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Transforming the Islamic Religious Education Curriculum in the Age of Artificial Intelligence: A Grounded Theory Study of AI Literacy, Epistemic Authority, and Islamic Ethics in Pre-Service Islamic Education Teacher Education

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ABSTRACT

Artificial intelligence reconfigures how knowledge is produced, validated, and assessed in higher education, yet little is known about how programmes preparing Islamic religious education teachers negotiate this shift at the level of curriculum. This constructivist grounded theory study, following Charmaz, explores the social process, epistemic considerations, value negotiations, and institutional dynamics of IRE curriculum transformation, treating AI literacy, epistemic authority, and Islamic ethics as sensitizing concepts rather than predetermined categories. Field data comprise in-depth interviews with nine informants at STITMA Yogyakarta curriculum managers, lecturers in curriculum development, Qur'an and Hadith, learning technology, and microteaching, third and seventh semester students, a field practicum supervisor, and an academic quality manager yielding 72 responses analysed through initial coding, focused coding, constant comparison, memo-writing, and category integration. Six categories emerged: transformation pressure and conditional adoption; critical-verificative AI literacy; negotiation of epistemic authority and teacher agency; digitally operationalised Islamic ethics; reconstruction of learning experience and assessment; and governance of implementation and access equity. The core process is the negotiation of knowledge validity: curricular change advances through the redistribution of epistemic labour across lecturers, students, and algorithmic outputs, with assessment functioning as the instrument that determines which knowledge and which responsibilities count as legitimate. The study contributes a substantive process account linking verification practices to curricular decision-making, and derives implications for graduate learning outcomes, assessment architecture, and AI-related academic policy.

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Introduction

Artificial intelligence does not merely add a new tool to the classroom; it alters how knowledge is produced, circulated, validated, and used. Legitimacy that once rested on institutional validation, peer review, and expert consensus now competes with algorithmic systems that deliver fast and seemingly persuasive output (Rumani, 2026), producing a hybrid epistemic ecosystem in which authority is distributed across human actors, algorithmic systems, and data infrastructures . At the level of assessment, generative AI expands the possibilities of personalised learning (Xia et al., 2024) while raising the risk of cheating and the erosion of academic integrity ; barriers to cheating fall significantly and the capacity to detect it becomes markedly harder (Lodge et al., 2023). Because the output of large language models can contain hallucinations fluent but untrue statements (Lye & Lim, 2024) the ability to evaluate critically shifts from an optional competence to a baseline condition. This transformation is therefore not a technical modernisation but a shift in the conditions under which knowledge claims are justified, and that is precisely where teacher education is located.

The impact on teacher competence is layered. Digital competence frameworks such as DigCompEdu and TPACK cover professional engagement, instructional design, cross-disciplinary content selection, and learner competence (Ng et al., 2023), yet the literature notes a scarcity of frameworks specifying which AI-related digital competencies teachers actually need in order to teach, learn, and assess . Conceptions of AI literacy for non-technical audiences are frequently developed from an engineering perspective and therefore fit educational contexts poorly (Chiu et al., 2024), and a scoping review of AI literacy in teacher education shows that prevailing frameworks rest on grey literature and computer science courses, with robotics integrated into 17 competencies spanning the definition of AI to AI ethics (Sperling et al., 2024). In practice, generative AI helps teachers and pre-service teachers draft lesson plans and opens access to teaching resources for all teachers (Berg & Plessis, 2023), but a study of pre-service mathematics teachers shows that the capacity to critique AI recommendations does not automatically develop into coherent lesson planning, because most participants remained at the level of critical thinking (Cohen et al., 2026). Global competence frameworks UNESCO among them tend to be policy- and competence-oriented and say relatively little about how those expectations are enacted in situated pedagogical design (Onbaşılı, 2026). This enactment gap is what makes a study of curriculum actors' meanings and actions necessary.

Pre-service IRE teacher education carries pedagogical, professional, epistemic, moral, and religious dimensions simultaneously: prospective teachers do not only learn to manage instruction but must also account for the validity of the religious content they will teach. Studies of Islamic education in the AI era show that integration drives change at three levels at once epistemic, pedagogical, and institutional while generating ethical challenges including data privacy, algorithmic bias, plagiarism, and the potential erosion of scholarly authority (Farhan et al., 2026). Other work warns of technology dependence that may weaken critical thinking and erode the values of *tarbiyah*, *ta'līm*, and *ta'dīb*, arguing that AI must be positioned as a means (*wasīlah*) rather than an end (*ghāyah*) (Shaieba & Al-Ahqaf, 2025). Such warnings are not a rejection of technology but an insistence that the primary curricular question is not "what features are available" but "what knowledge, values, and responsibilities should be formed in prospective teachers". Several scholars have proposed adjusting the IRE curriculum to AI-based technology through understanding technological concepts, AI ethics, digital literacy skills, character education, and strengthening Islamic values (Hernawati et al., 2024), yet these proposals remain normative and do not explain how curriculum actors actually negotiate change under concrete institutional conditions.

