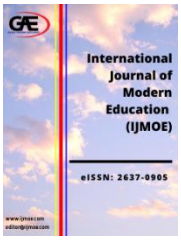
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AI-MEDIATED REFLECTIVE PRACTICE AMONG IN-SERVICE EDUCATORS: A SYSTEMATIC REVIEW THROUGH A SOCIOCULTURAL THEORY LENS

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Abstract:

The integration of Artificial Intelligence (AI) in education is reshaping educators' reflective practice and professional learning. AI research has largely focused on instructional and productivity applications, leaving its role in mediating reflection among in-service educators underexplored. This Systematic Literature Review synthesised evidence from 31 studies identified through a PRISMA-guided search of Scopus, Web of Science, and Google Scholar. Drawing on Sociocultural Theory and Schön's reflective practitioner framework, a hybrid thematic analysis revealed two meta-themes: individual competencies and dispositions, and professional competencies. Six sub-themes emerged: depth of reflection and emotional awareness, socio-ethical considerations, cognitive and metacognitive functioning, reconstruction of educator identity, continuous professional development, and enhanced AI literacy. Findings indicate that AI functions as a mediational artefact that supports reflective inquiry, meaning-making, and professional growth. Rather than replacing professional judgement, AI enables educators to critically evaluate practice, navigate contextual complexities, and engage in continuous professional development within AI-enhanced educational environments.

Keyword:

Artificial Intelligence, Reflective Practice, In-Service Educators, Sociocultural Theory, Professional Development, Teacher Education

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Introduction

The accelerating expansion of artificial intelligence (AI) in education has undeniably disrupted conventional paradigms of educators' professional learning experiences. The emergence of generative AI tools, learning analytics systems, intelligent tutoring systems, and AI-assisted feedback platforms has compelled re-examination of established educators' professional learning and practice. Many educators now view AI as a useful resource for supporting differentiation, instructional efficiency, personalised feedback, and data-informed teaching practices (van den Berg & du Plessis, 2023). Beyond its instructional affordances, AI introduces tensions between technological efficiency and educators' professional agency (Duan & Zhao, 2024; Röhl, 2025). These developments suggest that educators are more critical of AI tool adoption as they are increasingly required to interpret, negotiate, and reflect on the role of AI. AI systems are not neutral technologies. Instead, they influence how educators notice classroom events, interpret learner behaviour, and make instructional decisions. As a result, reflective practice has become increasingly important in discussions surrounding meaningful AI integration in education.

Literature Review

Reflective practice has long been recognised as central to professional learning and teacher development. The original conceptualisation of professional learning as a process of reflection embedded within practice was introduced by Schön (1983). The author distinguished between reflection-in-action, which occurs during professional activity, and reflection-on-action, which takes place retrospectively after an experience. Together, these forms of reflection enable practitioners to examine their decisions, respond to emerging challenges, and refine their professional knowledge. Building on Schön's work, Zeichner and Liston (1996) introduced reflection-for-action, underscoring the importance of reflective insights to inform future decisions and professional growth. This development shifted reflective practice from a primarily evaluative process towards a continuous cycle of inquiry encompassing present action, retrospective analysis, and future-oriented planning.

Through reflection, educators interrogate assumptions, reconsider pedagogical decisions, and reconstruct professional understanding in response to classroom realities Farrell (2011). However, reflective practice is often criticised for becoming procedural or compliance-driven rather than genuinely transformative (Mann & Walsh, 2017). Traditional approaches commonly depend on memory recall and self-reporting, which may limit the depth and accuracy of reflective engagement. A study by Ovadiya (2024) highlighted that educators often rely on retrospective memory recall and self-reported accounts of professional experiences. Such approaches may be susceptible to selective recall, hindsight bias, and subjective interpretation, potentially limiting the accuracy, completeness, and depth of reflective

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engagement. For transformative professional change to happen, the depth of reflection plays an instrumental role in reconstructing educators' beliefs and practice.

The emergence of AI technologies introduces new possibilities to facilitate the limitations of traditional reflective practice. AI-assisted classroom analytics, automated feedback systems, video-based reflection platforms, and conversational AI tools offer educators alternative ways to engage with professional experiences. Sert (2025) showed that an AI-powered question-detection tool (QBot) supported teachers' reflection on classroom discourse by enabling structured reflective engagement with their own teaching practices. Chen and Chan (2022) reported that video-based professional development supported by visualisations and analytics helped teachers examine classroom discourse. The visualisation also facilitated teacher change through reflective analysis of practice. Collectively, these AI technologies mediated educators' reflection beyond technological efficiency toward reshaping how educators interpret and respond to teaching practice during and after instruction.

