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Artificial Intelligence Literacy and Pedagogical Adaptation among Islamic Religious Education Teachers: A Systematic Literature Review

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Artificial Intelligence Literacy; Islamic Religious Education; Pedagogical Adaptation; Religious Knowledge Verification; Teacher Competencies.

Abstract

This study aims to examine artificial intelligence (AI) literacy among Islamic Religious Education (IRE) teachers, identify pedagogical adaptations associated with AI use, and develop a context-sensitive conceptual framework for responsible integration. A systematic literature review informed by PRISMA 2020 and thematic synthesis examined research published between 2019 and 2026, drawing on educational databases and relevant theoretical frameworks. Findings identify five interrelated literacy dimensions: foundational, evaluative, pedagogical, ethical, and reflective-professional. Pedagogical adaptation encompasses lesson planning, differentiated materials, dialogic learning, assessment redesign, and strengthened teacher mentoring. The synthesis also identifies four challenges: unreliable AI-generated information, technological dependence, ethical and institutional concerns, and uneven teacher competencies. A central finding is that verifying religious knowledge against the Qur'an, hadith, and authoritative scholarship links evaluative, pedagogical, and ethical literacy. Building on AI literacy scholarship, Technological Pedagogical Content Knowledge, and UNESCO's teacher competency framework, the study proposes a five-dimensional model that places teachers' scholarly judgment and moral responsibility at the center of AI-assisted instruction. This model offers a conceptual basis for professional development that integrates content verification, instructional design, ethical safeguards, and reflective practice. Because the framework is derived from literature synthesis rather than field testing, its indicators, applicability, and relationship with instructional outcomes require empirical validation across diverse IRE contexts.

Kata kunci:
Literasi Kecerdasan Buatan; Pendidikan Agama Islam; Adaptasi Pedagogis; Verifikasi Pengetahuan Keagamaan; Kompetensi Guru..

Abstrak

Penelitian ini bertujuan menganalisis literasi kecerdasan buatan (AI) guru Pendidikan Agama Islam (PAI), mengidentifikasi bentuk adaptasi pedagogis dalam pemanfaatannya, dan merumuskan kerangka konseptual integrasi AI yang bertanggung jawab. Penelitian menggunakan systematic literature review dengan acuan PRISMA 2020 dan sintesis tematik terhadap kajian terbitan 2019–2026 serta kerangka teori yang relevan. Hasil sintesis mengidentifikasi lima dimensi literasi AI yang saling berkaitan, yaitu literasi dasar, evaluatif, pedagogis, etis, dan reflektif-profesional. Adaptasi pedagogis mencakup perencanaan pembelajaran, diferensiasi materi, pembelajaran dialogis, penyesuaian asesmen, dan penguatan peran guru sebagai pembimbing. Empat tantangan utama meliputi ketidakakuratan informasi AI, ketergantungan teknologi, persoalan etika dan kelembagaan, serta kesenjangan kompetensi guru. Temuan penting menunjukkan bahwa verifikasi pengetahuan keagamaan berdasarkan Al-Qur'an, hadis, dan literatur keislaman otoritatif menjadi mekanisme penghubung literasi evaluatif, pedagogis, dan etis. Dengan mengintegrasikan kajian literasi AI, kerangka Technological Pedagogical Content Knowledge, dan kerangka kompetensi AI guru UNESCO, penelitian merumuskan model konseptual lima dimensi yang menempatkan pertimbangan keilmuan dan tanggung jawab moral guru sebagai pusat pengambilan keputusan pembelajaran berbantuan AI. Model ini memberikan dasar bagi pengembangan profesional guru yang memadukan validasi materi keagamaan, desain pembelajaran, perlindungan etis, dan

refleksi berkelanjutan. Karena belum diuji melalui penelitian lapangan, indikator, keterterapan, dan hubungan model dengan hasil pembelajaran masih memerlukan validasi empiris pada beragam konteks PAI.

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Introduction

The development of artificial intelligence (AI) has transformed how information is produced, retrieved, summarized, and used in education (Maryani, 2025). Generative AI systems enable teachers to prepare lesson plans(Sarmita dkk., 2025), Generative AI systems enable teachers to prepare lesson plans(Azis dkk., 2026), adapt instructional materials to learners' needs, and formulate preliminary feedback(Saleh dkk., 2025). Nevertheless, AI use also raises concerns about information accuracy, algorithmic bias, transparency, privacy, and the reliability of generated outputs(Wibowo, 2025). AI systems may present seemingly convincing information without adequate evidentiary support (Raharjo, 2023). Successful educational integration therefore depends not only on technological availability but also on teachers' capacity to understand system limitations, critically evaluate outputs, and make responsible pedagogical decisions.