The problematic of AI literacy in Islamic education is more complex because literacy

here is not only a technical skill. A comprehensive AI competence framework places ethics, collaboration, and self-reflection on an equal footing with technology and its impact, and adds self-efficacy and a reflective mindset as competence dimensions . The UNESCO framework demands that AI applications be ethical, transparent, non-discriminatory, and auditable (Chan, 2023), with five core competence areas for teachers (Stracke et al., 2025), while the AI competence framework for students specifies human-centred mindset, AI ethics, AI techniques and applications, and AI system design (Chiu & Rospigliosi, 2026). For prospective IRE teachers, responsible AI literacy requires the ability to understand, use, evaluate, and critique AI pedagogically and religiously. Studies in IRE contexts document the risk of misinformation and hallucination affecting learners' understanding of religious material that demands accuracy and trustworthy references, alongside unequal digital literacy between teachers and learners (Udhma & Burhanuddin, 2025); other identified challenges include accuracy, ethics, and alignment with Islamic educational values (Suhendi et al., 2024). AI literacy in IRE is therefore twofold: a pedagogical competence and, at the same time, an epistemic and ethical one.

The question of epistemic authority is the most sensitive dimension. Research on generative AI and knowledge governance proposes the construct of epistemic authority redistribution, namely a change in the distribution of influence within organisational knowledge processes due to the growing legitimacy of AI output conceptually distinct from mere trust in or acceptance of technology (Alshammari, 2026). The philosophy of AI epistemology shows that the epistemic superiority of AI systems is often wrongly presumed, while system opacity complicates any assessment of the justification for its output (Ferrario et al., 2024). A study of 610 participants shows that the tendency to defer judgement to AI correlates with trust in automation and perceived system performance, and tends to be stronger in high-risk scenarios (Milella & Cabitza, 2026). In the Islamic domain, digital mediation changes not only access to fatwas but also the balance between evidence-based reasoning and infrastructural visibility, generating new ambiguities about authority and moral agency in AI-assisted religious tools (Atallah, 2026). Other work diagnoses a "digital schism", namely the epistemic tension between the hierarchical logic of *sanad* and the distributed logic of algorithms (Rois & Yazdani, 2026). Fatwa authority from AI generally cannot become the sole legal reference because of its anonymous character (*majhūl al-ḥāl*) (Hakim & Azizi, 2023), and major Indonesian Islamic organisations have rejected the practice of AI-issued fatwas (Tarwiyyah, 2025). The curricular question that follows is how relations among lecturers, scholars, Islamic sources, students, and AI technology are rearranged in acquiring and validating religious knowledge.

Islamic ethics supplies normative vocabulary for responding to these problems, but that vocabulary must be distinguished from its implementation in institutions. *Tabayyun* as a principle of critical verification, *amānah* in scholarship, and epistemic *adab* have been proposed as the basis for reorienting Islamic education from knowledge transfer towards the cultivation of wisdom (Khasani, 2026). Integrating Qur'anic *tabayyun* into an algorithmic ethics framework is seen as relevant for ensuring verification, prudence, and responsibility regarding AI-generated information (Fepriani & Ratnasari, 2026), while another approach offers a sharī'ah-aligned framework, including the use of AI for Qur'anic exegesis and critical hadith verification (Abubakari, 2025). Yet normative principles do not by themselves become institutional procedures: stating that academic honesty matters does not explain how a rubric assesses revision traces, how student data are protected, or how violations are handled in graduated steps.

Prior research can be synthesised into four strands that speak to one another but have not yet met. The *first strand*, AI in higher education, moves from concerns about integrity towards assessment redesign: generative AI may alter programme goals and student

learning outcomes through personalisation , prompting the principle of *Against, Avoid and Adopt* and comprehensive assessment redesign ; another synthesis stresses managing bias, digital divides, and the erosion of the authenticity of student work (Francis et al., 2025), recommending generative AI literacy programmes and transparent policy . The limitation of this strand is its macro-level policy orientation; social processes at the level of religious study programmes are rarely traced. The *second strand*, AI literacy and teacher education, yields rich frameworks but focuses on individual competence: AI literacy and competency frameworks add self-efficacy and a reflective mindset across five main components technology, impact, ethics, collaboration, and self-reflection with a research agenda on prompt engineering, data literacy, algorithmic literacy, and empirical studies . Studies of pre-service teachers show positive perceptual shifts after generative AI training and recognition of the need for careful technology integration (Seo et al., 2024), as well as adaptation of TPACK statements for teaching AI literacy (Yim & Wegerif, 2024); however, AI competence is not limited to basic knowledge and technical skills, but demands emphasis on human agency, ethical consideration, critical thinking, and human-centred design (Cukurova, 2024). Evidence on how that competence materialises in curricular decisions within religious education programmes remains thin.

