Awareness and Misconceptions of AI Among Educators

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ABSTRACT

The rapid expansion of Artificial Intelligence (AI) in education has been accompanied by both opportunities and challenges, with its effective adoption being largely dependent on how well AI is understood by educators and how accurately its capabilities and limitations are perceived. Existing studies have shown that awareness levels are inconsistent and that widespread misconceptions are held across different educational levels and geographical regions, with greater familiarity being reported by higher-education lecturers compared to primary and secondary school teachers. Misconceptions such as the belief that AI will replace human teachers, assumptions that AI possesses human-like intelligence, concerns regarding the dehumanization of learning, and anxieties related to data privacy have been found to hinder meaningful AI integration in educational practice. In this study, contemporary literature on educators' awareness and misconceptions of AI has been synthesised through a narrative review of publications published between 2020 and 2025, and patterns of awareness, dominant misconceptions, and factors influencing AI adoption have been analysed. Findings indicate that awareness remains highly variable, misconceptions persist across contexts, and institutional support, digital literacy, and access to professional development are significant determinants of educators' readiness to use AI. Based on these insights, it is suggested that targeted AI literacy initiatives, structured professional development, and clear institutional policies are urgently required to dispel misconceptions and promote ethical, confident, and responsible use of AI in education. This review is expected to contribute to ongoing scholarly and policy discussions by providing evidence-based guidance for policymakers, institutions, and training providers to strengthen educators' preparedness for AI-enhanced teaching and learning.

Keywords— Artificial Intelligence; Educator Awareness; Misconceptions; Professional Development; Responsible AI Integration

INTRODUCTION

Artificial Intelligence (AI) has rapidly become a defining force in contemporary education systems, offering new possibilities for personalised instruction, adaptive learning environments, automated assessment, and intelligent tutoring systems [3], [5], [19]. As AI-enabled tools become increasingly embedded in pedagogical and administrative processes, educators play a decisive role in determining whether such technologies are integrated meaningfully, cautiously, or in ways that undermine pedagogical intent [7], [12]. Research has shown that educators' perceptions and conceptual understandings profoundly influence their willingness to adopt AI tools, their ability to evaluate AI outputs critically, and their confidence in navigating emerging ethical considerations [5], [8], [18].

Despite AI's growing visibility, educators' awareness of AI remains uneven across educational levels and geographical regions. Higher-education lecturers typically exhibit greater familiarity with AI tools due to their exposure to plagiarism detection systems, academic analytics, and emerging generative AI platforms [6], [8], [20]. In contrast, teachers in K–12 settings often report fragmented or superficial awareness, with many

conflating AI with general digital automation or lacking clarity regarding its operational mechanisms [1], [2], [11], [15], [17]. Studies in Sweden, Turkey, and Northern Cyprus highlight that many teachers possess only partial conceptualisations of AI and struggle to differentiate between rule-based systems and machine-learning processes [1], [2], [11]. These disparities are compounded by infrastructural inequities and limited formal AI training, especially in developing contexts [10], [15], [23].

Equally critical is the persistence of misconceptions about AI, which shape educators' attitudes and behaviour. Common misconceptions include the belief that AI possesses human-like cognition, that AI systems operate with inherent neutrality or infallible accuracy, and that AI tools may replace human teachers entirely [11], [17], [18]. Such misconceptions are evident across both K–12 and higher-education sectors and are often reinforced by media narratives, limited AI literacy, and the absence of scaffolded professional development [4], [7], [12]. The emergence of generative AI since 2023 has introduced new layers of confusion and concern, with educators expressing uncertainty about academic integrity, hallucinated outputs, data privacy, and students' potential overreliance on AI-generated content [8], [9], [22], [23].

Although the literature addressing AI in education has expanded substantially, existing reviews tend to focus on broad pedagogical trends, technological affordances, or barriers to acceptance, rather than conducting a focused synthesis of educators' awareness, misconceptions, and readiness [3], [4], [10], [12], [14], [19], [21]. Research on AI literacy is similarly fragmented, with several scoping reviews highlighting the absence of validated frameworks to guide educators' conceptual understanding and pedagogical decision-making [12], [13], [14], [17]. Furthermore, empirical studies examining educators' engagement with generative AI remain limited and geographically uneven, creating an urgent need for updated analyses reflecting post-2022 technological realities [8], [22], [23].

In response to these gaps, this study conducts a narrative review of peer-reviewed literature published between 2020 and 2025 to synthesise contemporary evidence on educators' awareness and misconceptions of AI and to examine the individual, institutional, and contextual factors influencing AI adoption. Specifically, the review aims to: (i) map awareness patterns across K–12 and higher-education contexts; (ii) identify and categorise dominant misconceptions; (iii) analyse determinants of AI readiness and adoption; and (iv) derive implications for policy, institutional strategy, professional development, and future research.