Within Islamic Religious Education (IRE), AI use presents additional complexities because teaching aims not only to develop religious knowledge but also to cultivate moral character (Lutfiani dkk., 2026),), internalize values, and strengthen learners' moral responsibility (Munawarsyah & Suratin, 2026). IRE encompasses Islamic creed (aqidah), worship, ethics (akhlaq), Qur'anic studies(Nurhayati & Nuâ€™man, 2022), and Islamic history. Teaching these subjects may involve interpretive diversity, scholarly disagreement, and religious sources with differing degrees of authority (Syafei, 2025). Well-structured, confidently phrased AI-generated explanations do not necessarily ensure religious accuracy or alignment with learning objectives (Mahmudah dkk., 2025). IRE teachers consequently bear a dual responsibility: harnessing technological opportunities to improve learning while safeguarding the validity of Islamic knowledge and supporting students' character development (Dahirin & Rusmin, 2024). integration in IRE thus requires an integrated consideration of epistemological, pedagogical, and ethical issues.

AI literacy is an essential competence for addressing these concerns. Long and Magerko (2020) conceptualize AI literacy as a set of competencies that enables individuals to understand, evaluate, communicate about, and interact effectively with AI technologies. In education, AI literacy cannot be reduced to application proficiency(Sudipa dkk., 2025), it must also encompass an understanding of technological characteristics, critical appraisal of outputs, awareness of bias and privacy, and judgments about alignment with instructional objectives (Mighfar dkk., 2026). In their systematic review of AI literacy in primary and secondary education, (Casal-Otero et al. 2023) document diverse conceptualizations and instructional approaches. Although their review offers an important foundation for understanding AI competencies in education, it does not specifically examine how IRE teachers make pedagogical decisions when religious information requires source verification and normative judgment.

The relationship between technological proficiency and instructional decision-making can be examined through the Technological Pedagogical Content Knowledge (TPACK) framework developed by (Mishra & Koehler, 2006). This framework emphasizes the interplay among technological, pedagogical, and content knowledge as the basis for integrating technology into instruction. Its contribution lies in showing that technology use must be considered alongside subject-matter characteristics and teaching strategies(Hennessy dkk., 2005). As a general framework, however, TPACK does not specify procedures for verifying generative AI outputs against religious sources, assessing the authority of Islamic knowledge, or establishing appropriate boundaries for AI use in moral education. This does not imply that TPACK neglects educational context; rather, its application to IRE calls for more context-sensitive indicators and decision-making procedures.

Alongside TPACK, UNESCO's AI Competency Framework for Teachers identifies five dimensions: a human-centred mindset, ethics of AI, AI foundations and applications, AI pedagogy, and AI for professional learning (Cukurova & Miao, 2024). This framework offers a comprehensive normative and competency-based foundation for responsible AI use. Because it addresses education broadly, however, it does not prescribe procedures for assessing the validity of religious information, distinguishing descriptive statements from normative judgments, or determining teachers' involvement when AI explains questions of Islamic creed, worship, or ethics. The present study therefore seeks not to replace UNESCO's framework but to contextualize its application to pedagogical adaptation in IRE.

Previous research on AI in education has made important contributions, although its primary emphases differ. In a systematic review of AI applications in higher education, Zawacki-Richter et al. (2019) found a predominance of technology-oriented research and comparatively limited attention to educators' perspectives (Zawacki-Richter dkk., 2019). This review helps explain earlier trends in educational AI research but does not address pedagogical issues arising from generative AI use in IRE. Kasneci et al. (2023) subsequently identified opportunities for large language

models to support instruction, material preparation, and feedback, while highlighting risks of hallucination, bias, and academic integrity violations(Kasneci, Seßler, dkk., 2023). Despite its broad account of benefits and risks, that study did not formulate procedures connecting AI-output evaluation with the validity of religious sources, IRE learning objectives, and educators' moral responsibilities.

Emerging scholarship on AI in Islamic education has also addressed teachers' readiness, ethical technology use, and the importance of preserving Islamic values in teaching. Nevertheless, the literature examined here points to a need for a more structured explanation of the relationship between teachers' AI literacy and pedagogical decision-making in IRE. The central issue is not simply whether teachers can operate AI tools, but how they determine the suitability of AI outputs, verify the authority of religious sources, align technology use with learning objectives, and sustain educational interactions that foster moral development. The research gap addressed here is therefore the need for a conceptual framework linking AI literacy competencies to mechanisms of pedagogical adaptation that reflect the epistemological and normative characteristics of IRE.

Three features distinguish this study from previous scholarship. First, it conceptualizes AI literacy as a basis for pedagogical decision-making rather than merely a set of technological skills. Second, it incorporates scholarly verification and the authority of religious sources as specific considerations in AI-assisted IRE instruction. Third, it connects decisions about AI use with instructional objectives, character formation, and teachers' professional responsibilities. Together, these features inform a pedagogical adaptation framework that complements TPACK and UNESCO's AI competency framework by emphasizing the relationship among critical evaluation of AI, verification of religious knowledge, and context-sensitive instructional decisions.