The *third strand*, the Islamic education curriculum in the digital era, is dominated by literature reviews and normative studies: identification of five adjustments of the IRE curriculum to AI-based technology , phenomenological work warning of technology dependence , and critical analysis of ChatGPT use in IRE learning highlighting the need for clear institutional policy amid unequal digital literacy . Exceptions are emerging, such as a descriptive qualitative study in a madrasah aliyah reporting concerns about data privacy, teacher competence, and alignment with Islamic ethical values (Hermawan et al., 2025), and a quasi-experimental study reporting gains in critical thinking scores (M = 78.6, SD = 7.8) and moral reasoning scores (M = 76.8, SD = 7.9), with 56.3% of students reaching an advanced level of critical thinking and 68.8% demonstrating advanced moral reasoning (Salim & Habibi, 2025). Even so, such designs measure intervention effects rather than processes of meaning construction. The *fourth strand*, epistemic authority and Islamic ethics in the AI era, develops rapidly but separately from teacher education: work on the digital mediation of fatwa authority , the digitisation of fatwas and the validity of scholarly transmission (Masruha et al., 2025), the reconstruction of religious authority and the emergence of a digital Islamic knowledge elite , and the rejection of AI fatwas by major Islamic organisations focuses on public religious authority, while work on Islamic ethics and AI offers normative frameworks *tabayyun*, *amānah*, *ḥikmah*, epistemic *adab* , the integration of *tabayyun* with algorithmic ethics , and sharī'ah-aligned frameworks without connecting them to curricular and assessment practice in pre-service teacher education.

Three gaps follow from this synthesis. *First*, an empirical gap: no study has procedurally traced how curriculum actors in pre-service IRE teacher education interpret, negotiate, and change practice when AI enters the formulation of objectives, the selection of sources, learning strategies, and assessment. This gap matters because global competence frameworks set expectations without explaining their enactment , and evidence from pre-service teachers shows that evaluating AI output does not automatically translate into coherent lesson planning . *Second*, a conceptual gap: AI literacy, epistemic authority, and Islamic ethics are habitually discussed in three separate literatures teacher education, digital religious authority, and normative ethics so the relationship among them, whether tension, negotiation, integration, or another mechanism, has not been explained in an integrated way; yet epistemic authority redistribution and system opacity bear directly on how the validity of Islamic sources is judged in the classroom. *Third*, a methodological gap: the dominance of literature reviews and effect-measurement designs leaves little room for

processual explanation of contextual conditions, actor actions, and their interlocking consequences.

Constructivist grounded theory offers a way to address these gaps, since its purpose is to build conceptual explanations of social process from the standpoint of actors through constant comparison and memo-writing, emphasising critical reflexivity, interpretation, context, and the co-construction of knowledge between researcher and participants (Keane, 2022). In this tradition, theory is understood as co-constructed (Montgomery et al., 2023), and the ontological shift introduced by Charmaz makes it possible to restore the voices of participants previously silenced by claims to objective truth (Priya, 2022). Theoretical sensitivity is required to understand phenomena in abstract terms and to show abstract relationships among them (Bowen, 2006), while sensitizing concepts guide the researcher's attention without becoming imposed categories .

The purpose of this study is to explore and build theoretical understanding of the social process, epistemic considerations, value negotiations, and institutional dynamics of curriculum transformation in pre-service IRE teacher education in the age of AI. Specifically, it aims to: (1) identify the contextual conditions that trigger and constrain curricular change; (2) explain actors' actions and interactions in interpreting AI literacy; (3) analyse how the validity of Islamic sources and epistemic authority are negotiated; (4) explain how Islamic ethical values are translated into practice, rubrics, and policy; and (5) formulate a substantive theory of the IRE curriculum transformation process.

Method

This study adopts a constructivist paradigm with a constructivist grounded theory design following Charmaz, chosen because the phenomenon under study is a social process that is not yet institutionalised and because the research question concerns meaning and action rather than effect measurement. The constructivist character positions the researcher within the production of knowledge, so that the resulting theory is a co-construction between researcher and participants , and the ontological shift introduced by Charmaz makes it possible to restore the voices of participants previously marginalised by claims to objective truth ; the consequence is an obligation of continuous critical reflexivity, since the researcher's position, religious experience, and pedagogical assumptions shape analytical sensitivity and coding decisions . Three sensitizing concepts AI literacy, epistemic authority, and Islamic ethics are treated in accordance with the function of sensitizing concepts in grounded theory: guiding initial attention without becoming categories imposed on the data ; the researcher records in memos when a code genuinely originates in the data and when it reflects the initial framework . The study site is the pre-service IRE teacher education programme at STITMA Yogyakarta, a context combining authoritative Islamic scholarship, pedagogical competence, and technological adjustment; the literature shows that Islamic higher education institutions in Indonesia place academic reform on an agenda with broad consequences for similar institutions (Suyadi et al., 2021) and that their lecturers negotiate an intersection between national policy, Islamic ethical values, and global educational discourse while retaining creativity and agency (Hasibuan, 2026), while the flexibility of the national curriculum for institutions and teachers shapes the room for manoeuvre of curriculum actors (Astuti & Kasprabowo, 2026).