The remainder of this paper is organised as follows. Section II reviews prior scholarship on educators' awareness, perceptions, misconceptions, and adoption of AI, synthesising findings across multiple empirical and review studies. Section III presents the findings of the narrative analysis and discusses them across key thematic domains, including awareness patterns, misconceptions, determinants of adoption, and cross-contextual differences. Section IV outlines the implications of these findings for policy, institutional practice, teacher education, and classroom implementation. Section V concludes the paper by summarising the key contributions. Section VI identifies the limitations of the review, and Section VII proposes directions for future research.

RELATED WORKS

Artificial intelligence in education (AIED) has become a rapidly growing research area in recent years, especially since the acceleration of generative AI technologies in 2022. The literature reveals diverse perspectives on educators' awareness, attitudes, misconceptions, and readiness toward AI across different educational contexts. This section synthesizes empirical studies and reviews from 2020–2025, covering K-12 teachers, higher-education lecturers, and teacher education programs.

Awareness of AI Across Educational Levels

Recent studies consistently highlight that educators' awareness of AI is unevenly distributed across educational sectors, disciplines, and regions. Case-based and survey-based research indicates that university lecturers, especially those in technology-related fields tend to report higher awareness and familiarity with AI concepts and tools than primary and secondary school teachers [1], [2], [7]. In higher education, instructors are more likely to have encountered AI through research analytics, learning management systems with AI features, plagiarism detection, or generative AI tools for writing and coding support [8], [9], [22]. This exposure

contributes to a baseline awareness of AI terminology and functionality, even when deeper conceptual understanding remains limited.

In contrast, findings from K–12 contexts suggest that awareness is often superficial and fragmented. Swedish teachers, for example, demonstrated partial understanding of AI, frequently conflating AI with general digital technologies or automation; many struggled to articulate how AI differs from conventional software or what it means for teaching and learning [11]. Similarly, teachers in Northern Cyprus were aware of AI as a "buzzword" and could name some AI applications, yet their practical understanding of how AI operates or could be integrated pedagogically was modest [1]. These patterns are echoed in other K–12 settings, where teachers report hearing about AI through social media or popular discourse rather than through formal professional development [15], [16].

Teacher education and pre-service contexts present a mixed picture. Some programs are beginning to include AI literacy components, but pre-service teachers' awareness is still heavily shaped by personal technology use and media narratives rather than structured coursework [15], [17]. Studies on teachers' needs for AI education show that many pre-service and in-service teachers alike feel unprepared to explain AI concepts to students or to make informed decisions about AI tools [15]. Taken together, the literature indicates that while "AI awareness" is increasing nominally, it often reflects a surface-level recognition of AI's existence rather than a robust, pedagogically grounded understanding.

Positive Perceptions and Perceived Usefulness of AI

Alongside awareness, a substantial body of research documents generally positive perceptions of AI's potential in education. Across primary, secondary, and higher education, educators often identify AI as a promising means of enhancing instructional efficiency, personalizing learning, and supporting data-informed decision making [3], [4], [5], [19]. Teachers and lecturers report that AI-powered tools can automate repetitive tasks such as grading, item generation, or scheduling, thereby freeing time for more complex pedagogical work and interaction with students [4], [7], [10].

Perceived usefulness also extends to AI's capacity to support differentiated instruction and learner engagement. In language learning contexts, for instance, AI chatbots and intelligent tutoring systems are perceived to help learners practice speaking and writing, receive immediate feedback, and access resources tailored to their proficiency level [6], [9]. Similar findings appear in studies of AI in academic writing support, where AI tools are seen as helpful for scaffolding structure, suggesting vocabulary, and promoting academic conventions, particularly for second-language learners [8], [9].

Several studies highlight that educators view AI as a way to foster higher-order skills. By offloading routine tasks to AI, teachers believe they can focus on designing inquiry-based activities, facilitating critical discussions, and mentoring students' metacognitive development [4], [6], [19]. Some also see AI as a resource for inclusive education, for example by providing adaptive supports or alternative representations for learners with diverse needs [3], [19]. Importantly, these positive perceptions are typically stronger among educators who have hands-on experience with AI tools, reinforcing the link between exposure, perceived usefulness, and willingness to experiment [5], [8], [22].

These positive perceptions are often stronger among technologically proficient educators or those with prior exposure to AI tools.

Negative Perceptions, Fears, and Ethical Concerns

Despite acknowledging AI's benefits, educators' perceptions are frequently ambivalent, combining optimism with concern. A recurring theme is anxiety about job displacement: many teachers express fear that AI could eventually replace human educators or substantially reduce their role, particularly when policy narratives emphasize efficiency and automation [5], [18]. These fears are more pronounced where teachers feel excluded from decision-making about technology adoption or where AI is framed primarily as a cost-saving measure.