Against this background, this study aims to (1) analyze how teachers' AI literacy is conceptualized in educational scholarship and its relevance to IRE; (2) identify forms of pedagogical adaptation that support critical, ethical, and contextually appropriate AI use in IRE; and (3) formulate a conceptual framework connecting AI literacy, scholarly verification, learning objectives, and Islamic values. Its theoretical contribution lies in developing an AI-literacy-based framework for pedagogical adaptation that positions teachers as the principal decision-makers in technology use. The proposed framework remains conceptual and requires empirical investigation to assess its relevance and applicability across different IRE settings.

Methods

This study employs a systematic literature review (SLR) approach using thematic synthesis to examine artificial intelligence (AI) literacy among Islamic Religious Education (IRE) teachers and its implications for pedagogical adaptation. The SLR approach is intended to systematically identify, evaluate, and synthesize previous research to develop a comprehensive understanding of AI literacy competencies, their applications in teaching and learning, and the pedagogical and

ethical challenges faced by IRE teachers. The review is guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 reporting guidelines (Page dkk., 2021) to support transparent reporting of literature identification, selection, and review procedures. It addresses three principal questions: How has research on teachers' AI literacy developed? What forms of pedagogical adaptation emerge in the use of AI? And how can AI literacy be integrated with the epistemological characteristics and values of Islamic education?

The literature search was designed to cover ERIC (Education Resources Information Center), the Directory of Open Access Journals (DOAJ), and Garuda (Garba Rujukan Digital), with Google Scholar serving as an additional search resource. Publications were restricted to the period 2019–2026. Search terms in English and Indonesian included "AI literacy," "artificial intelligence literacy," "generative AI," "teacher competence," "pedagogical adaptation," "Islamic Religious Education," "literasi AI," "guru PAI," and "pendidikan agama Islam." Keywords were combined using the Boolean operators AND and OR, subject to the search functions available in each database. The inclusion criteria covered empirical research articles relevant to AI literacy, teacher competencies, AI use in teaching practice, and pedagogical adaptation, published in English or Indonesian and available in full text for examination. Duplicate records, non-scholarly publications, studies unrelated to teachers' competencies or pedagogical practices, and articles that failed to meet eligibility criteria were excluded from the main synthesis. Conceptual and policy documents, including the UNESCO AI competency framework and the TPACK framework, were used as theoretical foundations and points of comparison when interpreting the findings.

The literature selection process comprised identification, duplicate removal, title and abstract screening, and full-text eligibility assessment against the predefined inclusion and exclusion criteria. Each selection decision was documented in a matrix recording publication details, topical relevance, full-text availability, and reasons for exclusion. The numbers of records identified, duplicates removed, articles screened, articles excluded, and studies ultimately included were to be reported in a PRISMA 2020 flow diagram based on the actual search results. The methodological quality of empirical studies was assessed using the 2018 version of the Mixed Methods Appraisal Tool (Hong dkk., 2018). Appraisal criteria were applied according to study design, including qualitative, quantitative, and mixed-methods research, with responses categorized as "Yes," "No," or "Can't tell." The appraisal findings were used to consider the strengths and limitations of the evidence during synthesis rather than being aggregated into an overall quality score.

Data were analyzed using the thematic synthesis approach developed by Thomas and Harden, which involves three stages: coding study findings, developing descriptive themes, and generating analytical themes (Thomas & Harden, 2008). Data from each article were extracted into a matrix containing the author(s), year of publication, research objectives, study design, educational context, participant

characteristics, principal findings, and study limitations. The synthesis focused on five analytical themes: dimensions of teachers' AI literacy; the use of AI in instructional planning and implementation; critical evaluation and verification of religious knowledge; ethical and institutional challenges; and the development of teachers' professional competencies. Relationships among these themes were then examined in light of the UNESCO AI competency framework and the Technological Pedagogical Content Knowledge (TPACK) approach to formulate a conceptual framework for AI literacy-based pedagogical adaptation in IRE. This framework positions teachers as professional decision-makers responsible for the accuracy of religious content, the appropriateness of instructional strategies, and the internalization of Islamic values.

Results And Discussion

Results

Mapping Research on AI Literacy among Islamic Religious Education Teachers

The literature review indicates that educational AI research has shifted from technological functions toward teacher competence, instructional adaptation, and ethical responsibility. In Islamic Religious Education (IRE), this development has distinctive features because technology use concerns not only instructional effectiveness but also the validity of religious knowledge, scholarly authority, and students' character formation. The literature can be grouped into three strands: research on AI in education generally; research on AI literacy and teacher competence; and empirical studies of AI use in IRE. These strands complement one another while differing in context, methodology, and research focus.

Zawacki-Richter et al., mapped AI applications in higher education and noted limited attention to educators' perspectives (Zawacki-Richter dkk., 2019). Kasneci et al., and Tlili et al., extended discussion of generative AI's educational potential alongside risks of inaccurate information, bias, and ethical concerns (Kasneci, Seßler, dkk., 2023; Tlili dkk., 2023). UNESCO's teacher AI competency framework highlights technological understanding, ethics, pedagogy, and professional development (Cukurova & Miao, 2024). Although these studies provide a conceptual foundation for AI literacy, they do not fully explain teachers' decisions when AI-generated content involves religious sources and character-development objectives in IRE.