Field data consist of semi-structured in-depth interviews with nine purposively selected informants representing different positions in the curricular process: a programme curriculum manager, a lecturer in IRE curriculum development, a Qur'an and Hadith lecturer, a learning technology lecturer, a microteaching lecturer, a third-semester student, a seventh-semester student, a field practicum supervisor, and an academic quality

manager, each with a distinct interview focus and eight response segments, yielding 72 responses in total. Analysis followed Charmaz's procedure: *initial coding* to name actions and meanings, *focused coding* to distil significant codes into conceptual categories, *constant comparative analysis* comparing incident with incident and category with category across informants, *memo-writing* as an integrated comparative method identified in the literature as a "cornerstone of quality" (Andersson, 2025) and as a means of processing the explicit and implicit meanings in participants' answers that drives abductive reasoning (Micallef et al., 2026), and finally category integration and identification of a core category. The mapping of transcript segments to analytical categories is documented as an appendix . Quality was maintained through reflexivity, transparency of the audit trail, and constant comparison; the criterion of complexity requires concepts to be shown as part of an interconnected web of ideas, while the criterion of resonance assesses how findings relate to prior literature (Bouncken et al., 2025). This study treats analytical sufficiency as the outcome of conceptual work rather than of participant numbers alone, consistent with the critique that turning saturation into a generic marker of quality is inappropriate (O'Reilly & Parker, 2012), although saturation remains recognised as important for the strength and completeness of findings (Ahmed, 2024); claims of analytical sufficiency are therefore advanced in a limited form tied to the nine informant perspectives.

Results and Discussion

1. Results

a. Informant profiles and data distribution

Nine informants were interviewed with distinct foci, each producing eight response segments, so that 72 responses were analysed in total.

Table 1. Informant profiles

Code	Role / perspective	Interview focus	Number of responses
I01	IRE programme curriculum manager	Curricular decision-making and change	8 segments (S01–S08)
I02	Lecturer, IRE curriculum development	Planning of outcomes–objectives, instruction, materials	8 segments (S01–S08)
I03	Lecturer, Qur'an and Hadith	Validation of scriptural evidence and source authority	8 segments (S01–S08)
I04	Lecturer, learning technology	Digital literacy, prompting, output testing	8 segments (S01–S08)
I05	Lecturer, microteaching	Teaching performance and authentic assessment	8 segments (S01–S08)
I06	IRE student, semester III	Early experience and unequal access	8 segments (S01–S08)
I07	IRE student, semester VII	Teaching materials and prospective-teacher identity	8 segments (S01–S08)
I08	IRE field practicum supervisor	Risk during school practicum	8 segments (S01–S08)
I09	Academic quality assurance manager	Standards, evaluation, phased implementation	8 segments (S01–S08)

b. Transformation pressure and conditional adoption (K1)

This category marks a drive for change that does not end in unconditional acceptance. Its constitutive condition is the acceleration of teaching-material production. The curriculum manager locates the earliest change not in courses but in student assignments: "Lesson plans that used to take days can appear in minutes. But I ask instead whether students understand why they chose the material, or merely accepted the machine's plan" . Variation appears among semester III students who find help in starting, "especially when I am confused reading the first chapter", yet admit a tendency to copy: "sometimes I want to copy the summary quickly". Semester VII students report a more complex pattern: AI accelerates module drafts and activity variation, but when checked against practicum classroom conditions, "some activities are too crowded for the available time. I end up spending time selecting and correcting them" . Conceptually, transformation proceeds as conditional adoption speed is accepted, dependence is rejected and practice changes ahead of formal policy, so change risks proceeding without a framework.

c. Critical-verificative AI literacy (K2)

This category marks AI literacy as the capacity to assess, test, and reject output rather than to compose prompts. The learning technology lecturer insists: "Not just writing a long prompt. They must understand that AI can be wrong, recognise which kinds of data are risky to enter, and be able to judge whether a recommendation is relevant to the objectives and the character of the learners". Practice proceeds in stages: students first learn to formulate questions, read the limits of the output, and look for errors; next they compare AI output with reference books and curriculum documents; at an advanced stage they design practice and reflection . The core exercise is a "three-round" sequence in which "students write their own draft, ask AI for an alternative, then mark the differences and cross-check", from which it becomes visible that "the first output is often too generic for the school context". The sharpest finding comes from the Qur'an and Hadith lecturer: "The AI answer included a reference number that looked precise, but after checking it did not match the text", and "asking the same chatbot to justify its answer only circulates sources that are not necessarily valid". Orientation shifts too: "some were initially defensive because they thought fluent text must be true" , while a semester III student admits, "at first I typed 'is this correct?' into the same application" before learning to mark unsourced passages. The pattern is consistent with external evidence: of 636 bibliographic citations generated by a chatbot across 42 topics, 55% of GPT-3.5 citations and 18% of GPT-4 citations proved fabricated, and in another study, of 178 reference sources produced by an AI dialogue system, 69 lacked a DOI (Zhai et al., 2024). The curriculum development lecturer states the consequence: "If everything is accepted just like that, it is a sign that guidance is needed, not a sign of successful AI use".

d. Negotiation of epistemic authority and teacher agency (K3)

