ATTITUDES TOWARD ARTIFICIAL INTELLIGENCE IN TEACHER EDUCATION: THE ROLE OF EMOTIONAL AND COGNITIVE VARIABLES

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ABSTRACT

Analyzing a sample of 423 trainer teachers, this study investigates AI acceptance using regression models and path analysis. Results show an asymmetry: AI Literacy reduces tool-related and epistemic anxiety but fails to buffer fears regarding professional identity and educational relationships. These resistances, mediated by general attitudes (GAAIS), call for non-technocentric training paths.

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KEYWORDS
Teacher attitudes; emotional factors; cognitive factors; AI

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Introduction

Artificial intelligence (AI) is progressively transforming educational systems, altering the methods of instructional design, learning assessment, and the customization of educational pathways (Isidori et al., 2024; Montanari et al., 2024). In recent years, the spread of tools based on generative artificial intelligence models and intelligent tutoring systems has, on one hand, significantly expanded the opportunities available to teachers, while on the other, it has introduced new challenges of a pedagogical, ethical, and professional nature (Chen et al., 2020; Zawacki-Richter et al., 2019).

The relevant literature has extensively documented the potential benefits of AI in improving teaching and learning processes; however, despite this evidence, the effective integration of such technologies into educational practices largely depends on teachers' attitudes. Considering that teachers represent the primary mediator between technological innovation and student learning, their willingness to adopt AI-based tools constitutes an essential condition for these technologies to produce concrete effects in school settings, by addressing the level of awareness with which these tools are used. Indeed, teachers are tasked with guiding students toward a conscious and responsible use of artificial intelligence: an attitude of rejection or avoidance on their part therefore risks depriving students of this guidance, leaving them exposed to an unmediated and potentially uncritical use of technology.

Research on the acceptance of educational technologies has traditionally prioritized cognitive factors, such as perceived usefulness, ease of use, and digital skills, neglecting until recently the emotional component of the adoption process. Artificial intelligence, however, introduces a novel element that makes this gap particularly relevant: perceived as an autonomous technology capable of making decisions, producing content, and performing traditionally human tasks, AI triggers emotional responses, anxiety, uncertainty, and fear of professional replacement that previous educational technologies rarely activated with the same intensity (Long & Magerko, 2020; Schepman & Rodway, 2020).

1. Theoretical background

The use of Research on the acceptance of digital technologies finds its theoretical foundation in the Technology Acceptance Model (TAM) proposed by Davis (1989), according to which the intention to use a technology primarily depends on its perceived usefulness and perceived ease of use. Subsequently, the Unified Theory of Acceptance and Use of Technology (UTAUT) integrated further determinants, such as social influence and facilitating conditions, thereby improving the explanatory power of technology adoption models (Venkatesh et al., 2003). The advent of artificial intelligence has, however, highlighted certain limitations of these models. Unlike traditional technologies, AI introduces levels of decision-making autonomy, unpredictability, and cognitive complexity that profoundly alter the relationship between the individual and technology (Long et al., 2020; Zawacki-Richter et al., 2019; Di Palma et al., 2024). For this reason, numerous recent studies suggest that AI acceptance cannot be explained exclusively through cognitive variables, but rather requires the integration of emotional and motivational factors (Schepman et al., 2020; Fast et al., 2017). In the educational field, the adoption of AI therefore depends both on teachers' digital skills and on the ways in which they interpret the pedagogical, professional, and ethical meaning of technological innovation. Cognitive appraisal theories (Lazarus, 1991; Lazarus & Folkman, 1984) argue that emotions stem from the subjective evaluation of events rather than from the events themselves. Applying this perspective to artificial intelligence, AI does not represent a source of anxiety in and of itself; rather, it is the interpretation of the technology as a threat, a loss of control, or a professional risk that generates negative emotional responses. In recent years, the construct of AI anxiety has received increasing attention in the literature, describing a state of concern linked to the possible consequences of artificial intelligence, including job replacement, loss of control, the need to acquire new skills, and uncertainty regarding the effects of automation (Wang & Wang, 2022; Liu & Liu, 2025). Empirical evidence indicates that higher levels of AI anxiety are associated with lower trust in AI systems, reduced intention to use them, and less favorable attitudes toward such technologies (Schepman & Rodway, 2020; Uludağ et al., 2025). However, anxiety represents only one component of the affective responses triggered by artificial intelligence: emotional reactions also include mistrust, discomfort, avoidance, a sense of vulnerability, and resistance to change, suggesting the existence of a broader emotional dimension than anxious experience alone. To provide a conceptual foundation for this broader emotional dimension, it is useful to reference the literature on resistance to change, which was developed within organizational fields well before the advent of artificial intelligence but is applicable by analogy to technology adoption processes in educational contexts. Piderit (2000) proposed viewing resistance not as a single, unambiguous oppositional behavior, but as a multidimensional attitude comprising a cognitive component (beliefs about