Empirical IRE studies provide a more specific perspective. Manggala et al., examined AI competence among primary-school IRE teachers (Manggala dkk., 2025); Syifakurnia et al., investigated generative AI in developing instructional materials (Syifakurnia dkk., 2026); Mutaqin et al., examined changes and negotiations in teachers' authority during AI-assisted instruction (Muttaqin, 2017); and Khotimah et al., studied IRE teachers' perceptions of AI as a teaching medium (Khotimah dkk., 2026). Their differing emphases suggest that IRE teachers' AI literacy is multidimensional, encompassing technical capability, knowledge evaluation, pedagogical judgment, ethical responsibility, and professional development.

Table 1. Synthesis of Empirical Studies on AI Literacy and Pedagogical Adaptation among IRE Teachers

Researcher	Context and method	Key findings	Synthesized dimensions
Manggala et al. (2025)	56 primary-school IRE teachers in Malang; descriptive quantitative study	Relatively high awareness of AI applications, but ethical competence and reflection require strengthening	Foundational, ethical, reflective-professional
Syifakurnia et al. (2026)	IRE teachers at MTs Hidayatul Islamiyah, Bojonegoro; qualitative case study	AI supports module and assessment preparation, but teachers face skill gaps and challenges validating religious content	Foundational, evaluative, pedagogical
Mutaqin et al. (2026)	20 IRE teachers in Indonesia; grounded theory	AI use involves negotiation of teachers' epistemic, pedagogical, and moral-relational authority	Evaluative, pedagogical, ethical, reflective-professional
Khotimah et al. (2026)	30 IRE teachers in Medan; descriptive survey	Teachers generally view AI positively as a learning aid but emphasize the need for guidance	Pedagogical, reflective-professional

Development of Five Dimensions of AI Literacy among IRE Teachers

The synthesis of empirical studies indicates that IRE teachers' AI competence cannot be reduced to operating digital applications. Manggala et al., identified differences between technological proficiency and ethical and reflective understanding (Manggala dkk., 2025). Syifakurnia et al., showed that using AI to develop instructional resources requires evaluation of religious content (Syifakurnia dkk., 2026). Mutaqin et al., highlighted teachers' epistemic and moral-relational authority (Muttaqin, 2017), while Khotimah et al. (2026) described teachers' acceptance of AI in instruction. Comparing these findings provides the basis for organizing IRE teachers' AI literacy into five interconnected dimensions.

The first dimension is foundational AI literacy: teachers' understanding of AI functions, potential, limitations, and output characteristics. This understanding is necessary to select appropriate AI applications for instructional needs. It does not require programming expertise but does require recognizing that AI-generated

information may be inaccurate and should be checked. Findings from (Manggala et al. 2025) and (Syifakurnia et al. (2026) underscore its relevance to IRE teachers' professional practice.

The second dimension is evaluative literacy, encompassing the ability to assess the accuracy, relevance, completeness, and validity of AI-generated information. It is particularly important in IRE because religious content draws on the Qur'an, hadith, Islamic jurisprudence (fiqh), creed (aqidah), and moral teachings (akhlaq). (Syifakurnia et al. 2026) demonstrated the need to validate AI-developed materials, while (Mutaqin et al. 2026) emphasized teachers' epistemic authority. Together, these findings support positioning religious knowledge verification as a defining feature of evaluative literacy in IRE. Verification may involve consulting primary sources, comparing authoritative Islamic scholarship, and considering the context in which religious evidence is invoked.

The third dimension is pedagogical literacy: teachers' ability to integrate AI appropriately into instructional planning, delivery, and evaluation. (Syifakurnia et al. 2026) documented AI-supported development of teaching resources and assessments, whereas (Mutaqin et al. 2026) connected AI use with changing teacher roles and pedagogical decisions. Integration should therefore be assessed not merely by efficiency in materials preparation but also by alignment with learning objectives, students' characteristics, and the technology's capacity to support reasoning and religious understanding.

The fourth dimension is ethical literacy, covering teachers' responsibility for academic honesty, privacy, fairness, transparency, and alignment between AI use and Islamic educational values. Findings on Islamic ethical competence (Manggala et al., 2025) and teachers' moral-relational authority (Mutaqin et al., 2026) support this dimension. In IRE, AI should be used in accordance with trustworthiness (amanah), honesty, accountability, and respect for scholarly sources. Ethical literacy therefore extends beyond compliance with technological rules to considering the educational consequences of AI use.

The fifth dimension is reflective-professional literacy: teachers' ability to evaluate AI use, recognize limitations in their instructional practice, and make continuous improvements. It draws on the competence-development needs identified by Manggala et al. (2025), teachers' perceptions and mentoring needs examined by Khotimah et al. (2026), and professional role changes described by Mutaqin et al. (2026). Professional reflection ensures that AI use progresses beyond mastering applications toward teaching practices evaluated through content quality, student engagement, and achievement of educational objectives.