Regardless, the utilisation of AI among educators demands critical judgment rather than mindless adoption (Xerri, 2025). Therefore, understanding this shift requires a change in the educators' learning perspective. Professional learning should be viewed as socially and technologically mediated rather than purely individual. This review therefore draws upon Sociocultural Theory (SCT), particularly the work of Vygotsky (1978), which views learning as shaped through interaction, language, cultural tools, and participation within communities. From this perspective, AI technologies are no longer treated as external supports for cognition. Instead, they function as mediational artefacts that shape the ways individuals engage, acquire knowledge, and interpret their surroundings. Reflection, therefore, becomes both a social and a technological process situated within broader institutional and professional contexts.

In practice, this sociocultural perspective is especially relevant because educators rarely reflect in isolation (Arefian et al., 2024; Novoa-Echaurren et al., 2025). Educators' engagement with AI technologies is influenced by leadership support, institutional culture, peer collaboration, and organisational expectations. AI-mediated reflection, therefore, extends beyond individual interaction with technology to encompass collaborative meaning-making and shared pedagogical interpretation. At the same time, AI systems increasingly influence what educators prioritise, how they interpret classroom situations (Jacobs et al., 2024; Kelly et al., 2025), and which forms of professional knowledge become privileged within educational settings.

Despite the growing body of research on AI in education, several gaps remain. First, much of the literature continues to frame AI primarily as an instructional or productivity tool. Existing AI-in-education literature has predominantly focused on adaptive learning, intelligent tutoring systems, assessment, learning analytics, and instructional support applications aimed at improving teaching effectiveness and student learning outcomes (Wang et al., 2024). Comparatively less attention has been given to AI as a mediational tool shaping reflective professional learning. Second, existing reviews often focus on pre-service educators or mixed participant groups. For example, the SLR by Harsono et al. (2025) included a broader study population, encompassing students, pre-service educators and in-service educators. A prominent SLR addressing AI and learning analytics in educator education was conducted by Salas-Pilco et al. (2022). The population under study was both pre-service and in-service educators. Taking into account the limited representation, the current SLR highlights in-service educators as the main study population to particularly illuminate the contextual realities and needs shaping their learning experiences.

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Last but not least, limited systematic synthesis exists concerning the professional needs of educators. A study by Tan et al. (2025) observed that existing AI-in-education research remains heavily concentrated on instructional applications, learning analytics, assessment systems, and AI-supported teaching practices. Significantly less attention has been given to teachers' professional development needs. Their systematic review of 95 studies found that only 35% of the reviewed literature focused on AI in teacher professional development, highlighting an imbalance in current research priorities. Within this limited body of professional development research, reflective practice remains comparatively underexplored. This limitation poses challenges in understanding how in-depth reflection among educators can be mediated by technological tools such as AI.

This SLR addresses existing gaps by bringing together evidence on how AI supports reflective practice among in-service educators. Drawing primarily on SCT, with support from Schön's (1983) reflective practitioner framework, the review positions AI not merely as a teaching tool but as a mediational artefact. In-service educators' engagement with AI shapes their professional learning, meaning-making, and reflective engagement within broader institutional and professional contexts. In practical terms, the findings highlight how AI can inform the design of professional development programmes. Emphasis should be on how reflective engagement, teacher agency, and context-sensitive pedagogy empower purposeful use of AI tools. Ultimately, the meaningful use of AI depends less on the technology itself and more on educators' ability to critically and reflectively engage with the professional experiences it mediates.

Methodology

Research Design

This SLR follows the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA), refined by Page et al. (2021), to provide a clearer structure for researchers conducting comprehensive SLRs aligned with the current research landscape. Using PRISMA helps researchers develop SLRs with a detailed methodology by encouraging a comprehensive search strategy and quality appraisal of selected articles. Although PRISMA was originally intended for the medical and healthcare industries, Page et al. (2021) highlight that its flexibility allows adoption across other disciplines, such as education. Based on the reference made to PRISMA, this SLR was developed by the researchers according to the four primary steps, which are:

i. Research Questions Formulation
ii. Strategic Searching Techniques (identification, screening and eligibility)
iii. Articles Quality Appraisal and;
iv. Data Extraction and Analysis

Research Questions Formulation

The formulation of the research questions was done through two sources. The first source was ideas from previous studies. For this particular SLR, studies by Arefian et al. (2024) and Salas-Pilco et al. (2022) were treated as the primary references. Both studies focused on the utilisation of GenAI in education on different populations. To assist with the search boundaries, the researcher referred to the highly used PICo mnemonic in systematic reviews (Lockwood et al.,

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2015). In the context of this SLR, in-service educators are considered the 'Population', AI for reflection is the 'Interest', and professional development is the 'Context". The research questions guided the article selection criteria, as well as the deductive formulation of meta-themes of this SLR, which are as follows:

(1) What implications does AI-mediated reflection have for in-service educators' individual competencies and dispositions?
(2) How does AI-mediated reflection contribute to the development of in-service educators' professional competencies?