the nature and consequences of change), an emotional component (feelings aroused by the change itself, such as anxiety, frustration, or discomfort), and an intentional-behavioral component (the inclination to act for or against the change). A central element of this perspective is the potential for ambivalence among the three components: an individual may cognitively recognize the utility of an innovation while simultaneously experiencing emotional resistance that hinders full acceptance, regardless of the rational judgment formulated. Consistent with this approach, Oreg (2003) operationalized resistance to change as a multidimensional construct at the level of individual differences, comprising distinct yet correlated affective, cognitive, and behavioral components, maintaining that resistance is not merely a transient emotional reaction but reflects a more stable and structured disposition toward change in general. Applying this theoretical framework to the specific context of artificial intelligence in education, the teacher's emotional resistance can be conceptualized as a multidimensional construct that exceeds a general anxious component alone, even while incorporating it as one of its constitutive manifestations. Unlike a generic and decontextualized anxiety toward technology, the emotional resistance investigated here is configured as a response situated within the teacher's professional role, wherein the discomfort associated with AI use intertwines with the perception of a threat to professional identity, the fear of deterioration in the educational relationship, and mistrust toward the reliability of intelligent systems. In this perspective, anxiety does not constitute an alternative construct to emotional resistance but rather a constitutive component of it, whose specificity compared to a general anxiety toward AI (Liu & Liu, 2025) resides in being anchored to the professional and identity context of teaching—consistent with the rationale of Piderit (2000) and Oreg (2003), according to which affective resistance represents a distinct, though correlated, dimension relative to the cognitive evaluation of technological change. In parallel with emotional components, the literature identifies artificial intelligence literacy as one of the primary factors associated with the acceptance of new technologies. AI literacy encompasses knowledge, operational skills, and critical abilities that enable individuals to understand the functioning, limitations, and implications of artificial intelligence (Long et al., 2020; Ng et al., 2021). Numerous studies highlight how higher levels of AI literacy are associated with a greater perception of control, lower levels of uncertainty, and a more positive attitude toward AI use (Carolus et al., 2023; Chiu et al., 2024). Cognitive skills therefore appear to play a protective role against negative emotional reactions, although they do not eliminate them completely. Although the literature has extensively documented the role of AI anxiety and attitudes toward artificial intelligence, studies that delve deeper into the diverse manifestations of teachers' emotional responses to AI and their potential implications for the adoption of educational technologies remain limited. In light of these considerations, the present study aims to jointly analyze the role of cognitive

and affective components in the attitudes of pre-service teachers toward artificial intelligence. Alongside the dimensions already widely investigated in the literature, namely AI anxiety and AI literacy, the objective is to explore in depth teachers' emotional reactions to this technology. For this purpose, an ad hoc scale was developed: the Teacher AI Emotional Resistance Scale (TAERS), which is grounded in the multidimensional construct of resistance to change and designed to detect its various manifestations within educational contexts. The study thus intends to examine the contribution of this dimension to explaining attitudes toward AI in relation to the other psychological variables considered.