Another cluster of concerns relates to data privacy, security, and surveillance. Educators worry about the collection and use of large volumes of student data required to power AI-driven analytics and adaptive systems [5], [7], [10]. Questions are raised about who controls this data, how it may be reused by vendors, and what safeguards exist against misuse or breaches [3], [19]. In some contexts, teachers are hesitant to adopt AI tools precisely because institutional policies and guidelines on data protection are either absent or not clearly communicated [10].

Ethical and pedagogical issues also feature prominently in literature. Teachers express unease about algorithmic bias and fairness, particularly in systems that support assessment, selection, or recommendation [3], [7], [19]. There is concern that AI might encode and amplify societal inequities if not critically scrutinized. On a pedagogical level, educators worry that AI could dehumanize learning by replacing rich interpersonal interactions with automated feedback, or by encouraging over-reliance on AI-generated answers among students leading to reduced student creativity and cognitive effort [5], [9], [11], [23]. In studies focusing on generative AI and large language models, participants describe tensions between leveraging AI for productivity and preserving academic integrity and authentic learning [8], [23]. These negative perceptions and ethical concerns do not always translate into outright rejection, but they shape cautious, conditional, or selective adoption.

These concerns are more pronounced among educators with lower digital literacy or from countries with weaker technological infrastructures.

Negative Perceptions, Fears, and Ethical Concerns

Beyond general concerns, literature identifies a set of persistent misconceptions that distort educators' understanding of AI and its implications. One widespread misconception is the belief that AI possesses general, human-like intelligence or even consciousness, leading some educators to anthropomorphize AI systems and attribute intentionality or emotions to them [1], [11], [18]. This can result in unrealistic expectations of what AI can do, or conversely in exaggerated fears about AI "taking over" human roles.

Another common misconception is the assumption that AI "learns" or "thinks" in the same way humans do. Studies show that many teachers are unfamiliar with the basic principles of machine learning, such as pattern recognition, training data, or probabilistic outputs [1], [11], [17]. As a result, they may overestimate the accuracy and reliability of AI tools, treating outputs as objective or neutral, or underestimate the role of human judgment in interpreting AI-generated recommendations. Misunderstandings also extend to generative AI: some educators assume that large language models have access to real-time internet data or personal records when, in fact, they operate on trained statistical representations [8], [23].

Giray's work on "Ten Myths About AI in Education" synthesizes several of these misconceptions, including the ideas that AI will inevitably replace teachers, that AI can automatically personalize learning for all students without teacher mediation, and that AI can function as a fully independent tutor [18]. Empirical studies echo these myths, noting that teachers sometimes equate any sophisticated digital tool with AI, blurring distinctions between automation, rule-based systems, and learning algorithms [11], [17]. Such misconceptions can be double-edged: they can generate unwarranted enthusiasm ("AI will solve all problems") or heightened resistance and anxiety ("AI is too dangerous to use"), both of which hinder balanced, evidence-based decision making.

Factors Influencing Educators' AI Adoption

Several studies explicitly investigate the factors that influence educators' willingness to adopt AI, often drawing on established technology acceptance frameworks such as the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT) [2], [7], [21]. At the individual level, perceived usefulness and perceived ease of use consistently emerge as strong predictors of behavioral intention to use AI tools [7], [21]. Educators who believe that AI can genuinely support their pedagogical goals and who find AI tools intuitive are more likely to experiment with and integrate them.

Digital literacy and self-efficacy are also central determinants. Teachers with higher confidence in their technology skills are more willing to explore AI-based applications, troubleshoot problems, and adapt their

practices [7], [12], [15]. Conversely, low digital competence is associated with avoidance, anxiety, and reliance on traditional methods [10], [15]. Demographic factors such as age and teaching experience show mixed results: some studies report younger teachers as more open to AI, while others suggest that experienced teachers become positive adopters once supported through adequate training [2], [10], [12].

At the institutional level, structural and cultural factors play a major role. Access to robust infrastructure, reliable internet connectivity, adequate devices, and supportive platforms is a prerequisite for meaningful AI use [3], [10], [19]. Equally important are leadership vision and organizational climate. When school or university leaders articulate a clear, pedagogically grounded strategy for AI, provide time and incentives for experimentation, and address ethical and policy issues transparently, educators are more likely to engage positively [19], [20]. Professional development opportunities that are ongoing, context-sensitive, and aligned with local curricula further strengthen adoption [4], [7], [12].

Regional and sociocultural contexts add another layer of complexity. Studies indicate that educators in developing countries face more pronounced infrastructure and resource constraints, which can overshadow pedagogical or ethical considerations [3], [10], [23]. In contrast, educators in better-resourced contexts may be more concerned with data protection, academic integrity, and long-term implications for professional identity [11], [18]. Bibliometric analyses of AI literacy and acceptance research highlight uneven global participation in the discourse, with certain regions overrepresented and others underexplored [14], [20]. These contextual factors underscore the importance of tailoring AI adoption strategies to local realities rather than assuming a one-size-fits-all model.