Strategic Searching Techniques

Aligning with PRISMA, three systematic searching strategies, namely identification, screening and eligibility, were employed. These strategies helped the researchers retrieve relevant articles. By adopting these strategies, articles retrieved could be comprehensively located and systematically synthesised to ensure organisation and transparency essential for this SLR. The search for potential articles to answer the research question began on 23rd September 2025. As illustrated in Figure 1, the researchers identified articles in three databases. This process involved the researchers' effort to identify suitable keywords to search for relevant articles. Based on the research questions formulated, the researchers identified three primary keywords: AI, reflective practice, and in-service educators. Using these keywords, the researchers undertook a search strategy with two primary techniques. The first was a manual searching strategy on Google Scholar. 'Handpicking', 'snowballing', and 'backward tracking' techniques were employed to ensure the search was comprehensive and that relevant studies could be included. Next, the researchers practised an advanced searching strategy by developing search strings based on basic functions such as field codes (TITLE-ABS-KEY), phrase searching, truncation, wildcards and Boolean operators in Scopus and Web of Science, as illustrated in Table 1. The identification process generated 1166 potential articles across the three selected databases.

Table 1: Search Strings for Scopus and WoS Databases

Scopus TITLE-ABS-KEY(("artificial intelligence" OR "AI" OR "machine learning" OR "deep learning" OR "neural network*" OR "intelligent system*" OR "intelligent tutoring system*" OR "adaptive learning system*" OR "learning analytic*" OR "educational data mining" OR "generative AI" OR "large language model*" OR "chatbot*" OR "conversational agent*" OR "intelligent agent*") AND ("reflective practice*" OR reflection OR "reflective learning" OR "reflective thinking" OR "reflective teaching" OR "reflective dialogue" OR "educator reflection" OR "critical reflection" OR metacognition OR "metacognitive skill*" OR "reflective process*" OR "self-reflection") AND ("in-service educator*" OR "practising educator*" OR "educator professional development" OR "educator education" OR "educator training" OR "educator growth" OR "professional learning" OR "continuing professional development" OR "CPD" OR educator* OR "school educator*"))
Web of Science TS=(("artificial intelligence" OR "AI" OR "machine learning" OR "deep learning" OR "neural network*" OR "intelligent system*" OR "intelligent tutoring system*" OR "adaptive learning system*" OR "learning analytic*" OR "educational data mining" OR "generative AI" OR "large language model*" OR "chatbot*" OR "conversational agent*" OR "intelligent agent*") AND ("reflective practice*" OR reflection OR "reflective learning" OR "reflective thinking" OR "reflective teaching" OR "reflective dialogue" OR "educator reflection" OR "critical reflection" OR metacognition OR "metacognitive skill*" OR "reflective process*" OR "self-reflection") AND ("in-service educator*" OR "serving educator*" OR "practising educator*" OR "educator professional development" OR "educator education" OR "educator learning" OR "educator training" OR

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"educator growth" OR "professional learning" OR "continuing professional development" OR "CPD" OR educator* OR "school educator*"))