Forms of Pedagogical Adaptation among IRE Teachers Using AI

The synthesis identifies five forms of pedagogical adaptation among IRE teachers: instructional planning, differentiation of learning materials, dialogic learning, assessment adjustment, and strengthening teachers' roles as mentors and role models. These analytical categories were developed from findings on AI-

supported instructional resources, assessment, and changes in pedagogical authority, interpreted through a technology-integration framework.

Planning-related adaptation involves using AI to support lesson design, materials development, and alternative learning activities. Syifakurnia et al. (2026) provided empirical examples of AI-assisted module and assessment development. However, generated content requires editing and verification to align with learning outcomes and the characteristics of religious knowledge. Differentiation of materials may involve varying explanations, examples, and exercises according to students' abilities. In both cases, AI supports rather than replaces teachers' professional pedagogical judgment.

Dialogic learning can be adapted by treating AI outputs as material for analysis and discussion. IRE students may compare AI-generated explanations with relevant religious sources, identify differences in arguments, and explain why particular information should be accepted or rejected. This approach is a pedagogical implication of the need to verify religious knowledge identified in the synthesis; it does not imply that every reviewed study has empirically tested its effectiveness.

Assessment adaptation involves evaluating learning processes, reasoning, and students' responsible use of sources. Because AI can generate written responses, teachers should consider assessment forms that go beyond the final product. These may include staged assignments, reflection, discussion, and oral explanation. At the same time, the synthesis concerning moral-relational authority indicates that teachers remain responsible for guiding students, providing examples of ethical conduct, and ensuring that technology does not replace human educational relationships.

Challenges in Implementing AI Literacy in IRE

The literature synthesis identifies four principal challenges: inaccurate information, technological dependence, ethical and institutional concerns, and gaps in teacher competence. The first arises when AI generates incorrect or incomplete information or provides claims without verifiable sources. In IRE, errors in quoting or explaining religious evidence can affect students' understanding of Islamic teachings. Findings on content validation and teachers' epistemic authority therefore highlight the importance of checking information before using it responsibly.

The second challenge is potential cognitive dependence on technology. AI's ability to generate explanations, summaries, and answers may reduce opportunities for students to read, reason, and develop arguments when its use lacks pedagogical direction. Teachers must therefore ensure that AI supports thinking rather than substitutes for students' intellectual activity. This also entails establishing appropriate boundaries for technology use and safeguarding academic integrity.

The third challenge concerns personal data protection, equitable access, transparency in AI use, and the need for institutional policies. The fourth is the gap between technical skills and teachers' pedagogical readiness. Findings on AI skills, content validation, and professional support indicate that teacher development should integrate multiple competencies. Training should not merely introduce applications;

it should also address information evaluation, instructional design, technology ethics, and reflection on teaching practice.

Thematic Synthesis and a Conceptual Framework for IRE Teachers' AI Literacy

Comparisons across individual studies show that the five AI literacy dimensions complement one another. Foundational literacy helps teachers recognize technological capabilities and limitations. Evaluative literacy enables judgments about information accuracy, while pedagogical literacy guides AI use toward instructional objectives. Ethical literacy informs responsible use, and reflective-professional literacy supports ongoing evaluation and improvement. Together, these relationships suggest that AI literacy is a professional competence inseparable from teaching context and teachers' scholarly responsibilities.

A distinctive feature of the synthesis in IRE is its positioning of religious knowledge verification as a mechanism linking evaluative, pedagogical, and ethical literacy. When AI produces religious materials, teachers must examine their validity before deciding whether they are suitable for instruction. This entails considering knowledge sources, alignment with learning objectives, and possible effects on students' understanding and character development. AI use can thus be understood as a series of professional decisions involving scrutiny, adaptation, acceptance, or rejection of technological outputs.

The proposed conceptual framework differs in emphasis from UNESCO's framework and TPACK. UNESCO specifies general AI competencies for teachers, whereas TPACK explains the integration of technological, pedagogical, and content knowledge. Mutaqin et al. (2026) specifically examined negotiations over IRE teachers' epistemic, pedagogical, and moral-relational authority. By contrast, this synthesis organizes five AI literacy competencies and explains how they support pedagogical decisions attentive to the validity of religious knowledge. Its contribution is therefore a context-sensitive conceptual framework for IRE, not a claim that the five dimensions have been validated as a measurement instrument.

Overall, the synthesis suggests that AI-supported pedagogical adaptation in IRE requires integration of technological proficiency, information evaluation, pedagogical judgment, ethical responsibility, and professional reflection. These five dimensions provide an analytical framework for developing IRE teachers' competencies and guiding further research on responsible AI integration in Islamic education.