The constitutive condition here is the availability of fluent output in domains demanding authoritative reference. The curriculum manager states: "AI can offer explanations, but it cannot be the final reference for the validity of a hadith or for legal determination. Students must still refer to verifiable sources and discuss disputed points with competent lecturers" . The Qur'an and Hadith lecturer frames AI's standing explicitly: "AI can be an initial search tool and a dialogue partner, but it is not a hadith expert, not a scholar, and not a religious decision-maker", and rejects a shift in habit: "What I reject is the change of habit from learning sanad and context to accepting fluent

sentences without evidence". Division of authority appears in cross-lecturer work: "I can teach prompt testing, but I should not be the one determining whether a hadith is sound. In joint assignments, IRE lecturers validate the material and technology lecturers check the digital process" . Boundaries for consultation are also formulated: "When output concerns differences of opinion among scholars, practical rulings, or judgements about other groups, discussion with experts becomes important. For composing variations of practice questions, students' room for autonomy is wider". A semester VII student reformulates the teacher's role: "the teacher's role shifts: not the one who produces documents fastest, but the one responsible for ensuring the lesson is correct and suited to the learners. The danger is if I stop questioning its suggestions" . The microteaching lecturer adds an example of material risk: a student displayed AI-generated worship illustrations "but the movements were incorrect" . Conceptually, this is not the removal of human authority but a redistribution of epistemic labour requiring reordered jurisdiction.

e. Digitally operationalised Islamic ethics (K4)

This category marks the translation of normative principles into observable behaviour. The Qur'an and Hadith lecturer operationalises two key concepts: "For me, tabayyun becomes visible when students do not pass on a religious quotation before tracing its source. Amanah becomes visible when they state the limits of their knowledge, including when they cannot yet verify a report". Data protection emerges as concrete practice: in a scenario where a prospective teacher wanted to enter a student's name and behavioural notes into a chatbot to request guidance strategies, the lecturer required that "the data be replaced with an anonymous description and sensitive information removed" , and a semester VII student states, "I do not want to enter real names, facial photographs, or notes on a pupil's family problems into an application" . The field practicum supervisor sets a firm boundary: "We must prohibit uploading children's identities and sensitive data without a lawful basis" . The issue of acknowledging assistance emerges as a significant finding: a semester VII student admits, "On practice assignments I once deleted the traces of AI assistance because no reporting format was requested. After discussion, I see that as problematic" , while the curriculum manager insists "honesty is not only naming the tool, but being able to explain which parts were genuinely thought through and what was verified" . Assessment of ethical conduct is framed behaviourally: "Not judging intentions from beautiful prose. I look at behaviour: citing sources, seeking consent where needed, acknowledging correction, and not spreading pupil data" . Conceptually, Islamic ethics functions as an operational criterion and becomes visible when embedded in procedure rather than in declarations of value.

f. Reconstruction of learning experience and assessment (K5)

Its constitutive condition is that a polished final product no longer serves as evidence of competence. The curriculum manager proposes: "I tend to require a revision trace: the initial prompt, comparison sources, the reason for discarding certain parts, and oral accountability. The final product may be neat, but it is the examination of the process that shows whether the prospective teacher understands" . The curriculum development lecturer wants "a simple audit sheet: which parts of the output were used, revised, and rejected, with reasons", and chooses a safe starting point: "I do not start from an obligation to use AI, but from comparing one self-made plan with an AI-assisted plan and accounting for the differences". The microteaching lecturer insists "a neat module does not guarantee that a student can respond to spontaneous questions" and proposes

"a process rubric: accuracy of content, reasons for the choice of method, ability to respond to feedback, and acknowledgement of sources and AI use" . Transparency is enacted through "notes: which ideas came from AI, which from books, and how they edited them" , while the Qur'an and Hadith lecturer requires "at least one relevant primary source or scholarly edition, a statement of the level of certainty, and an account of why one AI answer was chosen or rejected". Notably, practice without AI is retained: "writing frameworks, summarising readings, and constructing one's own questions" before AI is used as a comparator , and a semester VII student considers it fairest "if we explain our planning process, show revisions, and are asked to enact the activity. Friends who made it themselves can be tested with the same standard" . Conceptually, assessment functions as an epistemic instrument determining which knowledge and responsibilities count as legitimate.

g. Governance of implementation and access equity (K6)

Its constitutive conditions are inconsistent rules and unequal capacity. The quality assurance manager identifies the risk that "each lecturer's rules contradict one another: in one class AI is treated as cheating, in another it is required. Without shared principles, students do not know what is assessed and how to be accountable" , and proposes minimum guidelines covering "purpose of use, risk level, obligation to check sources, transparency of assistance, data confidentiality, and how to assess process". Access inequality is voiced in layers: the curriculum manager warns that "if assignments require paid applications, we may be measuring the ability to pay, not pedagogical ability" ; a semester III student reports "not everyone has a laptop or a stable connection in their boarding house. I often use a phone myself"; the learning technology lecturer insists "I design assessment around argumentation and the revision process, which can be done with books or free tools, not around exclusive features" ; and the quality assurance manager adds, "Students with premium subscriptions may produce neater products; that must not automatically earn a higher grade" . A semester III student also highlights the social dimension of recognition: "I worry about being considered lazy if I write 'AI-assisted'". Handling of violations is graduated "clarification, education, assignment remediation, and action in accordance with policy" and implementation proceeds in phases: "Start with a few courses using a shared rubric, record the problems, discuss with instructors and students, then evaluate whether the practice deserves to be extended" . The proposed indicators are processual: "whether the rubric requires evidence of verification, whether lecturers provide feedback, and whether students can explain their revisions. Counting how many AI accounts exist is not enough to show educational quality".