Source: Authors' Own Work

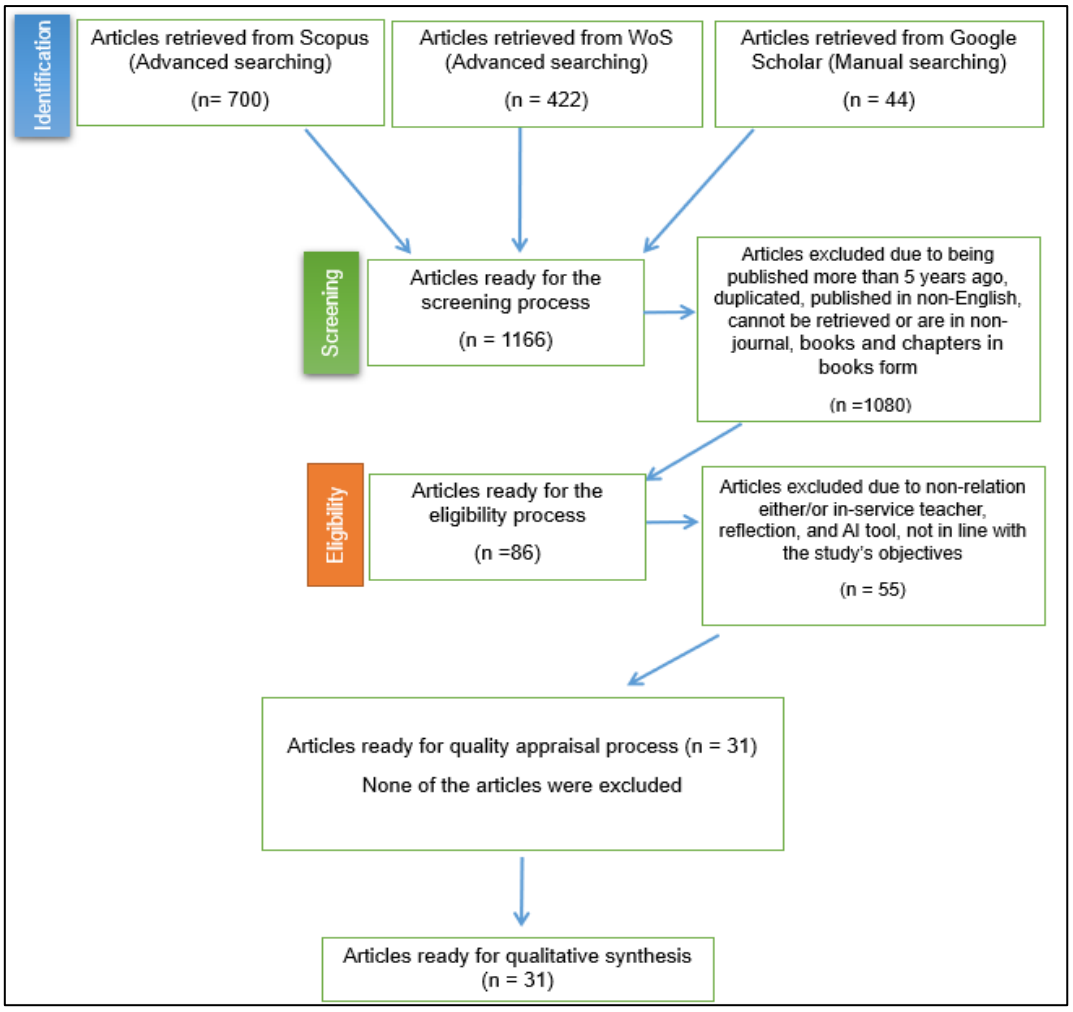


Figure 1: Adapted PRISMA Diagram

Source: Authors' Own Work Based on PRISMA Diagram By Page et al. (2021)

The second process in the systematic searching strategy was screening. This process involved establishing criteria for article selection as shown in Table 2. Two primary reasons for screening were: first, to reduce the total number of articles to be reviewed, and second, to select only relevant articles that addressed the formulated research questions. For this SLR, three main criteria were predetermined. First, the year of publication. Only articles published between 2021 and 2025 were selected to ensure sufficient representation of the latest trends in this field. Second, the type of publication, in which only journal articles, books and chapters in books were chosen to provide specificity to this SLR. The final one is language. Only journal articles that are written in English were selected to avoid any misunderstanding of the content that may lead to an inaccurate representation of the results. Duplicates were also removed. Through this process, 1080 articles were removed based on the combined criteria. Articles that included both pre-service and in-service educators were not excluded, but attention was directed to findings related to in-service educators. The remaining 86 articles then underwent the next stage, the Eligibility process.

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All the selected articles were included in the third stage of the systematic search strategy, which involved assessing their eligibility for inclusion. Eligibility requires researchers to determine whether the selected articles are relevant to the formulated objective(s). For this SLR, we carefully examined the titles, abstracts, and full articles. Only articles that have a direct correlation to the objective of this SLR were chosen, while those that do not were excluded. Through this process, 55 articles were removed for being unrelated to in-service educators and reflection, the use of an AI tool, or the study's objectives. By the end of the process, 31 articles entered the quality appraisal.

Table 2: Inclusion and Exclusion Criteria

Criterion	Inclusion	Exclusion
Timeline	2021 – 2025	2020 and earlier, 2026
Document Type	Journal articles, books and chapters in books	Conference proceeding etc
Language	English	

Source: Authors' Own Work

Articles Quality Appraisal

A quality appraisal of the remaining articles was performed based on the six criteria established by Abouzahra et al. (2020). The six criteria are:
QA1. Is the purpose of the study clearly stated?
QA2. Is the interest and the usefulness of the work clearly presented?
QA3. Is the study methodology clearly established?
QA4. Are the concepts of the approach clearly defined?
QA5. Is the work compared and measured with other similar work?
QA6. Are the limitations of the work clearly mentioned?

For each criterion, three answer options are given, which are Yes (represents 1 mark), Partly (represents 0.5 mark) and No (represents 0 mark). A minimum total mark of 3.0 must be recorded for an article to be accepted. This process showed that all articles met the minimum requirement; therefore, the remaining 31 articles were accepted for data extraction and analysis.

Data Extraction and Analysis

This review employed a hybrid thematic analysis approach as proposed by Swain (2018), combining deductive and inductive analytical procedures. Hybrid thematic analysis was selected to maintain theoretical sensitivity while remaining receptive to emerging patterns across the literature. The deductive phase was informed by the theoretical lenses underpinning the review, namely Sociocultural Theory and Schön's reflective practice framework. Initial coding focused on concepts associated with reflective practice, sociocultural mediation, cognitive and metacognitive development, professional identity, professional learning, and competence development.

Following the deductive phase, an inductive analysis was conducted to identify recurring patterns, relationships, and emerging insights across the selected studies. Data extraction focused on the reflective processes, educators' individual competencies and dispositions, and professional competency development. The coding process was iterative and comparative. All

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authors were involved in continuous refinement through repeated examination of the included studies to ensure conceptual consistency and analytical coherence.