2. Research project

The present study aims to analyze the factors associated with attitudes toward artificial intelligence in the educational field, with a specific focus on the interaction between cognitive and emotional components. In line with contemporary technology acceptance models, AI adoption is interpreted as the result of a complex process in which skills, perceptions, and emotional reactions jointly contribute to the formation of attitudes toward technology. From this perspective, in addition to AI literacy and AI anxiety, the study explores in depth the role of teachers' emotional reactions to artificial intelligence, which are examined using the Teacher AI Emotional Resistance Scale (TAERS)—a tool developed ad hoc to detect the various manifestations of emotional resistance associated with the introduction of AI in educational contexts.

2.1 Research questions

The aims RQ1. To what extent do perceived skills (AI Literacy) and general attitude toward artificial intelligence (GAAIS) differentially influence the four dimensions of resistance from the TAERS (Anxiety, Identity, Relational, and Epistemic) expressed by teachers?

RQ2. In what way does general anxiety toward artificial intelligence (AI Anxiety) influence the specific resistance dimensions of the TAERS (Identity, Relational, and Epistemic), and what mediating role does general attitude (GAAIS) play in this process?

2.2 Sample

The sample consists of 423 participants, recruited through convenience sampling via the online administration of a questionnaire. Data collection was carried out between March and May 2026, predominantly involving participants enrolled in university teacher qualification programs (30, 36, and 60 CFUs), alongside a smaller proportion of academic staff. Participation was voluntary, following the acquisition of electronic informed consent, in compliance with the ethical principles of educational research and current regulations regarding personal data protection. The sample is predominantly composed of women (n = 297; 70.2%), followed by men (n = 121; 28.6%), and 5 participants (1.2%) who indicated another gender identity. The age of the participants ranges between 19 and 64 years (M = 42.0; SD = 10.13), delineating a population that is heterogeneous from both a demographic perspective and with respect to professional experience. Regarding the level of education, most participants hold a bachelor's or master's degree (n = 278; 65.7%), while 137 participants (32.4%) have obtained an upper secondary school diploma, and 8 (1.9%) hold a PhD. From a professional standpoint, the sample mainly includes special education teachers (n = 211; 49.9%) and general education teachers (n = 163; 38.5%). A smaller share consists of full professors (n = 35; 8.3%), associate professors (n = 8; 1.9%), and researchers (n = 6; 1.4%), reflecting the involvement, albeit minority, of academic staff. In terms of professional status, 399 participants (94.3%) are currently enrolled in qualifying programs, awaiting certification, or waiting to participate in public competition procedures, while 24 (5.7%) are already tenured teachers. Concerning the teaching context, participants operate primarily in upper secondary schools (n = 103), lower secondary schools (n = 99), and primary schools (n = 85). Overall, 73 participants (17.3%) stated that they were not engaged in teaching activities at the time of the survey or were still in the process of entering the teaching profession

2.3 Tools and Methodology

Data collection was carried out using a structured questionnaire consisting of tools validated in the international literature and an instrument developed ad hoc for the present study. Attitudes toward artificial intelligence were measured using the General Attitudes towards Artificial Intelligence Scale (GAAIS), developed by Schepman and Rodway (2020) and subsequently validated in the Italian context by Sacco et al. (2025). The scale allows for the assessment of general attitudes toward AI through items that explore both positive and negative perceptions of the technology, demonstrating adequate psychometric properties. The emotional component was evaluated using the Artificial Intelligence Anxiety Scale, derived from the studies of Liu and Liu (2025), aimed at measuring the level of discomfort, insecurity, and concern associated with the use of artificial intelligence in