Research Gaps Identified in Current Literature

Although research on AI in education has grown rapidly since 2020, several critical gaps remain. First, K–12 teachers are under-represented in AI perception and awareness studies. Most empirical work focuses on higher education settings, where lecturers tend to have more digital exposure and institutional support [1], [2], [7], [20]. As a result, current knowledge disproportionately reflects technologically rich environments, leaving early primary, rural, and under-resourced schools insufficiently examined [10], [15], [23].

Second, there is a notable lack of comprehensive empirical studies on educators' misconceptions of AI. While individual studies highlight fragmented or inaccurate understandings, such as anthropomorphizing AI, overestimating capabilities, or conflating AI with automation, few large-scale or cross-context studies systematically map these misconceptions or examine how they develop [11], [17], [18]. Much of the existing evidence originates from small samples, qualitative findings, or exploratory analyses. This limits the generalizability of insights into how misconceptions constrain adoption.

Third, the literature reveals an absence of standardized, validated AI literacy frameworks for educators. Although frameworks and curricula exist at conceptual or theoretical levels particularly in higher education, very few have been empirically validated, adapted for K–12, or integrated into teacher education programs in a systematic way [12], [14], [17]. Professional development programs for AI are often ad hoc, short-term, or not aligned with classroom needs, resulting in inconsistent outcomes [6], [15].

Fourth, current research remains heavily centered on technology acceptance models (TAM, UTAUT) to explain educators' adoption of AI [7], [21]. While useful, these models primarily capture intention rather than real classroom enactment. Consequently, there is limited understanding of how teachers implement AI tools, how they negotiate ethical issues, or how AI affects pedagogical decision-making in practice. Studies rarely follow educators longitudinally or examine sustained use over time.

Finally, despite the global explosion of generative AI (e.g., ChatGPT, Bard, Gemini) since late 2022, empirical research on generative AI adoption among educators remains limited. Existing studies tend to be cross-sectional or descriptive, focusing on initial attitudes, anxieties, or intended use rather than long-term pedagogical integration or learning outcomes [8], [23]. The speed of technological change has outpaced formal research, creating a gap between classroom realities and scholarly evidence.

Collectively, these gaps suggest the need for more diverse sampling, cross-context comparison, standardized AI literacy frameworks, longitudinal adoption studies, and deeper empirical investigation of misconceptions in the age of generative AI.

Descriptive Statistics and Distribution of Reviewed Studies

A quantitative synthesis of the 23 studies reviewed (2020–2025) reveals several patterns in research focus, educator context, methodological distribution, and thematic emphasis. These descriptive statistics provide additional clarity regarding where scholarly attention has been concentrated and, more importantly, where notable gaps persist.

Distribution by Education Level: This is shown in Figure 1. A clear overrepresentation of higher education persists, with K–12 contexts under-researched, especially early primary and rural schools. Only 2 studies (9%) focused specifically on early primary education [4], [16].

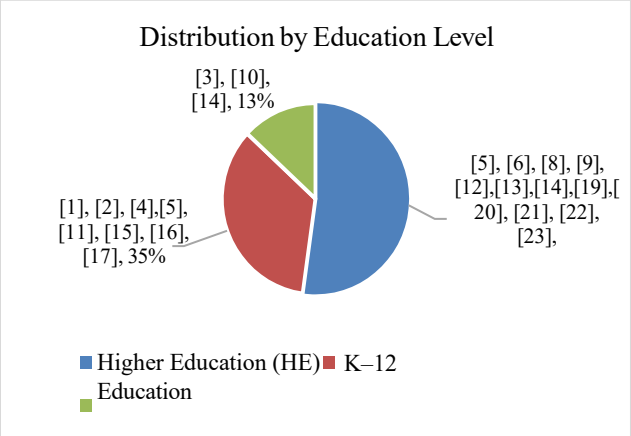

Fig. 1 Article distribution by Education Level

This gap limits understanding of how AI is perceived at foundational levels where misconceptions may form earliest.

Methodological Type: There is a heavy reliance on surveys and literature reviews (Figure 2), with relatively few in-depth qualitative studies, longitudinal designs, or classroom intervention studies.

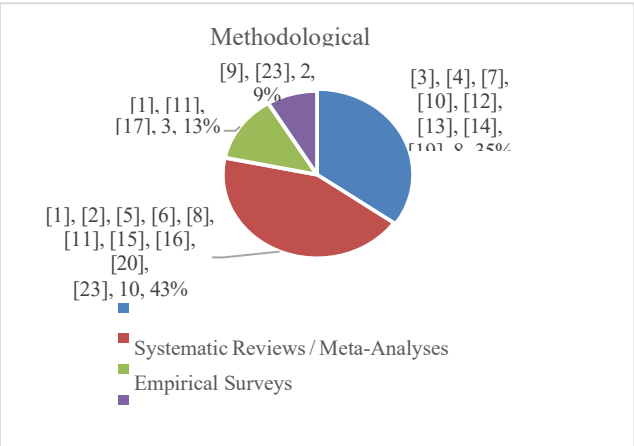

Fig. 2 Article distribution based on Methodological Type

This limits insights into how awareness, misconceptions, and adoption change over time or translate into classroom practice.