Discussion

Artificial Intelligence Literacy as a Professional Competency of Islamic Religious Education Teachers

The findings indicate that artificial intelligence (AI) literacy among Islamic Religious Education (IRE) teachers is a multidimensional competency comprising five dimensions: foundational AI literacy, evaluative literacy, pedagogical literacy, ethical literacy, and reflective-professional literacy. These dimensions demonstrate that AI competence extends beyond the operational ability to use applications; it also involves evaluating information, making pedagogical decisions, considering ethical

implications, and reflecting on teaching practices. This finding is consistent with Long and Magerko , who identify understanding, using, and critically evaluating AI as important elements of AI literacy (Long & Magerko, 2020).

These findings also align with UNESCO's AI Competency Framework for Teachers (Cukurova & Miao, 2024). The framework identifies five competency areas: a human-centred mindset, ethics of AI, AI foundations and applications, AI pedagogy, and AI for professional learning. However, the present study places particular emphasis on evaluative and reflective-professional literacy in IRE teaching. This distinction suggests that general AI competency frameworks need to be contextualised according to the characteristics of subject matter and educational objectives.

Manggala et al. identify variations between teachers' proficiency in AI applications and their ethical and reflective competencies (Manggala dkk., 2025). Meanwhile, Syifakurnia et al. show that using AI to prepare instructional resources still requires the ability to validate religious content (Syifakurnia dkk., 2026). Both findings reinforce the perspective of Ng et al., who conceptualise AI literacy in terms of knowledge, use, evaluation, and ethical considerations (Ng dkk., 2021). Technological proficiency is therefore a prerequisite, but it is not sufficient evidence of teachers' professional readiness to use AI.

Considering the relationship between the findings and these theoretical perspectives, IRE teachers' AI literacy should be understood as a professional competency integrating technological capabilities with scholarly and educational responsibilities. The contribution of this study lies in organising five dimensions of AI literacy around the needs of IRE teaching, particularly the need to safeguard the validity of religious knowledge and support students' character development. Accordingly, teacher competency development should continuously address technological proficiency alongside evaluative, pedagogical, ethical, and reflective capabilities.

Evaluative Literacy and the Verification of Religious Knowledge in IRE Teaching

The findings highlight the central role of evaluative literacy in the use of AI for IRE teaching because it enables teachers to assess the accuracy, relevance, and validity of information. In IRE, evaluating information concerns not only general factual accuracy but also its consistency with the Qur'an, hadith, and authoritative Islamic scholarship. This finding accords with Long and Magerko , who include critical evaluation among AI literacy competencies(Long & Magerko, 2020). Kasneci et al. likewise emphasise the need to scrutinise generative AI outputs because they may contain inaccurate or biased information(Kasneci, Seßler, dkk., 2023).

Syifakurnia et al., demonstrate that using AI to develop IRE instructional resources requires validation of religious content (Syifakurnia dkk., 2026). Meanwhile, Muttaqin et al., emphasise teachers' epistemic authority in determining whether knowledge is suitable for classroom use (Muttaqin, 2017). Together, these findings indicate that AI does not remove teachers' scholarly responsibilities; rather, it increases the need to examine sources and arguments. In this context, evaluative literacy serves

as a mechanism for assuring the quality of information before it enters the educational process.

From an Islamic educational perspective, the practice of verifying information can be linked to the principle of tabayyun, as expressed in Qur'an 49:6 (Surah al-Hujurat). This principle provides a normative basis for exercising caution when receiving information. Nevertheless, applying it to AI-generated content also requires practical skills in checking sources, comparing explanations, and identifying potential errors. This perspective reinforces Miao and Cukurova's (2024) emphasis on ethical considerations and human responsibility in AI-related decision-making.

Thus, this study positions the verification of religious knowledge as a mechanism connecting evaluative, pedagogical, and ethical literacy. Teachers must ensure that AI outputs are not only relevant to learning objectives but also supported by defensible scholarly foundations. This emphasis constitutes a context-specific contribution to the development of AI literacy in Islamic education. Evaluative literacy therefore serves not only to detect technological errors but also to protect the authority of religious knowledge and the integrity of IRE teaching.

AI-Based Pedagogical Adaptation from the Perspective of Technological Pedagogical Content Knowledge

The findings indicate that AI use encourages IRE teachers to adapt their pedagogical practices in lesson planning, instructional material development, classroom activities, and assessment. Such adaptation demonstrates that AI integration is not simply a matter of using applications; it involves aligning technology with learning objectives and instructional characteristics. This process can be understood through the Technological Pedagogical Content Knowledge (TPACK) framework developed by Mishra and Koehler, which emphasises the integration of technological, pedagogical, and content knowledge in facilitating meaningful learning (Mishra & Koehler, 2006).

Syifakurnia et al. show that AI can assist IRE teachers in preparing learning modules and developing assessments (Syifakurnia dkk., 2026). This finding is consistent with Kasneci et al., who identify the potential of generative AI to support instructional material development, personalised learning, and feedback (Kasneci, Seßler, dkk., 2023). Nevertheless, technological efficiency does not automatically ensure instructional quality. From a TPACK perspective, teachers must still ensure that AI-generated materials align with learning objectives, students' characteristics, and the validity of religious knowledge.