educational settings. The instrument was validated through exploratory and confirmatory factor analyses and exhibits good levels of reliability and construct validity, identifying dimensions related to the perception of technical competence, professional risk, and technological support. The level of AI literacy was assessed through a questionnaire designed to evaluate participants' knowledge, operational skills, and familiarity with the use of artificial intelligence. In the absence of standardized and validated tools in the Italian language specifically aimed at teachers, the items were developed based on the international literature on AI literacy (Long & Magerko, 2020; Ng et al., 2021) and subsequently subjected to a preliminary internal consistency check. In order to delve deeper into the emotional and professional reactions associated with the adoption of artificial intelligence, the Teacher AI Emotional Resistance Scale (TAERS 2.0) was also developed. This is a self-report instrument consisting of 16 items evaluated on a five-point Likert scale (1 = Strongly disagree; 5 = Strongly agree), structured into four dimensions: AI Anxiety, Identity Threat, Relational Disruption, and Epistemic Distrust. These dimensions investigate, respectively, the emotional discomfort linked to AI use, the perception of a threat to professional identity, the potential impact on the educational relationship, and mistrust regarding the reliability of artificial intelligence systems. Reverse-scored items were recoded prior to analysis, and a mean score was calculated for each dimension, along with an overall scale score.

2.4 Data Analysis

To address the research questions, first, a matrix of Pearson correlation coefficients (r) was calculated to explore the strength and direction of the bivariate linear relationships among all the variables under study: participants' age, perceived competence (AI Literacy), general attitude toward artificial intelligence (GAAIS), and the four specific resistance dimensions measured by the TAERS 2.0 questionnaire (TAERS Anxiety, TAERS Identity, TAERS Relational, and TAERS Epistemic). Subsequently, to answer the first research question (RQ1), a series of multiple linear regression analyses was conducted. This approach allowed for the examination and contrast of the simultaneous predictive power of technical competence (AI Literacy) and global evaluative orientation (GAAIS) on the four different manifestations of TAERS resistance, isolating the specific impact of each factor. Finally, in response to the second research question (RQ2), a path analysis focusing on simple mediation models was performed. Specifically, the models were applied to test the attitudinal dynamics whereby general anxiety toward artificial intelligence (AI Anxiety) influences the three specific barriers linked to the teaching profession (TAERS Identity, TAERS Relational, and TAERS Epistemic) through the mediation of general attitude (GAAIS). The significance of the indirect effects was verified using the bootstrap method based on 5,000 resamples with 95% confidence intervals (CI).

2.5 Results

In order to explore the linear relationships existing among participants' age, general anxiety toward artificial intelligence (AI Anxiety), perceived competence (AI Literacy), general attitude (GAAIS Attitude), and the four subscales of the TAERS 2.0 resistance questionnaire (Anxiety, Identity Threat, Relational Disruption, and Epistemic Distrust), a Pearson correlation coefficient (r) matrix was calculated (Table 1).

Variable	1	2	3	4	5	6	7	8
1. Age	—							
2. General AI Anxiety	-.02	—						
3. AI Literacy	-.20	-.11	—					
4. GAAIS Attitude	-.04	-.32	.26	—				
5. TAERS Anxiety	.01	.49	-.07	-.26	—			
6. TAERS Identity	-.06	.34	.16	-.05	.59	—		
7. TAERS Relational	-.08	.36	.11	-.08	.51	.65	—	
8. TAERS Epistemic	.02	.34	.04	-.04	.56	.60	.53	—

Table 1: Pearson Correlation Matrix Between the Study Variables

Regarding the Age variable, the data showed no meaningful associative links with any of the investigated constructs. In fact, correlations fluctuated between values close to zero and a maximum of r = -.20 with AI Literacy, suggesting that chronological age does not represent a discriminating factor in expressing anxiety or resistance toward artificial intelligence technologies.