Focus on misconceoptions: Despite widespread discussion of misconceptions in policy discourse, empirical research on misconceptions is sparse, small-scale, and often geographically narrow.

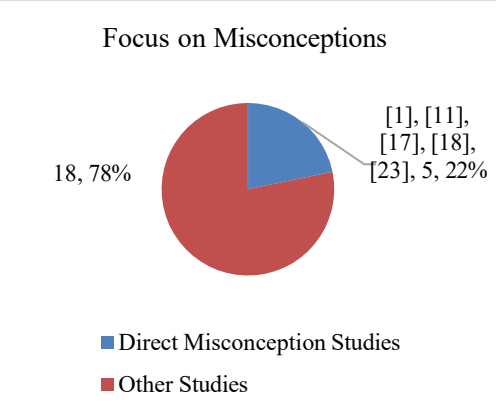

Fig. 3 Articles Focusing on Misconceptions

This represents a major research gap.

FINDINGS AND DISCUSSION

This section synthesizes findings from the 23 reviewed studies by examining patterns of educators' awareness of AI, dominant misconceptions, determinants of adoption, interrelationships among key constructs, cross-context differences, and alignment with theoretical frameworks commonly used to explain technology acceptance. The synthesis integrates empirical insights with conceptual interpretations to provide a coherent understanding of how educators perceive and approach AI in education, and how these perceptions influence adoption behaviors.

Patterns of Awareness Across Contexts

Across the reviewed literature, educators' awareness of AI varies substantially by educational level, geographic region, and exposure to AI-enabled tools. A recurring pattern is the higher awareness reported by higher-education (HE) lecturers compared to K–12 teachers. Studies in HE contexts found that lecturers commonly encounter AI-driven systems through plagiarism detection software, adaptive learning environments, and academic analytics, contributing to moderate to high awareness levels [5], [6], [8], [20]. Bibliometric analyses further show that HE institutions have been focal points for AI-related training and digital transformation initiatives, supporting greater conceptual familiarity [14], [20].

In contrast, K–12 teachers generally exhibit lower and more fragmented awareness, particularly in early-primary settings. Evidence from Sweden indicates that many teachers struggle to distinguish AI from automation or general ICT tools and hold only superficial notions of how AI processes information [11]. Similar issues were reported in Northern Cyprus, where K–12 teachers exhibited awareness of AI as a concept but demonstrated limited understanding of its functionality or pedagogical relevance [1]. Studies in Turkey and Spain similarly reveal that teachers' awareness tends to be shallow, with many educators unable to articulate the difference between rule-based systems and machine learning approaches [2], [4].

Regional differences compound these disparities. Educators in well-resourced European or East Asian contexts often have moderate awareness but lack depth in conceptual knowledge [2], [11], [14], whereas teachers in developing regions, such as parts of the Middle East, Southeast Asia, and Africa, frequently report limited exposure to AI tools and minimal formal training opportunities [5], [15], [23]. These variations suggest that awareness is strongly mediated by digital access, institutional culture, and opportunities for hands-on engagement.

A cross-comparison of awareness patterns reveals two systemic tendencies:

1) Awareness does not equate to understanding. Educators may be familiar with AI as a concept but lack accurate mental models of how AI works.

2) Awareness tends to be tool-driven rather than concept-driven. Educators often understand specific applications (e.g., ChatGPT, Grammarly, Duolingo) without understanding the underlying AI principles.

Overall, the literature suggests that educators' awareness of AI remains heterogeneous and inconsistent, with substantial gaps in foundational AI literacy across all educational levels.

Dominant Misconceptions Among Educators

A significant portion of empirical and review studies reveal widespread misconceptions that shape educators' perceptions of AI in education. These misconceptions arise from limited conceptual understanding, media narratives, and insufficient professional development.

One pervasive misconception is the anthropomorphization of AI, where educators assume that AI systems possess human-like intelligence, emotions, or agency [11], [18]. Teachers often describe AI as "thinking" or "deciding," attributing cognitive processes that do not reflect the probabilistic and statistical nature of AI models. This anthropomorphic framing leads to unrealistic expectations of AI capabilities and introduces unwarranted concerns about autonomy or control.

Another common misconception involves the belief that AI will replace teachers, especially in tasks such as instruction delivery, assessment, or feedback [5], [18]. Although studies consistently show that teachers value human interaction, empathy, and contextual judgment, the fear of replacement persists, particularly among educators with limited digital self-efficacy or exposure to AI [1], [11], [17]. Misconceptions about role replacement can reduce openness to AI adoption and increase technostress.