The analysis sought to uncover how AI-mediated reflection influenced educators' development at both individual and professional levels. Through this iterative process, two overarching meta-themes were generated: (a) individual competencies consisting of four sub-themes and (b) professional competencies comprising two sub-themes. Table 3 summarises the themes in the literature analysed. Taken together, these themes provide a comprehensive understanding of how AI-mediated reflection contributes to the development of in-service educators within contemporary educational contexts.

Table 3 : A Summary of Themes Identified

STUDY	INDIVIDUAL COMPETENCIES & DISPOSITIONS				PROFESSIONAL COMPETENCIES	
	DR&EA	S-EC	C-MF	REI	CPD	EAI
Arefian et al. (2024)	√	√	√	√	√	
Baran et al. (2023)	√	√			√	
Chang & Hwang (2025)	√	√			√	
Dann et al. (2024)	√	√			√	
Ding et al. (2024)	√	√		√	√	√
Engeness et al. (2025)	√	√	√	√	√	√
Ghiasvand & Seyri (2025)	√	√		√	√	√
Gunbatar et al. (2025)	√	√	√			√
Heaton et al. (2024)	√	√	√	√		
Jacobs et al. (2024)	√			√		
Javahery et al. (2025)	√	√	√	√		√
Karumbaiah et al. (2023)	√	√				
Kelly et al. (2025)	√		√			
Kim & Kwon (2025)	√	√		√	√	
Kumar et al. (2024)	√	√	√		√	√
Le & Pham (2025)	√	√		√		
Lee et al. (2024)	√	√	√	√		√
Linderoth et al. (2025)		√		√	√	
Liu et al. (2025)	√		√	√		
Mante et al. (2025)	√	√	√		√	
Mateus et al. (2024)	√	√	√			
Minnillo et al. (2024)	√	√				
Nikolic et al. (2025)	√	√	√			
Novoa-Echaurren et al. (2025)	√	√	√	√	√	
Phillips et al. (2023)	√					
Sun & Sun (2025)	√					
Vartiainen et al. (2025)	√	√	√	√		√
Yang & Banks (2024)	√	√	√	√		√
Yanti et al. (2025)	√	√	√		√	√
Yeh, H.-C. (2025)		√				
Yoon et al. (2025)	√	√	√	√		√

ACRONYM	MEANING
DR & EA	Depth of reflection & Emotional Awareness
S-EC	Socio-Ethical Considerations

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C-MF	Cognitive-Metacognitive Functioning
REI	Reconstruction of Educator Identity
CPD	Continuous Professional Development
EAI	Enhanced AI Literacy

Source: Authors' Own Work Based on The Analysis

Research Findings

The systematic analysis carried out in this SLR was based on 31 selected articles. Overall, the synthesis of these articles resulted in multifaceted implications across educators' personal and professional domains. Although the inclusion year was 2021, articles that fit the context of this study were published starting from 2023, which aligned with the release of ChatGPT in 2022. Four (13%) articles were published in 2023; 11 (35%) were in 2024; 16 (52%) were in 2025. The research questions inherently constituted two meta-themes: implications for educators' individual competencies and dispositions (comprising four sub-themes) and for professional competencies (comprising two sub-themes). Each sub-theme is presented accordingly.

Individual Competencies and Dispositions

The findings suggest that AI-mediated reflection extends beyond a technical process of reviewing practice and functions as a mechanism through which educators construct professional meaning, negotiate identity, and regulate their learning. Analysis revealed that 31 (100%) out of 31 articles reported outcomes related to at least one sub-theme of educators' individual competencies and dispositions. The first sub-theme, depth of reflection and emotional awareness, was traced in 29 (94%) out of 31 studies. In these studies, deep reflection was associated with enhanced emotional awareness experienced by the educators. Javadi et al. (2017) reported that the Iranian language educators demonstrated heightened emotional awareness by applying constraints when engaging in algorithmic interactions. This was particularly seen in situations where emotional sensitivity and tacit knowledge were required. Similarly, Le and Pham (2025) explicitly discussed emotional labour and pedagogical ambivalence when dealing with AI to interrogate tensions, uncertainties and professional judgment. In-depth reflection and critical emotions emerged when the educators reflected on the AI outputs in relation to their cultural sensitivity.

The second common sub-theme that emerged from the analysis is socio-ethical considerations. Socio-ethical considerations refer to cultural norms, social expectations, and ethical principles that shape how in-service educators utilise, interpret, and engage with AI tools. The discussion on socio-ethical considerations when reflecting with AI tools emerged in 26 (84%) articles. 16 of the articles discussed the ethical dimension alone, two on the social dimension alone and eight on both dimensions. For instance, Ghiasvand and Seyri (2025) emphasised the importance of navigating ethical dilemmas to ensure that AI-supported practices remained aligned with classroom culture and pedagogical values. Similarly, several studies highlighted how educators' decisions regarding AI use were shaped by prevailing social expectations and contextual norms within their professional environments (Karumbaiah et al., 2023; Kim & Kwon, 2025). These findings suggest that educators do not engage with AI in isolation. Their reflective practice continuously negotiates the social meanings, ethical responsibilities, and cultural expectations associated with AI use.