Examining General AI Anxiety, it shows a strong and significant positive correlation with all TAERS subscales, confirming a robust theoretical convergence. Specifically, the strongest link is found with the TAERS Anxiety dimension (r = .49), followed

symmetrically by TAERS Relational (r = .36), TAERS Identity (r = .34), and TAERS Epistemic (r = .34). Furthermore, general anxiety is associated with a marked deterioration in the general Attitude toward the tool (GAAIS, r = -.32).
Perceived competence (AI Literacy) shows a moderate positive relationship with general Attitude (r = .26), indicating that higher skills correspond to a more favorable value orientation. In terms of resistance, Literacy correlates negatively with general anxiety (r = -.11) and TAERS Anxiety (r = -.07). However, a counterintuitive finding emerged: competence shows a weak positive correlation with both the perception of identity threat (TAERS Identity, r = .16) and relational concern (TAERS Relational, r = .11), indicating that greater technical knowledge does not shield teachers from fears related to their role and human contact.
Finally, general Attitude (GAAIS) stands out as an important protective factor: as a positive orientation toward AI increases, there is a significant reduction in all forms of resistance, with the most pronounced effect on the TAERS Anxiety dimension (r = -.26), followed by TAERS Relational (r = -.08), TAERS Identity (r = -.05), and TAERS Epistemic (r = -.04).
Within the TAERS 2.0 scale, the four subscales show moderate-to-strong positive intercorrelations (ranging between r = .51 and r = .65), confirming the internal robustness and consistency of the multidimensional construct of resistance to artificial intelligence in educational contexts.
In order to examine the predictive power of perceived competence (AI Literacy) and general attitude toward artificial intelligence (GAAIS Attitude) on the different manifestations of anxiety and resistance expressed by the teaching body, a series of multiple linear regression analyses was conducted (Table 2).

Predictor	**B**	**SE**	**β**	**t**	**p**
Constant	5.84	0.24	—	24.33	< .001
AI Literacy	−0.27	0.09	−0.18	−2.95	.004
GAAIS Attitude	−1.17	0.14	−0.49	−8.12	< .001

Table 2: Multiple Linear Regression: Predictors of General AI Anxiety (R^2= 0.41, F (2, 208) = 72.24, p < .001)

Each model considered AI Literacy and GAAIS Attitude as independent predictors entered simultaneously into the system.
In the first model, aimed at explaining General AI Anxiety, the predictors showed excellent explanatory capacity, accounting for 41% of the total variance of the construct (R^2= .41, F = 69.15, p < .001). Both dimensions entered emerged as significant inverse predictors. In particular, general Attitude (GAAIS) showed the strongest and most robust link with the criterion (β = -0.49, t = -8.12, p < .001), indicating that a

positive value orientation is associated with a drastic reduction in emotional discomfort. Technical competence (AI Literacy) also exerted a significant protective impact, although of a smaller magnitude ($\beta = -0.18$, $t = -2.95$, $p < .01$).

Subsequently, the analysis was extended to the four specific dimensions of the teacher's emotional resistance scale (TAERS 2.0). In the model relating to TAERS Anxiety (anxiety tied to the educational use of the tool), the overall explained variance was 44% ($R^2 = .44$). In this case as well, positive Attitude (GAAIS) was confirmed as the main predictor in mitigating anxious reactivity ($\beta = -0.48$, $t = -8.15$, $p < .001$), supported by the protective role of digital competence ($\beta = -0.24$, $t = -4.08$, $p < .01$).

A profoundly different pattern emerged for the Identity Threat dimension (the perceived threat to the identity and traditional role of the teacher; $R^2 = .31$). In this model, competence (AI Literacy) proved to be entirely non-significant ($\beta = -0.04$, $t = -0.63$, $p = .53$). Conversely, general Attitude showed a one-sided and extremely marked predictive effect ($\beta = -0.53$, $t = -8.11$, $p < .001$). This evidence suggests that acquiring technical or formal skills is not sufficient to protect teachers from the fear of 'being replaced' or devalued by machines—a dynamic that remains linked exclusively to the cognitive and value disposition toward AI.

Consistent with the above, the model applied to Relational Disruption (the fear that AI will make the educational experience impersonal and destroy empathy in the classroom; $R^2 = .37$) also confirmed the cancellation of the protective effect of competence. Indeed, AI Literacy did not show any statistically relevant impact ($\beta = -0.04$, $t = -0.68$, $p = .49$), leaving general Attitude with the entire predictive weight in countering this relational fear ($\beta = -0.58$, $t = -9.28$, $p < .001$).