A third misconception concerns the overestimation of AI accuracy and objectivity. Several studies indicate that educators often assume AI-based systems are neutral or infallible, failing to recognize that AI outputs depend on training data quality and algorithmic design choices [5], [19], [23]. This misconception is especially problematic in contexts where teachers rely on automated grading tools or recommendation algorithms without critical evaluation.

Additionally, educators frequently conflate automation with AI, categorizing non-AI tools as "AI" simply because they automate tasks [11], [17]. This conflation obscures meaningful distinctions between AI and traditional software, which in turn undermines educators' ability to evaluate tools effectively.

Finally, misconceptions surrounding generative AI are emerging, especially post-2023. Teachers may incorrectly assume that tools like ChatGPT access real-time information or student data, or they may misunderstand the risks of hallucinations and biased outputs [8], [9], [23]. This adds a new dimension to the misconception landscape that earlier studies did not address.

Overall, misconceptions represent a crucial barrier to informed adoption. Their persistence across countries and education levels suggests that AI literacy interventions must explicitly address and correct inaccurate beliefs, not merely provide technical skills.

Determinants of Educators' AI Adoption

Educators' willingness to adopt AI is shaped by a combination of individual, institutional, and sociocultural factors. At the individual level, self-efficacy, digital literacy, and attitudes toward technology consistently emerge as key determinants. Teachers with higher confidence in their technological abilities are more likely to engage positively with AI tools and integrate them into practice [7], [12], [15]. Several studies highlight that perceived usefulness and ease of use, core constructs from the Technology Acceptance Model (TAM), significantly predict adoption intention in both K–12 and HE settings [5], [21], [23].

Institutional factors include the availability of infrastructure, such as reliable internet access, devices, and AI-enabled platforms. Studies across multiple regions show that insufficient infrastructure is one of the most common barriers to AI adoption, especially in developing countries [3], [10], [15]. Professional development (PD) is another critical determinant. Teachers consistently emphasize the need for ongoing, practical, and

contextually grounded PD opportunities that focus not just on tool usage but also on pedagogical applications and ethical considerations [4], [7], [16], [17].

Leadership and policy support also play significant roles. Institutions with clear AI integration strategies, ethical guidelines, and supportive leadership environments tend to foster greater educator confidence and willingness to experiment [19], [20]. Conversely, environments characterized by unclear policies or top-down mandates without teacher consultation may exacerbate resistance or anxiety.

Sociocultural factors appear prominently in cross-regional studies. For example, teachers in high-income countries tend to be more concerned with ethics, privacy, and transparency, whereas teachers in low-income settings emphasize infrastructural barriers and the relevance of AI to local curricula [10], [15], [23]. These distinctions illustrate that adoption cannot be fully understood without considering contextual variables.

Overall, the determinants of adoption are multifaceted, indicating that successful AI integration requires not only technological readiness but also supportive institutional ecosystems and culturally responsive professional learning opportunities.

Interrelation Between Awareness, Misconceptions, and Adoption

A cross-study synthesis reveals clear interrelationships among awareness, misconceptions, readiness, and adoption. Low awareness is strongly associated with higher prevalence of misconceptions, particularly regarding AI autonomy, accuracy, and pedagogical role [1], [11], [17]. Conversely, educators with higher awareness which are particularly those who understand AI principles rather than only tools, demonstrate fewer misconceptions and greater confidence in using AI-based systems [5], [8], [20].

Misconceptions act as cognitive filters that shape educators' interpretation of AI and influence their adoption choices. For instance, teachers who believe AI can replace human educators may resist technology adoption, while those who view AI as supportive of differentiated instruction display greater openness [4], [18]. Similarly, educators who conflate automation with AI may misjudge the value or limitations of AI-enabled tools, resulting in inappropriate or suboptimal use.

Awareness and misconceptions collectively influence readiness, defined as the degree to which educators feel prepared to integrate AI tools into their pedagogical practice. Studies repeatedly show that readiness is not simply a function of access or attitude, but is moderated by teachers' conceptual understanding and beliefs [7], [12], [23]. Teachers with robust conceptual understanding and lower misconception levels are more likely to critically evaluate AI tools, align them with pedagogical goals, and engage in adaptive experimentation.

This interrelationship can be summarized as follows:

- Low awareness → high misconceptions → low readiness → reduced adoption
- High awareness → low misconceptions → high readiness → increased adoption

To visually summarize these interrelationships, Table 2 presents a structured overview of how the constructs intersect based on the reviewed literature.

TABLE I: Interrelation between the intersection of construct and the reviewed literature

Construct	Influenced By	Leads To	Supported By Studies
Awareness	Exposure, PD, institutional support	Lower misconceptions	[1], [2], [5], [11], [20]
Misconceptions	Low awareness, media narratives, lack of AI literacy	Lower readiness, resistance	[11], [17], [18], [23]

Readiness	Awareness + accurate understanding + PD	Higher adoption intention	[4], [7], [12], [15], [23]
Adoption	Readiness, institutional context, perceived usefulness	Actual pedagogical integration	[5], [7], [19], [21], [23]

A. Cross-Context Differences (K–12 vs Higher Education)

The distinction between K–12 and higher education reveal meaningful divergences. Early primary teachers face unique challenges due to limited exposure to AI, fewer institutional resources, and a stronger emphasis on child-centered pedagogy. Studies show that K–12 teachers are more likely to hold misconceptions about AI, express anxiety about potential misuse, and feel unprepared for AI-related instruction [1], [11], [15], [16].