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Another consistent pattern that emerged is cognitive and metacognitive functioning. Cognitive function refers to processing and understanding information, whereas metacognitive function involves monitoring and regulating one's cognitive processes. Out of 17 (55%) studies, 11 discussed cognitive functioning in isolation, while six studies established the connection between cognitive and metacognitive functioning. Vartiainen et al. (2025) found that teacher educators perceived generative AI as a cognitive tool that could foster metacognition, self-regulation, responsibility, and learner agency. Through collaborative exploration and reflection on AI's possibilities and limitations, participants developed a more nuanced understanding of their own thinking processes and pedagogical decision-making. Similarly, Kelly et al. (2025) demonstrated how AI-generated feedback promoted deeper cognitive engagement by directing educators' attention to specific features of their classroom discourse. Teachers engaged in a process of sense-making, interpreting automated feedback and linking it to classroom contexts and instructional practices. Although many of the studies reported increased cognitive functioning among educators, some studies raised concerns that reliance on AI tools could hinder cognitive capacity. For instance, Yoon et al. (2025) associated dependence on AI with a diminution of decision-making and a reduction in self-reflection patterns as 'metacognitive laziness'.

The final sub-theme related to individual competencies and dispositions is the reconstruction of educator identity, which was traced in 16 (52%) studies analysed. Educators acknowledged increased awareness of AI's role in their practice, whether for instructional use or professional growth. Eight studies explicitly indicated that educators mostly began the studies with sceptical or cautious assumptions about the use of AI. However, these preconceptions shifted to a more positive understanding at the end of the studies. For instance, a computer science educator in the study by Kim and Kwon (2025) described her identity reconstruction from a 'shy engineer' to a more confident and capable educator. Findings from Ghiasvand & Seyri (2025) further supported the emergence of this sub-theme. They demonstrated that collaborative reflection on AI integration facilitated language teacher identity reconstruction through role transformation, enhanced professional expertise, pedagogical development, and increased self-reflective capacity. Meanwhile, Yang and Banks (2025) illustrated how teacher educators' reflective engagement with generative AI prompted ongoing reconsideration of their professional roles, capabilities, and responsibilities. Collectively, these findings reflect a process of professional self-repositioning in response to emerging technological demands.

Professional Competencies

The implications of AI-mediated reflective practice were not only observed at the personal level but also transcended to the professional level. The analysis revealed that educators' willingness to engage in continuous professional development (CPD) was strengthened through their reflective experiences with AI tools. This sub-theme emerged in 13 (42%) of the reviewed articles. Yanti et al. (2025) reported that Indonesian middle school educators articulated a pressing need for educators to continuously develop professionally in order to address the challenges of implementing lessons using AI-generated videos. Focusing on large language models (LLMs), Kumar et al. (2024) revealed the AI tools' capacity to facilitate CPD for designing and developing courses. Phillips et al. (2023) reported that AI models assisted data retrieval and analysis to support educators' reflection. Educators in some of the studies also reported voluntary willingness to engage with AI tools once the studies concluded for upskilling and self-directed professional development (Arefian et al., 2024; Jacobs et al., 2024;

Sun & Sun, 2025). This sustained engagement suggests that educators perceived AI not merely as a temporary instructional aid but as a valuable resource for ongoing professional learning.
The analytical results also identified enhanced AI literacy associated with educators' engagement with AI tools. Their exploration of AI tools was characterised by iterative refinement of prompts to improve the quality of intended outputs. Of the 11 (35%) articles identified under this sub-theme, five explicitly highlighted the need for AI literacy to be systematically developed among educators. Vartiainen et al. (2025) reported that educators frequently experienced frustration when AI systems failed to generate the expected responses. Therefore, Yang and Banks (2025) identified AI literacy as a fundamental component of twenty-first-century educator preparation. Both studies demonstrated that desirable outputs were often achieved only through repeated cycles of reflection, evaluation, and prompt refinement. Similar to this finding, Ding et al. (2024) found measurable growth in educators' AI literacy. Six of the seven participating educators reported enhanced AI literacy following their engagement in AI-focused professional development activities. These findings suggest that AI literacy is a dynamic and reflective form of professional knowledge developed through mediated interaction with technological tools.

Discussion

Taken together, the findings for both meta-themes suggest that AI-mediated reflective practice extends beyond the instrumental use of technology. AI tools emerged as mechanisms through which educators construct meaning, regulate learning, negotiate professional identities, and engage in continuous professional growth. Viewed through the lens of SCT (Vygotsky, 1978), complemented by the reflective practice framework (Schön, 1983), the reviewed studies indicate that AI serves not only as a technological tool. Their treatment as a mediational artefact shaping educators' reflective processes and professional development is evident.