h. Core category and inter-category relations

Constant comparison across the nine informants points to the core category **negotiation of knowledge validity as the driver of curriculum transformation**. Its mechanism links conditions (transformation pressure, inconsistent rules, unequal access), actions (verification, boundary-setting on jurisdiction, translation of ethical values, assessment redesign), and consequences (the need for shared guidelines, an AI-assistance disclosure format, and processual indicators). The curriculum manager's formulation of success reinforces the direction of this process: "Not when everyone opens a chatbot. The first sign is that lecturers and students can explain when AI helps, when it must be stopped, and who is responsible for the religious content being taught" , and the quality assurance manager closes with the criterion of auditability: "Not making AI always present, but making its use explainable, auditable, not harmful to pupils, and

still respectful of IRE scholarship" .

Table 2. Grounded theory category matrix and segment distribution

Code	Category name	Transcript segments
K1	Transformation pressure and conditional adoption	I01-S01, I05-S01, I06-S01, I07-S01
K2	Critical-verificative AI literacy	I02-S01, I02-S07, I03-S03, I04-S01, I04-S02, I04-S04, I06-S03, I06-S08
K3	Negotiation of epistemic authority and teacher agency	I01-S03, I01-S08, I02-S04, I02-S08, I03-S01, I03-S02, I03-S04, I03-S06, I05-S04, I05-S07, I05-S08, I06-S02, I07-S02
K4	Digitally operationalised Islamic ethics	I01-S04, I02-S05, I03-S05, I04-S03, I05-S03, I06-S06, I07-S04, I07-S05, I08-S03, I08-S06
K5	Reconstruction of learning experience and assessment	I01-S02, I01-S05, I02-S02, I02-S03, I02-S06, I03-S07, I03-S08, I04-S06, I05-S02, I05-S05, I06-S07, I07-S07, I08-S08
K6	Governance of implementation and access equity	I01-S06, I01-S07, I04-S05, I04-S07, I04-S08, I05-S06, I06-S04, I06-S05, I07-S08, I08-S05, I09-S01, I09-S02, I09-S04

Table 3. Relations between categories, subcategories, and empirical evidence

Category	Analytical subcategories	Empirical evidence (segments)
K1	Acceleration of production; concern about understanding; informal change	I01-S01, I05-S01, I06-S01, I07-S01
K2	Testing output; tracing sources; reasoned rejection	I02-S01, I02-S07, I03-S03, I04-S01, I04-S02, I04-S04, I06-S03, I06-S08
K3	Limits of AI authority; expert consultation; cross-lecturer division of labour	I01-S03, I01-S08, I02-S04, I02-S08, I03-S01, I03-S02, I03-S04, I03-S06, I05-S04, I05-S07, I05-S08, I06-S02, I07-S02
K4	Data anonymisation; statements of limitation; disclosure of assistance	I01-S04, I02-S05, I03-S05, I04-S03, I05-S03, I06-S06, I07-S04, I07-S05, I08-S03, I08-S06
K5	Process assessment; oral accountability; practice without AI	I01-S02, I01-S05, I02-S02, I02-S03, I02-S06, I03-S07, I03-S08, I04-S06, I05-S02, I05-S05, I06-S07, I07-S07, I08-S08
K6	Shared principles; access equity; phased implementation	I01-S06, I01-S07, I04-S05, I04-S07, I04-S08, I05-S06, I06-S04, I06-S05, I07-S08, I08-S05, I09-S01, I09-S02, I09-S04

2. Diskussion

a. Curriculum transformation as a social and epistemic process.

The data indicate that curriculum change in IRE in the AI era is better understood as an epistemic process unfolding socially than as an administrative decision: what changes first are the conditions of justification what counts as sufficient evidence, who is authorised to establish validity, and how accountability is demanded. The curriculum manager locates change in assignments rather than courses , suggesting that the hidden curriculum of assignment practice moves faster than the written curriculum. This aligns with the diagnosis that knowledge legitimacy once resting on institutional validation now coexists with algorithmic systems . Unlike the literature emphasising authority shifts in the public sphere, category K3 shows that in this setting the shift takes the form of locally negotiated epistemic division of labour: technology lecturers check the digital process, IRE lecturers validate the material . The author's argument is that this very separation is the point of vulnerability: if the curriculum does not explicitly set out cross-field procedures, the division of labour may become a transfer of responsibility. The curricular consequence is a need for layered validation mechanisms written into curriculum documents rather than practised informally.

b. AI literacy in the construction of pre-service IRE teacher competence.