Pedagogical adaptation can also involve dialogic learning and assessment practices that foreground reasoning processes. AI-generated responses may serve as discussion material through which students compare information, examine arguments, and develop critical thinking skills. In IRE, these strategies can encourage understanding that goes beyond memorisation to include analytical and reflective engagement. Nevertheless, as Tlili et al., caution, educational AI use must account for

technological limitations and the risk of students becoming dependent on automatically generated answers (Tlili dkk., 2023).

On this basis, TPACK remains relevant for explaining AI-based pedagogical adaptation, although its application to IRE requires particular attention to the validity of religious knowledge. The present study positions evaluative literacy as a mechanism accompanying the integration of technology, pedagogy, and content. Consequently, pedagogical adaptation depends not only on teachers' ability to use AI but also on their professional judgement in selecting, modifying, or rejecting technological outputs according to instructional needs and scholarly responsibilities.

Ethical Literacy, Teacher Authority, and Students' Character Development

The findings indicate that ethical literacy is an important dimension of AI use because it concerns academic honesty, responsibility, privacy, and students' character development. In IRE, technology use must be consistent with the objectives of Islamic education, which emphasise the integration of knowledge, attitudes, and conduct. This finding aligns with UNESCO's framework (Miao dkk., 2013), which identifies the ethics of AI and a human-centred mindset as essential teacher competencies. Both dimensions underscore the importance of preserving human agency and responsibility in the use of technology.

Kasneci et al., explain that generative AI in education entails risks associated with inaccurate information, bias, and academic integrity(Kasneci, Sessler, dkk., 2023). Tlili et al. (2023) likewise stress the importance of responsible chatbot use in educational settings. These concerns are relevant to Muttaqin et al. (2026), who describe the negotiation of teachers' epistemic, pedagogical, and moral-relational authority in AI-assisted instruction. Technology does not eliminate the teacher's role; instead, it heightens the need for professional responsibility in guiding students.

From the perspective of Islamic education, ethical literacy can be associated with the values of amanah (trustworthiness), sidq (truthfulness), and adab (proper conduct) in acquiring and using knowledge. These values provide a normative foundation for ensuring that AI is not used to facilitate plagiarism, disseminate unverified information, or displace students' responsibility for learning. This perspective is consistent with the human-centred orientation advanced by UNESCO (Miao & Cukurova, 2024). AI use should therefore preserve the teacher's role as a mentor, guide, and role model in character formation.

Accordingly, IRE teachers' ethical literacy should be understood as an integration of Islamic educational values and principles of technological ethics. Strengthening ethical competence requires more than individual awareness; it also calls for institutional policies on data protection, academic integrity, and appropriate limits on AI use. This study emphasises that AI integration in IRE must preserve teachers' epistemic, pedagogical, and moral responsibilities. Technology should support the educational process rather than replace the relationships and role modelling through which teachers educate students.

Reflective-Professional Literacy and the Continuous Development of IRE Teachers' Competencies

The findings show that reflective-professional literacy supports the continuous development of IRE teachers' AI competencies. This dimension encompasses the ability to evaluate technology use, identify limitations, and improve instructional strategies through experience. It is consistent with the AI Competency Framework for Teachers developed by Miao and Cukurova (2024), particularly its AI for professional learning dimension. The framework recognises professional learning as a crucial component of teachers' competencies amid AI-driven educational transformation.

Theoretically, this finding can also be interpreted through Schön's concept of the reflective practitioner. Schön argues that professional practice develops through reflection both during and after action. In AI-assisted instruction, reflection may involve examining the accuracy of content, the appropriateness of teaching strategies, and students' responses. This perspective indicates that reflective-professional literacy entails more than learning to use new technologies; it also involves refining professional judgement through practical experience.

Manggala et al., in examining variations in teachers' competencies, and Khotimah et al., in investigating teachers' perceptions and support needs, demonstrate the importance of targeted professional development. These findings can be linked to Mishra and Koehler, who stress that technology integration requires the interplay of technological, pedagogical, and content knowledge. AI training for IRE teachers should therefore address not only application skills but also the evaluation of religious information, instructional design, assessment development, and reflection on implementation outcomes.

Based on this analysis, the development of IRE teachers' AI literacy should take place through continuous professional learning. Practice-based training, professional learning communities, and peer mentoring offer possible approaches to collaborative competency development. However, their effectiveness still requires empirical examination in IRE contexts. This study therefore identifies reflective-professional literacy as an important mechanism connecting AI use with sustained improvements in instructional quality.