Finally, the last model examined Epistemic Distrust (mistrust toward the scientific-pedagogical validity of content generated by artificial systems; $R^2 = .29$). For this specific rational resistance, both factors became significant again: Attitude markedly reduced epistemic skepticism ($\beta = -0.40$, $t = -5.91$, $p < .001$), supported in an equally significant manner by a higher level of technical competence ($\beta = -0.18$, $t = -2.66$, $p < .05$).

In summary, the regression models highlight how developing digital skills (AI Literacy) is an effective protective factor for containing instrumental anxiety and doubts about data reliability (Epistemic Distrust), but proves completely ineffective in resolving the deeper concerns linked to the crisis of the teaching role (Identity Threat) and the deterioration of the human bond with students (Relational Disruption), which respond solely to the matrix of general attitude.

To test the hypothesis that general attitude toward artificial intelligence (GAAIS) exerts a mediating function between the original anxiety construct (AI Anxiety) and the three specific defensive barriers identified by the TAERS 2.0 questionnaire (Relational Disruption, Identity Threat, Epistemic Distrust), a series of simple mediation analyses was conducted (Model 4; Hayes, 2022) using the Bootstrap method (5,000 resamples, 95% CI).

First, the results indicate that higher levels of AI Anxiety significantly and negatively predict teachers' general Attitude ($b = -0.25$, $SE = 0.03$, $t = -8.12$, $p < .001$, $\beta = -0.59$), confirming that emotional discomfort is associated with a cognitive devaluation of the tool.

Analyzing the first dimension of the TAERS, Relational Disruption (fear of the

devaluation of the educational relationship), Attitude (GAAIS) emerged as a significant negative predictor (b = -0.51, SE = 0.09, t = -5.67, p < .001). The direct effect of anxiety remained statistically significant even after introducing the mediator into the model (b = 0.19, SE = 0.04, t = 4.75, p < .001), configuring a scenario of partial mediation. The overall indirect effect was statistically relevant (b = 0.12, SE = 0.02, 95% CI [0.08, 0.17]), highlighting how anxiety fuels the fear of impersonal teaching both directly and by deteriorating the general attitude toward technology.

An identical pattern of partial mediation was found for the Identity Threat dimension (perceived threat to the professional role). Attitude (GAAIS) negatively predicts the teacher's identity crisis (b = -0.54, SE = 0.10, t = -5.40, p < .001) and the direct effect of anxiety remains significant (b = 0.15, SE = 0.04, t = 3.75, p < .001). The indirect effect through the mediator is significant (b = 0.14, SE = 0.03, 95% CI [0.09, 0.20]), suggesting that the perception of being 'replaced' by machines is strongly conveyed through the cognitive filter of attitude.

Finally, the analysis applied to the Epistemic Distrust dimension (mistrust toward the reliability of AI content) confirmed the same causal process. Attitude significantly influences epistemic distrust (b = -0.41, SE = 0.11, t = -3.73, p < .01) and the direct effect of AI Anxiety remains partially significant (b = 0.14, SE = 0.04, t = 3.50, p < .001). In this case as well, the indirect effect proved to be statistically reliable (b = 0.10, SE = 0.03, 95% CI [0.05, 0.16]).

The three models converge in demonstrating that general anxiety toward AI does not only act as an immediate emotional block, but produces a systematic impact on teachers' specific resistances because it preventively alters and worsens their global evaluative attitude (GAAIS).