Category K2 shows that the AI literacy required centres on the capacity to audit rather than to produce, as the informant insists that literacy is "not just writing a long prompt". This strengthens frameworks that place ethics, collaboration, and self-reflection on an equal footing with technology and impact , and that direct research towards prompt engineering, data literacy, algorithmic literacy, and a reflective mindset . This study adds a dimension that has received little attention: **sanad literacy**, namely the habit of tracing the chain and context of a reference when machine output presents a seemingly precise attribution as captured by the finding that an AI reference number "looked precise, but after checking did not match the text". Its relevance is reinforced by evidence that large language models tend to fill missing information with synthetic text and to produce non-existent references (Heersmink et al., 2024), by documented fabrication prevalence and by the risk of *confidently wrong* systems (Gravel et al., 2023); validating references by checking whether a DOI exists has also been proposed (Mugaanyi et al., 2024). Because the capacity to evaluate AI suggestions does not automatically extend to coherent lesson planning , it is not enough to add an AI literacy course; verification procedures must be embedded in Islamic subject assignments, where false attribution is most consequential.

c. Reconstruction or negotiation of epistemic authority.

Category K3 offers empirical support for the thesis of epistemic authority redistribution a change in the structure of influence within knowledge processes owing to the growing legitimacy of AI output, distinct from mere technology acceptance . System opacity explains why assessing the justification of AI output is difficult , and the tendency to defer judgement to AI is stronger in high-risk scenarios ; findings that students initially "thought fluent text must be true" and that an answer on the concept of *tarbiyah* "differed from the lecture notes, but the language was convincing" show this mechanism operating at the level of study habits. In the Islamic domain, digital mediation alters the balance between evidence-based reasoning and infrastructural visibility and generates new ambiguities about authority and moral agency ; concerns about the validity of scholarly transmission and the tension between the logic of *sanad* and that of algorithms form the macro context explaining the boundary-setting observed

in K3, such as the refusal to treat AI as a "hadith expert" or "religious decision-maker". The author's argument is that in pre-service teacher education the central problem is not the public legitimacy of religious authority but the formation of epistemic habit. The reasoning that anonymity renders AI output unable to serve as the sole legal reference matters pedagogically because it can be translated into teachable criteria, and the rejection of AI fatwas by major Indonesian Islamic organisations marks an institutional boundary that should be reflected as curriculum rule. What distinguishes these findings from the digital-authority literature is that legitimacy here is negotiated not at the level of discourse but at the level of rubrics and the distribution of teaching duties .

d. Islamic ethics as a consideration in curriculum transformation.

Category K4 shows Islamic values function as operational criteria when embedded in procedure: *tabayyun* becomes the obligation to trace before passing on, *amānah* becomes a statement of the limits of one's knowledge, and responsibility becomes disclosure of assistance and data protection. This aligns with proposals to reorient Islamic education towards the cultivation of wisdom with *tabayyun*, *amānah*, *ḥikmah*, and epistemic *adab* as key concepts , the integration of *tabayyun* into algorithmic ethics , and sharī'ah-aligned frameworks . The critique advanced here is that such literature tends to stop at principles without showing institutional mechanisms. The present data reveal concrete intermediate mechanisms: **an AI-assistance disclosure format, data anonymisation procedures, and graduated responses to violations** (clarification, education, assignment remediation, policy action) . The finding that a student deleted traces of AI assistance because no reporting format existed shows that the absence of a mechanism is not neutral: it encourages procedural dishonesty. The warning that AI should be positioned as a means rather than an end supplies an evaluative criterion, and the recognition that not using AI remains a professional decision helps ensure that the curriculum can still achieve its aims when technology is unavailable.

e. The relationship between AI literacy, epistemic authority, and Islamic ethics.

The key question of this study is how the three focal concepts relate. On the basis of constant comparison across informants, the relationship that emerges is neither harmonious integration nor open conflict, but **productive tension managed through the ordering of jurisdiction**: AI literacy supplies the capacity to test, Islamic ethics supplies the normative criteria for deciding, and epistemic authority supplies the mechanism for authorising. All three function together only when rules clearly specify who has jurisdiction over which domain, as seen in the cross-lecturer division of labour and in the distinction that analysis of Qur'anic verses demands "stricter verification than the task of creating variations of classroom games".

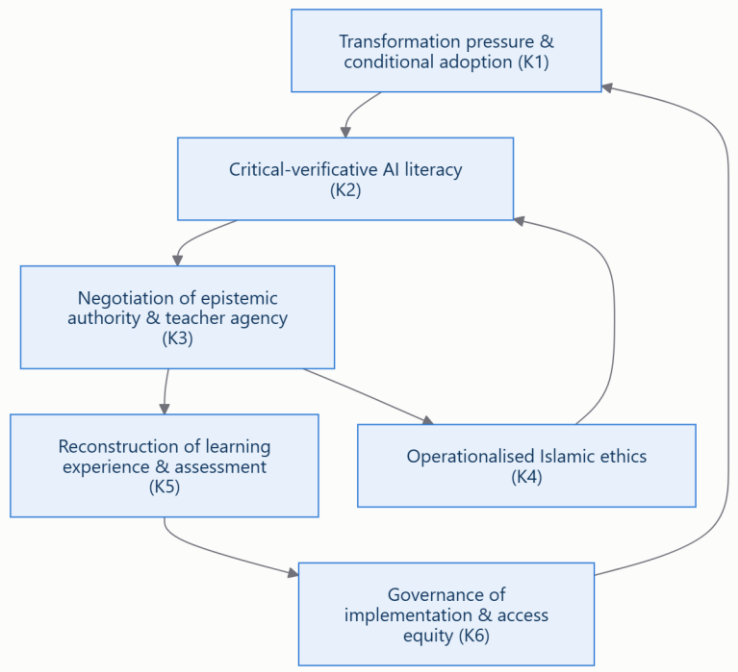


Figure 1. Relations among categories from the analysis.