From an SCT perspective, learning and development occur through interactions with mediating cultural tools that support higher-order cognitive functioning (Vygotsky, 1978). Across the reviewed studies, AI functioned as such a mediational artefact by providing feedback, generating alternative perspectives, supporting inquiry, and facilitating access to professional knowledge (Arefian et al., 2024; Kelly et al., 2025; Kumar et al., 2024; Yang & Banks, 2025). Rather than passively accepting AI-generated outputs, educators actively interpreted, questioned, and refined AI responses. This process enables deeper reflective thinking and co-constructs professional knowledge. This mediational process was particularly evident in the deepening of educators' reflection and emotional awareness. Educators frequently moved beyond technical evaluations of AI outputs to reflect on uncertainty, professional judgement, and emotional responses. From Schön (1983) perspective, these tensions reflect the uncertain and indeterminate nature of professional practice. Educators must navigate situations that cannot be resolved through technical solutions alone and therefore require reflective judgement.

Nonetheless, tensions emerged when AI-generated recommendations conflicted with cultural sensitivities, tacit pedagogical knowledge, or ethical responsibilities. Such tensions were especially prominent in non-Western contexts, where AI-generated outputs occasionally reflected assumptions misaligned with local cultural norms and educational realities. Evidence from the reviewed studies further illustrates how cultural sensitivity, ethical responsibilities, and contextual expectations mediated educators' reflective engagement with AI (Javahery et al., 2025; Vartiainen et al., 2025; Yoon et al., 2025). Through critical engagement with AI

tools, educators developed socio-ethical awareness that shaped their interactions with AI tools. These findings illustrate SCT's proposition that meaning making is culturally mediated. Emotional awareness emerged as educators negotiated tensions between AI-generated recommendations and locally situated pedagogical values, norms, and expectations.

Similarly, the findings relating to cognitive and metacognitive functioning provide further support for the SCT perspectives. Consistent with SCT, AI tools functioned as cognitive tools that supported reasoning, sense-making, and self-regulation. Cognitive tools augment an individual's cognitive capacity by collaborating as intellectual partners (Jonassen, 2009). AI tools may function as mediational cognitive tools that support educators in performing reflective tasks beyond what might otherwise be achieved independently. For example, Lee et al. (2024) reported that GPT-4V-powered teacher analytics supported reflection-in-action and reflection-on-action. Such detailed interpretations of classroom processes enhanced educators' awareness of necessary instructional adjustments beyond the reach of traditional approaches. Educators used AI-generated feedback to analyse classroom interactions, interpret teaching practices, and monitor their own thinking processes. These findings suggest that AI can extend cognitive capacity by providing external representations and feedback that facilitate deeper analysis.

At the same time, the development of metacognitive awareness through self-monitoring and reflective evaluation resonates strongly with Schön's conception of reflective practice. Educators in the studies demonstrated reflection-on-action when they engaged in critical examination of their own assumptions and decision-making processes (Kelly et al., 2025; Vartiainen et al., 2025). However, concerns regarding overreliance on AI and the emergence of "metacognitive laziness" highlight the importance of maintaining professional agency (Javahery et al., 2025; Yoon et al., 2025). These contradictory findings suggest AI-mediated reflection may enhance reflective capacity only when educators remain active participants in the reflective process. Rather than offloading cognitive processes, educators should take charge of their interactions with AI tools by being active knowledge constructors. Through active negotiation of AI-generated outputs, educators indirectly enhance their critical thinking. This reciprocal human-machine partnership mitigates the effects of overreliance on AI tools.

Another significant finding concerns the reconstruction of educator identity. The reviewed studies suggest that reflective engagement with AI often prompted educators to reconsider their professional roles, capabilities, and responsibilities. The SCT perspective posits that professional identity is socially constructed through participation in culturally situated activities and interactions rather than solely through individual cognitive change (Lave & Wenger, 1991; Solari & Martín Ortega, 2022). As educators engaged with AI tools, they encountered new expectations regarding technological competence, pedagogical innovation, and professional expertise. Many of the analysed studies reported that educators moved from uncertainty or scepticism to greater confidence and agency after their experiences with AI tools. This process also aligns with Schön's notion of reflective practice. Practitioners continually reconstruct their professional selves through reflective engagement with practice as they negotiate beliefs, values, and identities in response to lived experiences and contextual demands (Farrell, 2011). The findings therefore suggest that AI-mediated reflection contributes not only to pedagogical improvement but also to the ongoing development of professional identity.