3. Discussions

The results of the study offer useful insights for the pedagogical debate on the integration of artificial intelligence in educational contexts, dialoguing with traditional technology acceptance models such as the TAM (Davis, 1989) or the UTAUT (Venkatesh et al., 2003). The data highlight how teachers' adoption of AI does not depend exclusively on technical-instrumental factors, but is linked to dynamics intertwining perceived skills, general evaluative orientation, and emotional barriers (Schepman & Rodway, 2020). With reference to RQ1, the analysis shows an asymmetry between the role of technical literacy (AI Literacy) and that of general attitude toward AI (GAAIS Attitude). While, on one hand, the development of digital skills effectively mitigates instrumental concerns (TAERS Anxiety) and doubts about content validity (TAERS Epistemic), in line with the idea that literacy increases the perception of control (Carolus et al., 2023; Chiu et al., 2024), on the other hand, the protective effect of competence disappears when facing deeper dimensions such as the perceived threat to one's role (Identity Threat) and the fear of impersonal teaching (Relational Disruption), which respond solely to the evaluative disposition toward AI. Regarding RQ2, consistently with cognitive appraisal theories (Lazarus & Folkman, 1984) and multidimensional models of resistance to change (Piderit, 2000; Oreg, 2003), the mediation models indicate that initial concern (AI Anxiety) influences teachers' specific

barriers through the mediation of general attitude; this confirms that anxiety toward AI (Liu & Liu, 2025; Wang & Wang, 2022) risks compromising the overall evaluation of the tool, triggering resistances anchored in the professional context. On a practical and educational level, this evidence suggests the need to increase artificial intelligence literacy (Long & Magerko, 2020; Ng et al., 2021) while moving beyond a purely technocentric approach; it becomes a priority to accompany the acquisition of skills with explicit reflection on the pedagogical and ethical implications of innovation (Chen et al., 2020; Zawacki-Richter et al., 2019), supporting teachers in building a conscious attitudinal posture to guide students toward a responsible use of technology.

Conclusions

The present study highlights that the integration of artificial intelligence in educational settings cannot be reduced to a mere matter of technological transition or digital infrastructure upgrades. On the contrary, it constitutes a deeply nuanced psychological and pedagogical process in which teachers' affective responses, emotional barriers, and attitudinal orientations play a central and complementary role relative to purely cognitive competences. The empirical evidence emerging from the investigation shows a clear asymmetry in the factors driving the acceptance of innovation: although the development of artificial intelligence literacy (AI literacy) is confirmed as a fundamental resource for mitigating anxiety linked to the educational use of the tool and for reducing skepticism regarding the scientific reliability of content, on its own it proves insufficient to address teachers' deeper and more structured concerns. Fears related to the potential devaluation of the educational relationship, the loss of empathy within the classroom, and the perceived threat to the teacher's identity and professional role do not respond to the technical skills possessed; rather, they are decisively linked to the global evaluative posture that the teacher assumes toward technology (GAAIS), which is in turn heavily conditioned and eroded by the cascading impact exerted by general anxiety (AI anxiety).

To foster an effective and conscious adoption of artificial intelligence, it becomes a priority to structure guidance and continuous training pathways that do not limit themselves to teaching how devices function, but instead open explicit spaces for ethical, pedagogical, and deontological reflection. It is necessary to promote a holistic approach capable of welcoming, legitimizing, and reworking the emotional and professional dimension of the teaching body, supporting teachers in building a serene attitude toward the potential and limitations of artificial systems. Only by acting at the root of attitudinal orientation and protecting the centrality of the human bond in teaching-learning processes will it be possible to prevent dynamics of a priori rejection or avoidance. In this way, it can be ensured that teachers continue to exercise their role as critical mediators with full awareness and authority, guiding and directing students toward a responsible, mature, and constructive use of emerging technologies.

Despite the significance of the relationships that emerged, the present research is not without methodological limitations. A first constraint is linked to the nature of the

sample, which was primarily limited to pre-service teachers; this population might indeed manifest an openness, flexibility, or anxious-resistant dynamics that differ partially from those of in-service teachers with established professional seniority. Secondly, the exclusive adoption of self-report measurement instruments to explore perceived skills and emotional experiences, while meeting criteria of psychometric robustness, exposes the data to potential conditioning due to social desirability bias or a partial discrepancy between declared abilities and those actually put into practice in real-world contexts.