The proposition that can be formulated is that epistemic tension is resolved not at the level of individual belief but at the level of procedure disclosure formats, the obligation to use primary sources, and cross-lecturer jurisdiction. If this proposition survives testing in other contexts, its theoretical contribution is a process account that may be called the reordering of epistemic jurisdiction within the curriculum: the process by which actors change the conditions of knowledge validity in response to the availability of algorithmic output, with assessment as its principal instrument.

f. Contribution of grounded theory.

Methodologically, this study demonstrates the usefulness of constructivist grounded theory for capturing a process that is not yet institutionalised: the core category emerged not from the three concepts in the title but from patterns recurring across informants' segments, while those concepts continued to function as sensitizing concepts . Its conceptual contribution is a testable six-category framework; its methodological contribution is a procedure for auditing AI use in analytical work as part of research ethics; its practical contribution is the curricular implications set out below. Limitations must be stated: analytical sufficiency is tied to nine informant perspectives in a single institution, so theoretical generalisation requires testing in other contexts.

g. Curricular implications.

First, graduate learning outcomes should name the ability to verify religious claims, audit source attribution, and decide on reasoned grounds when not to use AI responding to the demand for competence emphasising human agency, ethical consideration, and critical thinking as well as the teacher competence areas in the UNESCO framework . *Second*, AI literacy should not be a single standalone course but distributed across Islamic subject assignments, learning methodology, and assessment , with the added requirement that jurisdiction over material validation be specified . *Third*, the learning sequence supported by the data is to write one's own draft, request an AI alternative, then mark differences and cross-check consistent with reports of perceptual shifts following encounters with generative AI's limitations and with recommendations for

more practical teacher education curricula . *Fourth*, rubrics should assess process: revision traces, reasons for rejection, audit sheets, and oral accountability, in line with assessment redesign principles . *Fifth*, an AI-assistance disclosure format, procedures for protecting learner data, and graduated responses to violations are needed; the need for clear institutional policy is also reported in IRE contexts and in a madrasah study highlighting data privacy and teacher competence . *Sixth*, assessment must be feasible with books or free tools ; the literature on the generative AI digital divide identifies four main barriers limited infrastructure and connectivity, inadequate AI literacy among stakeholders, economic barriers, and the absence of inclusive institutional policy (Eddine et al., 2026), including factors affecting AI adoption among students (Şova et al., 2024). Data from an open-education context show that 83% of respondents routinely experienced internet problems when accessing materials (Kodchakorn et al., 2025), that 78% of students already use AI for learning, and that 27% purchased their own AI tools . Such gaps risk deepening existing inequalities, as warned in the literature on dimensions of access, skills, and outcomes (Siddiqi, 2026) and on unequal access to devices, software, and reliable internet connections (Nagaraj et al., 2023). *Seventh*, success indicators should be processual whether rubrics require evidence of verification, whether lecturers give feedback, and whether students can explain revisions rather than counts of accounts or applications.

Compared with prior research, the contribution offered here is complementary: the AI teacher-education literature supplies competence frameworks, the Islamic education literature supplies normative foundations, and the digital religious authority literature supplies a diagnosis of shifting authority; this study links the three through a process account at the level of curricular decision-making and assessment in a pre-service IRE teacher education programme.

Conclusion

This study addressed its aim of exploring and building theoretical understanding of the social process, epistemic considerations, value negotiations, and institutional dynamics of curriculum transformation in pre-service IRE teacher education through nine informant perspectives and 72 responses. *First*, transformation unfolds as a social and epistemic process: what changes first are the conditions of knowledge justification at the level of assignments and task design rather than the structure of courses, so change proceeds as conditional adoption ahead of formal policy. *Second*, the AI literacy required is critical-verificative, centred on the capacity to audit claims and source attribution, so that assessment becomes an epistemic instrument determining which knowledge and responsibilities count as legitimate. *Third*, the relationship between AI literacy, epistemic authority, and Islamic ethics takes the form of productive tension managed through the ordering of jurisdiction: Islamic ethics functions as operational criteria, while epistemic authority is negotiated through cross-field division of labour rather than the displacement of human roles by machines. The core category that emerged is the negotiation of knowledge validity as the driver of curriculum transformation, with assessment, disclosure formats, and shared guidelines as its binding mechanisms.

Implications for curriculum transformation comprise three interrelated reorderings: of jurisdiction over the validation of Islamic material, of assessment around process and revision traces, and of governance encompassing an AI-assistance disclosure format, learner data protection, and mechanisms safeguarding access equity. These are recommendations derived from the analysis, not findings of tested effectiveness.

This study has one limitation, it develops recommendations for curriculum

transformation but does not evaluate their effectiveness in practice. Future research could implement and assess these recommendations across different programmes and institutional types, including madrasahs and pesantren, and investigate how assessment practices, institutional policies, and prospective teachers' epistemic habits develop over time.

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