In contrast, higher-education lecturers tend to adopt more pragmatic perspectives. They are often already using AI tools for academic writing, analytics, or content generation and exhibit higher levels of self-efficacy [6], [8], [20], [22]. However, HE educators also express concerns about academic integrity and the reliability of generative AI tools [8], [9].

Regional differences add further complexity. Teachers in technologically advanced contexts focus on privacy, ethics, and fairness [11], [18], whereas those in resource-constrained settings emphasize infrastructural barriers and lack of training [10], [15], [23]. These cross-context differences reinforce the need for differentiated AI literacy strategies tailored to local realities.

IMPLICATIONS

The findings presented in this review hold several important implications for policymakers, educational institutions, teacher training systems, classroom practice, and the research community. Because awareness, misconceptions, readiness, and adoption are interdependent constructs, attempts to strengthen AI integration in education must recognize the systemic nature of these relationships. The implications outlined below highlight the multilevel interventions required to promote responsible, equitable, and pedagogically meaningful AI use across different educational contexts.

Implications for Policy

Policy frameworks governing AI in education must prioritize AI literacy, ethical safeguards, and contextualized integration strategies. Policymakers should articulate clear national or regional guidelines outlining expectations for AI implementation, including principles related to transparency, data protection, informed consent, and algorithmic fairness. The findings indicate that misconceptions are widespread and often reinforced by media narratives or inconsistent institutional communication; therefore, policies must include explicit public education components to correct inaccurate beliefs and promote informed discourse among educators [11], [17], [18]

Furthermore, policies should incorporate differentiated pathways for K–12 and higher education, acknowledging the distinct pedagogical aims and infrastructural realities of each sector. In many developing regions, infrastructural inadequacies remain a major barrier to adoption [10], [15], [23]. National strategies should therefore invest in foundational digital infrastructure while also promoting locally relevant AI resources, particularly for rural and underserved schools. Finally, policies should mandate continuous data governance audits and require developers of educational AI to meet transparent reporting standards, ensuring the tools introduced into classrooms are empirically validated, ethically sound, and aligned with curricular goals.

Implications for Educational Institutions

At the institutional level, the findings emphasize the need for comprehensive, strategically integrated AI readiness plans. Institutions play a crucial role in shaping teachers' awareness and correcting misconceptions; hence, internal communication must accurately represent AI's capabilities and limitations. This includes providing educators with accessible documentation, exemplars of pedagogically aligned AI use, and guidelines

for evaluating the appropriateness of AI tools for a particular learning context.

Institutions should also invest in robust physical and digital infrastructure, such as reliable internet access, compatible devices, and secure AI-enabled learning platforms. Infrastructure is not merely a technical requirement but a determinant of equity. Teachers in resource-limited environments cannot develop or exercise readiness if they lack functional access to AI systems [10], [15]. Institutional leadership should further cultivate a culture of innovation by supporting experimentation and reducing perceived risks associated with using AI tools in teaching.

Another essential implication is the need for institution-level ethical and academic integrity frameworks, especially given the rise of generative AI and its implications for assessment and student authorship [8], [9], [22]. Institutions must provide clear guidelines that balance responsible use with pedagogical innovation, ensuring that educators can incorporate AI safely without compromising academic standards.

Implications for Teacher Training and Professional Development

Professional development (PD) emerges across literature as one of the strongest determinants of educators' readiness to integrate AI [4],[7], [12], [16], [17], [23]. The implications are therefore substantial. PD programs must move beyond tool-based training toward concept-driven AI literacy, helping educators develop accurate mental models of how AI systems function, what they can and cannot do, and how to critically evaluate their outputs. Effective PD should explicitly address misconceptions, using examples, counterexamples, and hands-on exploration of common AI systems.

PD initiatives must also be ongoing rather than episodic, embedded into teachers' workflow, and tailored to specific educational levels. Early primary educators, for instance, require PD that contextualizes AI within developmental learning theories and age-appropriate pedagogical approaches [16]. Higher education lecturers may require training focused on ethical issues, academic integrity, and AI-driven assessment design [8], [20], [22].

Crucially, PD must equip teachers to integrate AI pedagogically, not just technically. Educators must learn how AI can support differentiation, assessment, collaboration, and personalized learning and where AI's limitations require human oversight and professional judgment. PD programs should also develop teachers' data literacy, equipping them to interrogate AI outputs and recognize issues related to bias, hallucination, or model limitations.