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At the professional level, AI-mediated reflection appears to strengthen educators' engagement in CPD. This interpretation is supported by studies in which educators voluntarily continued engaging with AI tools beyond formal interventions for self-directed learning and professional growth (Arefian et al., 2024; Jacobs et al., 2024; Sun & Sun, 2025). The conventional model of professional learning has been criticised for its episodic and fragmented nature, which impedes sustained growth (Darling-Hammond et al., 2017; Desimone, 2023). In response, in-service educators have begun to conceptualise AI as a means of fostering personalised and enduring professional development to complement the lack of time for ongoing professional development. Holmes & Littlejohn (2024) proposed that AI tools are capable of supporting self-regulated, workplace-embedded learning and extending professional growth beyond formal training programmes. These findings closely align with SCT's conceptualisation of professional learning as participation in ongoing mediated activity rather than the acquisition of discrete skills. Learning occurs through participation in socially situated practices and engagement with cultural tools that mediate professional action and understanding (Lave & Wenger, 1991; Wertsch, 1998). In parallel, Schön's framework suggests that professional expertise develops through repeated cycles of action and reflection. Educators' willingness to continue using AI tools after formal interventions ended indicates that reflective learning became embedded in everyday professional practice.

Finally, the emergence of enhanced AI literacy further illustrates the complementary explanatory power of SCT and Schon's framework. The findings indicate that AI literacy was developed through iterative cycles of experimentation, evaluation, and refinement rather than through passive exposure to technology. This evidence mirrors Long and Magerko's (2020) conceptualisation of AI literacy as a set of competencies involving the critical evaluation and purposeful use of AI systems rather than mere awareness of the technology. Studies reported that participants refined prompting strategies based on prior experiences (Vartiainen et al., 2025; Yang & Banks, 2025), critically scrutinised and contextualised AI-generated outputs (Javahery et al., 2025), and developed greater AI literacy through sustained engagement with AI-supported activities (Ding et al., 2024; Minnillo et al., 2024). Viewing from the lens of SCT, AI literacy therefore represents a form of mediated competence that develops through interaction with technological artefacts. Simultaneously, the repeated process of prompt refinement reflects Schön's concepts of reflection. Educators continuously reflect on AI-generated outcomes to adjust their instructional and professional approaches. As a result, AI literacy emerges not merely as a technical skill but as a reflective professional capability. In increasingly AI-mediated educational environments, AI literacy is instrumental for educators to exercise critical judgment.

All in all, the synthesis suggests that AI-mediated reflection operates as a sociocultural and reflective process. SCT explains how AI mediates learning through interaction with cultural tools and social contexts, whereas Schön's framework explains how educators engage in reflective inquiry while interacting with those mediational tools. By implication, this process helps in-service educators cultivate both personal insights and professional competence. At the personal level, rather than functioning solely as a technological innovation, AI serves as a mediating partner that supports deeper reflection, socio-ethical reasoning, cognitive and metacognitive growth, as well as professional identity reconstruction. At the professional level, active engagement with AI fosters continuous professional development while simultaneously advancing educators' AI literacy. The integration of SCT and Schön's Reflective Practitioner framework therefore provides a coherent explanation of how AI-mediated reflection

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contributes to educator development by simultaneously supporting mediated learning and reflective inquiry.

Conclusion

In illustrating how reflection among in-service educators is mediated through AI technologies, this SLR has limitations. First, the study considered in-service educators' experiences reflecting on AI only at personal and professional levels. Future studies are recommended to delve deeper into macro levels to provide a more holistic understanding of this discipline. Second, because the reviewed articles are in English, the educators reviewed are more likely to be English educators than educators teaching other subjects. Therefore, researchers proficient in multiple languages are strongly encouraged to include articles in other languages as well. Lastly, although the researchers attempted to provide a selection of related articles, we cannot guarantee that we included all relevant articles. However, we made a comprehensive effort to ensure the selected studies addressed the two research questions.

Overall, the SLR undertaken in this study offers several notable contributions. First and foremost, this study contributes meaningful insights into educator education in the era of AI. It provides essential considerations for informed, evidence-based policy and practice for responsible organisations involved in teacher training and educator development. Data from numerous relevant empirical studies provide a stronger justification than a single study. Secondly, this SLR extends SCT into the emerging context of AI-mediated reflective practice. It illustrates how AI functions as a mediational artefact that supports reflective inquiry, identity development, cognitive regulation, and professional learning among in-service educators. Active participation enables AI tools to support in-service educators' knowledge construction, foster meaning-making, and strengthen professional learning. Simultaneously, ongoing cycles of inquiry, feedback, and adaptation of AI-generated outputs facilitate reflection. Consequently, this review offers a theoretically grounded explanation of how AI-mediated reflection contributes to educators' personal and professional development. Ultimately, the findings underscore AI tools' potential to catalyse transformative professional development. It compels professional development providers to envision AI's role in fostering personalised growth, reflective engagement, and adaptive expertise among educators.

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Use of AI Technology During the preparation of this work, the authors used ChatGPT and Grammarly to assist with the language construction. After using these tools, the authors reviewed and edited the content as needed and take full responsibility for the published article.

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