding of AI-related content. This result reinforces the importance of pedagogical training and instructional practice in strengthening teachers' confidence.

The most significant finding of the present study was the strong positive effect of self-efficacy on AI readiness. Self-efficacy emerged as the most powerful predictor in the structural model, indicating that teachers' readiness for AI instruction depends substantially on their beliefs about their capability to use AI technologies successfully. This finding strongly supports self-efficacy theory and aligns with numerous studies emphasizing the role of efficacy beliefs in technology adoption, digital learning, and instructional

Iranian Journal of Educational Sociology
E-ISSN: 2645-3460

innovation (Ismaniati et al., 2025; Montag et al., 2023; M. Wang et al., 2025). Teachers who feel capable of using AI technologies are more likely to demonstrate practical readiness for AI integration because they perceive technological demands as achievable rather than overwhelming. Self-efficacy may increase persistence, reduce anxiety, strengthen problem-solving orientation, and encourage experimentation with innovative teaching strategies. In contrast, teachers with low self-efficacy may avoid AI-related instructional activities even if they recognize the importance of AI in education.

The mediating role of self-efficacy was another key contribution of the study. The results demonstrated that perceived usefulness, behavioral intention, relevance, attitude, and confidence influenced AI readiness indirectly through self-efficacy. This finding indicates that positive attitudes and motivational orientations toward AI do not directly produce readiness unless teachers develop sufficient confidence in their own capabilities. In other words, self-efficacy acts as a psychological bridge connecting favorable perceptions of AI to actual instructional preparedness. This result is highly consistent with studies showing that self-efficacy mediates the relationships between technological literacy, AI trust, pedagogical knowledge, and AI integration intentions (Kurdal & Kaplan, 2026; Montag et al., 2023; Xu et al., 2025). The mediating role identified in the present study suggests that educational interventions focused solely on increasing awareness or positive attitudes toward AI may be insufficient unless they also strengthen teachers' efficacy beliefs through training, guided practice, and supportive learning experiences.

The findings can also be interpreted within broader educational management and organizational development frameworks. Schools increasingly face pressure to integrate AI into teaching and learning processes, yet institutional readiness often depends on human factors more than technological availability. Teachers are the primary agents of educational innovation, and their psychological preparedness determines whether technological reforms become sustainable classroom practices. Studies on AI policy and educational transformation have emphasized that successful AI integration requires teacher-centered approaches involving professional development, support systems, pedagogical adaptation, and institutional trust (Rahsepar et al., 2025; Rajabian Deh-Zireh, 2024; Sheikh Shoaei, 2021). The present findings support this perspective by demonstrating that teachers' internal beliefs significantly shape their readiness for AI implementation. Therefore, educational policymakers should not view AI integration solely as a technological process but also as a psychological and organizational transformation requiring attention to teachers' beliefs, motivations, and professional identities.

The findings additionally highlight the growing importance of AI literacy in educational systems. As AI technologies become integrated into instructional design, assessment, and communication, teachers are increasingly expected to function not only as technology users but also as facilitators of AI literacy among students. Studies examining AI literacy and higher-order thinking have emphasized that teachers play a critical role in helping learners develop critical, ethical, and reflective approaches toward AI technologies (Hosseini, 2025; Liang et al., 2023; Zhang et al., 2025). However, teachers can fulfill this role effectively only when they themselves possess adequate confidence and readiness. The present study therefore contributes to understanding how teachers' AI-related beliefs shape the broader educational capacity for AI-based learning and innovation.

Another implication of the findings concerns teacher professional development. The strong role of self-efficacy suggests that professional learning experiences should prioritize mastery experiences, collaborative learning, guided practice, and ongoing support rather than merely providing theoretical information about AI. Research has shown that technology-related self-efficacy develops most effectively when individuals experience successful engagement with technological tools in authentic contexts (Falebita & Kok, 2025; Mustafa et al., 2025). Accordingly, AI-related training programs should include practical workshops, classroom simulations, peer mentoring, and opportunities for reflective experimentation. Such experiences can reduce fear and uncertainty while increasing teachers' confidence and readiness for AI integration.

Overall, the results of the present study demonstrate that teachers' readiness for AI instruction is a multidimensional phenomenon influenced by attitudinal, motivational, cognitive, and psychological factors. Although positive attitudes, behavioral intention, perceived usefulness, and relevance are important, self-efficacy plays the decisive role in converting these perceptions into actual readiness. The findings therefore reinforce the argument that successful AI integration in education depends not only on technological infrastructure and policy initiatives but also on strengthening teachers' confidence in their ability to use AI meaningfully and effectively in educational contexts.

E-ISSN: 2645-3460

One limitation of the present study is that the data were collected exclusively through self-report questionnaires, which may have increased the possibility of response bias and socially desirable responding. In addition, the study was conducted within a specific geographical and educational context, limiting the generalizability of the findings to other regions, educational systems, or cultural environments. The cross-sectional design of the research also restricted the ability to draw causal conclusions regarding the relationships among the variables. Furthermore, the study focused primarily on psychological and attitudinal variables and did not directly examine external organizational factors such as technological infrastructure, institutional support, or access to AI resources, which may also influence teachers' readiness for AI instruction.

Future studies are recommended to employ longitudinal and experimental designs to examine how teachers' self-efficacy and readiness for AI instruction develop over time and in response to targeted training programs. Researchers may also investigate the role of additional variables such as organizational culture, digital leadership, technological infrastructure, AI literacy, innovation climate, and professional learning communities in shaping teachers' readiness for AI integration. Comparative studies across different educational levels, subject areas, and cultural contexts could provide a broader understanding of the factors influencing AI readiness. In addition, qualitative and mixed-method approaches may offer deeper insights into teachers' lived experiences, concerns, and expectations regarding AI-based education.

Educational policymakers and school administrators should design comprehensive professional development programs aimed at strengthening teachers' confidence and practical competence in using AI technologies. These programs should emphasize hands-on training, collaborative learning experiences, mentoring, and continuous support rather than purely theoretical instruction. Schools should also invest in appropriate technological infrastructure, AI-based educational resources, and institutional support systems to facilitate meaningful AI integration. Curriculum planners are encouraged to incorporate AI literacy and AI pedagogy into teacher education programs so that teachers become better prepared for emerging technological demands. Finally, fostering a supportive organizational climate that encourages experimentation, innovation, and reflective technology use can significantly enhance teachers' readiness and willingness to integrate AI into educational practice.

Authors' Contributions

Authors equally contributed to this article.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

Acknowledgments

We hereby thank all participants for agreeing to record the interview and participate in the research.

Declaration of Interest

The authors report no conflict of interest.

Funding

According to the authors, this article has no financial support.

Ethical Considerations

All procedures performed in studies involving human participants were under the ethical standards of the institutional and, or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

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