Theoretical Contributions and Implications for Developing an AI Literacy Framework for IRE Teachers

The study proposes a conceptual framework of AI literacy for IRE teachers consisting of five dimensions: foundational AI literacy, evaluative literacy, pedagogical literacy, ethical literacy, and reflective-professional literacy. The framework draws on the concept of AI literacy (Long & Magerko, 2020)TPACK (Mishra & Koehler, 2006)and the AI Competency Framework for Teachers (Miao & Cukurova, 2024). These perspectives provide complementary foundations concerning technological competence, pedagogical integration, and teachers' professional responsibilities. The resulting five dimensions therefore represent a contextual organisation of competencies suited to the characteristics of IRE teaching.

The study's theoretical contribution lies in positioning the verification of religious knowledge as a mechanism linking evaluative, pedagogical, and ethical literacy. This emphasis extends the contextual application of AI literacy to Islamic education without claiming that all five dimensions are entirely new concepts. Whereas Muttaqin et al. focus on the negotiation of teacher authority, the present study examines the competencies needed to support professional decision-making in AI use(Muttaqin, 2017). It thus offers a complementary perspective on the transformation of IRE teachers' roles in the age of artificial intelligence.

In practical terms, the five-dimensional framework may provide an initial basis for developing AI competency programmes for IRE teachers. Such programmes should integrate the ability to understand AI, verify information, design learning experiences, consider ethical implications, and engage in professional reflection. These implications align with (Miao and Cukurova 2024), who advocate comprehensive AI competency development for teachers, and (Mishra and Koehler 2006), who situate technology integration within the relationship between pedagogical and content knowledge. AI competency development should therefore prioritise the quality of instructional decisions rather than proficiency in applications alone.

Nevertheless, this study has limitations because its synthesis draws on research conducted across diverse contexts, methods, and areas of emphasis. The proposed five-dimensional framework remains conceptual and has not yet been tested as a competency model through field research. Future studies should therefore develop measurable indicators, examine construct validity, and investigate the relationship between AI literacy and the quality of IRE teachers' pedagogical adaptation. Overall, this study provides a conceptual foundation for developing AI literacy that integrates technological competence, scholarly responsibility, and Islamic educational values.

Conclusion

The findings indicate that AI literacy among Islamic Religious Education (IRE) teachers is a multidimensional competence encompassing foundational AI literacy, evaluative literacy, pedagogical literacy, ethical literacy, and reflective-professional literacy. These dimensions collectively support teachers' critical, responsible integration of AI in accordance with IRE objectives. AI-based pedagogical adaptation includes instructional planning, development of teaching materials, dialogic learning, assessment design, and reinforcement of teachers' roles as mentors and moral exemplars. However, AI use also faces challenges involving inaccurate religious information, technological dependence, ethical concerns, and competence gaps. The findings emphasize that AI integration in IRE requires technological proficiency, pedagogical competence, and scholarly responsibility to operate together.

The study's principal contribution is a five-dimensional conceptual framework for IRE teachers' AI literacy, developed through synthesis of AI literacy theory, Technological Pedagogical Content Knowledge (TPACK), and UNESCO's AI Competency Framework for Teachers. Its novelty lies in positioning verification of religious knowledge as a mechanism connecting evaluative, pedagogical, and ethical

literacy, thereby providing a context-sensitive account of AI competence in IRE. Theoretically, the framework enriches AI literacy scholarship by integrating technological competencies, epistemic responsibility, and Islamic educational values. Practically, it can inform professional development that addresses not only AI application skills but also religious content validation, instructional design, technology ethics, and sustained professional reflection.

This study is limited by its reliance on the scope, characteristics, and methodological quality of prior research included in the systematic literature review. Differences in educational contexts, methods, and research emphases limit generalizability and preclude conclusions about direct effects of AI literacy on instructional quality or student learning outcomes. Moreover, the five-dimensional framework remains conceptual and requires empirical testing. Future research should develop and validate indicators of AI literacy among IRE teachers, examine its relationship with pedagogical adaptation, and evaluate implementation in diverse Islamic educational settings. These steps are needed to assess the framework's relevance and practical utility.

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Ethical Statement

Ethical approval was not required because this study employed a systematic literature review of previously published scholarly works and publicly available academic sources. The research did not involve direct human participation, collection of personal data, or experimental procedures. Academic integrity was maintained through appropriate source attribution, critical evaluation of the literature, and responsible interpretation of research findings.

Artificial Intelligence (AI) Use Statement

Artificial intelligence (AI) tools were used solely to assist with language editing, grammatical correction, and improving the clarity and readability of the manuscript. AI was not used to fabricate research data, generate references, determine study eligibility, conduct thematic synthesis, or formulate the conceptual framework and research conclusions. All literature selection, source verification, analytical interpretations, and scholarly arguments were reviewed and verified by the author, who assumes full responsibility for the accuracy, originality, and integrity of the manuscript.

Author Contributions

Mella Puspitasari Putri Alghifari was responsible for the conceptualization, research design, literature identification and selection, methodological development, data extraction, critical appraisal, thematic synthesis, conceptual framework development, manuscript preparation, and final revision. The author reviewed and approved the final version of the manuscript and assumes full responsibility for its scholarly content.

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