Implications for Classroom Practice

The findings highlight that AI integration should be anchored in pedagogical value, not technological novelty. Educators must critically evaluate when and how AI can enhance learning, considering student needs, task complexity, and curricular objectives. AI tools should be employed to support, rather than replace, core instructional processes such as formative assessment, scaffolding, and feedback.

To reduce misconceptions and promote responsible use, teachers should model transparent AI usage in the classroom explaining how AI systems generate outputs, where they may fail, and why human judgment remains essential. This not only improves pedagogical clarity but also promotes student AI literacy. Teachers can incorporate AI into collaborative learning activities, critical evaluation tasks, and inquiry-based learning, helping students engage with AI as both a tool and an object of inquiry.

Classroom AI use must also uphold ethics, privacy, and inclusion. Educators should adopt AI tools that adhere to ethical guidelines, avoid tools requiring unnecessary student data, and ensure that AI does not reinforce inequities or marginalize learners with diverse needs. Teachers must also remain vigilant about the risk of overreliance, ensuring that students develop the capacity to think critically and independently rather than deferring to AI outputs uncritically.

Implications for Researchers

The findings reinforce the need for more empirically grounded and theoretically integrated research on

educators' awareness, misconceptions, readiness, and AI adoption. Researchers must expand the evidence base by designing studies that:

- Investigate misconceptions using validated AI literacy frameworks
- Conduct longitudinal analyses of adoption
- Examine the pedagogical impacts of AI integration
- Compare regional and national differences
- Explore the emergence of generative AI in real classrooms post-2023

Methodological diversity is also required. Survey-based research dominates literature, but qualitative studies, design-based research, and mixed-methods investigations are necessary to capture the complexity of classroom-level AI integration. Researchers must also engage interdisciplinary perspectives from computing, cognitive science, ethics, and educational psychology to develop more holistic models of AI adoption.

CONCLUSION

This narrative review synthesizes contemporary research on educators' awareness, misconceptions, readiness, and adoption of AI in educational settings. The findings highlight substantial variability in awareness across educational levels and regions, with higher-education lecturers generally demonstrating greater familiarity than K–12 teachers. Misconceptions remain pervasive, shaping educators' perceptions of AI's role, accuracy, and pedagogical utility. Adoption is influenced by a dynamic interplay of individual attitudes, institutional support, professional development, and sociocultural context.

The analysis underscores that improving educators' readiness for AI-enhanced teaching requires more than access to technology; it demands accurate conceptual understanding, supportive policies, pedagogically aligned professional development, and institutional ecosystems that foster responsible innovation. The growing influence of generative AI further amplifies the need for critical evaluation skills and ethical guidelines across all education levels.

By identifying research gaps and synthesizing findings across diverse contexts, this review contributes a structured understanding of the factors shaping educators' engagement with AI. It further provides actionable insights for policymakers, institutions, teacher educators, and researchers seeking to promote informed, equitable, and effective AI integration in educational practice.

LIMITATIONS

While this review provides a comprehensive synthesis of relevant literature, several limitations must be acknowledged. First, the review is limited to studies published between 2020 and 2025. Therefore, earlier foundational work may offer additional context. Second, the review relies on studies indexed in Scopus and published primarily in English, potentially excluding relevant research in non-English-speaking regions. This may underrepresent practices and perspectives from parts of Africa, Latin America, and Southeast Asia.

Third, the heterogeneity of research designs including surveys, qualitative studies, and systematic reviews limits direct comparability across studies. Many studies rely on self-reported measures of awareness or attitudes, which may not accurately reflect actual understanding or classroom behavior. Additionally, relatively few studies focus specifically on early primary teachers, generative AI adoption, or validated AI literacy frameworks.

Finally, the rapid evolution of AI technologies means that scholarly discourse may lag behind classroom realities. Findings must therefore be interpreted as representing a dynamic and rapidly changing field rather than a stable or mature body of knowledge.

RECOMMENDATIONS FOR FUTURE RESEARCH

Based on the identified gaps, several avenues for future research are recommended. First, there is a need for large-scale empirical studies investigating misconceptions and foundational AI literacy among educators, especially in K–12 contexts. These studies should employ validated frameworks and robust measurement tools.

Second, future studies should examine longitudinal trajectories of AI adoption, tracking how awareness, misconceptions, and readiness evolve over time and following the implementation of professional development programs. Third, there is a pressing need for intervention-based research, including design-based studies evaluating the impact of specific AI literacy or PD interventions on teacher practice.

Next, cross-national comparative research is needed to understand how sociocultural, infrastructural, and policy differences shape educators' AI perceptions and adoption behaviors. Fifth, given the rise of generative AI, empirical studies should investigate its pedagogical implications, ethical challenges, and classroom integration strategies in real-world scenarios.

Finally, researchers should explore opportunities to integrate multi-theoretical frameworks, combining TAM, UTAUT, and AI literacy perspectives to develop comprehensive models that more accurately capture the complexity of AI adoption in educational settings.

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