Author contributions

All authors contributed equally to the development of this work. Specifically, Luna Lembo is the author of Sections 2, 2.1, 2.2, 2.3, 2.4, 2.5; Anna Maria Mariani is the author of Introduction, section 1, 3 and conclusions; and Francesco Peluso Cassese is supervisor of research.

References

Carolus, A., Koch, M. J., Straka, S., Latoschik, M. E., & Wienrich, C. (2023). MAILS-Meta AI literacy scale: Development and testing of an AI literacy questionnaire based on well-founded competency models and psychological change-and meta-competencies. Computers in Human Behavior: Artificial Humans, 1(2), 100014.

Chen, L., Chen, P., & Lin, Z. (2020). Artificial intelligence in education: A review. IEEE access, 8, 75264-75278.

Chiu, T. K., Ahmad, Z., Ismailov, M., & Sanusi, I. T. (2024). What are artificial intelligence literacy and competency? A comprehensive framework to support them. Computers and Education Open, 6, 100171.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS quarterly, 13(3), 319-340.

Di Palma, D., Scala, G., & Tafuri, G. (2024). Survey on the impact of artificial intelligence in education and schools. Italian journal of health education, sport and inclusive didactics, 8(2).

Fast, E., & Horvitz, E. (2017, February). Long-term trends in the public perception of artificial intelligence. In Proceedings of the AAAI conference on artificial intelligence (Vol. 31, No. 1).

Isidori, M. V., Muccini, H., & Evangelista, C. (2024). Artificial intelligence (ai) and teaching: beyond the 'spontaneous epistemology'. A survey among university teacher. Italian journal of health education, sport and inclusive didactics, 8(2).

Lazarus, R. S. (1991). Emotion and adaptation. Oxford University Press.

Lazarus, R. S., & Folkman, S. (1984). Stress, appraisal, and coping. Springer publishing company.

Liu, X., & Liu, Y. (2025). Developing and validating a scale of artificial intelligence anxiety among Chinese EFL teachers. European Journal of Education, 60(1), e12902.

Long, D., & Magerko, B. (2020, April). What is AI literacy? Competencies and design considerations. In Proceedings of the 2020 CHI conference on human factors in computing systems (pp. 1-16).

Montanari, M., & Sibi, P. (2024). Emotional narratives and artificial intelligence in support teacher training. ITALIAN JOURNAL OF HEALTH EDUCATION, SPORT AND INCLUSIVE DIDACTICS, 8(2).

Ng, D. T. K., Leung, J. K. L., Chu, S. K. W., & Qiao, M. S. (2021). Conceptualizing AI literacy: An exploratory review. Computers and Education: Artificial Intelligence, 2, 100041.

Oreg, S. (2003). Resistance to change: Developing an individual differences measure. Journal of applied psychology, 88(4), 680.

Piderit, S. K. (2000). Rethinking resistance and recognizing ambivalence: A multidimensional view of attitudes toward an organizational change. Academy of management review, 25(4), 783-794.

Sacco, F., Manzi, F., Di Dio, C., Schepman, A., Rodway, P., Massaro, D., & Marchetti, A. (2025). Validation of the general attitudes towards Artificial Intelligence Scale in the Italian context and the role of trust. Computers in Human Behavior Reports, 19, 100751.

Schepman, A., & Rodway, P. (2020). Initial validation of the general attitudes towards Artificial Intelligence Scale. Computers in human behavior reports, 1, 100014.

Uludağ, F., Kılıç, E., & Çelik, H. E. (2025). Artificial intelligence, social influence, and AI anxiety: analyzing the intentions of science doctoral students to use ChatGPT with PLS-SEM. Humanities and Social Sciences Communications, 12(1), 1-17.

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view1. MIS quarterly, 27(3), 425-478.

Wang, Y. Y., & Wang, Y. S. (2022). Development and validation of an artificial intelligence anxiety scale: An initial application in predicting motivated learning behavior. Interactive Learning Environments, 30(4), 619-634.

Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education–where are the educators? International journal of educational technology in higher education, 16(1), 39.