



Reimagining Teacher Education in the Age of Artificial Intelligence: A Critical Review of Opportunities, Competencies and Ethical Challenges

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Abstract

Artificial intelligence (AI), particularly the rapid development of generative artificial intelligence (GenAI), is reshaping the knowledge, competencies, and professional practices expected of contemporary teachers. Teacher education consequently faces a dual responsibility: it must prepare teachers to use AI productively in pedagogical practice while simultaneously developing their capacity to question, evaluate, and regulate its educational use. This paper critically reviews the emerging role of AI in teacher education, with particular attention to pre-service teacher preparation, pedagogical design, assessment and feedback, reflective practice, professional learning, and AI literacy. Moving beyond technologically deterministic accounts of AI-driven educational transformation, the review examines the conditions under which AI may strengthen rather than diminish teacher agency and professional judgement. Particular attention is given to generative AI because its capacity to produce text, images, instructional materials, assessment tasks, explanations, and feedback has created qualitatively different opportunities and challenges for teacher preparation. The review also examines concerns relating to algorithmic bias, hallucinated information, data privacy, academic integrity, unequal access, transparency, accountability, and overdependence on automated systems. Drawing on contemporary scholarship and international competency frameworks, the paper proposes an AI-Enabled Teacher Education Framework (AI-TEF) organized around five interconnected dimensions: AI Understanding, AI-Supported Pedagogy, Critical Evaluation, Ethical Responsibility, and Human-AI Professional Agency. The framework positions AI competence not as technical proficiency alone but as the capacity to make pedagogically justified, ethically responsible, and context-sensitive decisions concerning AI. The paper argues that the future of teacher education should not be organized around replacing teacher expertise with automated intelligence, but around preparing teachers who can critically orchestrate human and artificial intelligence while preserving the relational, ethical, creative, and professional foundations of teaching.

Keywords: Artificial Intelligence; Generative AI; Teacher Education; Pre-Service Teachers; AI Literacy; Teacher Competence; AI Pedagogy; Professional Development; Ethical AI

1. Introduction

Artificial intelligence has moved rapidly from a specialized technological field to an increasingly visible component of educational practice. AI-enabled systems can generate instructional content, recommend learning resources, analyse learner data, provide automated feedback, support assessment, facilitate personalization, and assist with administrative and professional tasks. The widespread accessibility of generative AI has accelerated this transformation by enabling educators and learners to interact directly with systems capable of generating human-like text, images, explanations, lesson materials, and other forms of educational content.

These developments have significant implications for teacher education. Preparing teachers for contemporary classrooms can no longer be limited to conventional technological competence. Future teachers increasingly need to understand what AI systems can and cannot do, how AI-generated information should be evaluated, when AI can meaningfully contribute to pedagogy, and when professional human judgement must take precedence.

Teacher education therefore occupies a particularly important position in the educational AI debate. Teachers are not merely end-users of educational technologies. They interpret curriculum, design learning experiences, assess learners, respond to diversity, make ethical decisions, and mediate relationships between students, knowledge, institutions, and technology. Consequently, the quality of AI integration in schools will depend substantially on how teachers understand and exercise their professional agency in AI-rich environments.

Earlier research on artificial intelligence in education focused substantially on intelligent tutoring systems, adaptive learning, learning analytics, automated assessment, and related technologies (Ma et al., 2014; Roll & Wylie, 2016; Zawacki-Richter et al., 2019). These applications remain important. However, generative AI has substantially expanded the educational discussion. Unlike many earlier systems operating primarily through institutionally controlled platforms, contemporary GenAI tools can be directly accessed by teachers and students and used for a wide variety of intellectual and pedagogical activities.

A pre-service teacher may use generative AI to generate lesson ideas, create differentiated activities, develop assessment questions, simplify or adapt explanations, construct classroom scenarios, obtain feedback on lesson plans, or support reflective writing. Similarly, teacher educators may use AI to develop teaching materials, support individualized learning, analyse patterns in student work, or facilitate professional learning.

These possibilities create considerable educational opportunities but also introduce substantial risks. AI-generated information may be inaccurate or fabricated. Automated outputs may reproduce social or cultural biases. Data entered into external systems may create privacy concerns. Excessive dependence on AI-generated materials may weaken opportunities for pre-service teachers to develop independent planning, reasoning, writing, and professional judgement. Generative AI also complicates conventional approaches to academic integrity and assessment.

International frameworks increasingly recognize that effective AI integration therefore requires more than technical competence. UNESCO's AI Competency Framework for Teachers emphasizes a human-centred orientation alongside AI ethics, foundations and applications, AI pedagogy, and AI for professional learning (Miao & Cukurova, 2024). Such frameworks signal an important shift from learning *how to operate AI tools* towards learning *how to exercise informed professional judgement about AI*.

This distinction is particularly important for teacher education.

The central question is no longer simply whether teachers should use artificial intelligence. AI systems are already entering educational environments. The more consequential question is:

What knowledge, competencies, professional dispositions, and ethical capacities should teacher education develop so that teachers can engage with AI critically, pedagogically, and responsibly?

This paper addresses this question through a critical review of emerging scholarship on AI and teacher education. It examines AI's potential contribution to teacher preparation while challenging assumptions that technological efficiency automatically produces educational improvement.

2. Scope and Approach of the Review

This paper adopts a critical narrative review and conceptual synthesis approach. It does not claim to be a systematic review or meta-analysis, nor does it report primary interview, survey, or experimental data.

The review draws upon scholarship concerning artificial intelligence in education, generative AI, teacher education, educational technology, AI literacy, teacher professional development, assessment, learning analytics, and ethical AI. International policy and competency frameworks are also considered where they provide conceptual guidance concerning the capabilities teachers require in AI-rich educational environments.

Earlier literature concerning intelligent tutoring systems, adaptive learning, learning analytics, automated assessment, and immersive technologies provides historical and conceptual foundations. Greater analytical attention, however, is given to the post-generative-AI educational landscape because the accessibility and generative capabilities of contemporary AI systems have altered the relationship between teachers and educational technology.

The review is organized thematically rather than chronologically. It considers AI in relation to teacher preparation, pedagogical design, personalization, assessment, reflective practice, professional development, AI literacy, ethics, professional agency, and educational equity.

The purpose is not to determine whether AI is inherently beneficial or harmful to teacher education. Rather, the paper examines the conditions under which AI may contribute to meaningful teacher learning and the conditions under which its use may undermine professional, ethical, or pedagogical objectives.

3. From Educational Technology to Generative Artificial Intelligence

Artificial intelligence in education predates the contemporary popularity of generative AI. Intelligent tutoring systems represented an important early attempt to develop computer-based environments capable of responding adaptively to learners. Research subsequently expanded towards automated assessment, adaptive learning systems, educational data mining, predictive analytics, and learning analytics.

Ma et al. (2014), for example, demonstrated through meta-analysis that intelligent tutoring systems could positively influence learning outcomes. Roll and Wylie (2016) documented the broader evolution of artificial intelligence in education, while Zawacki-Richter et al. (2019) identified multiple applications of AI within higher education and simultaneously raised questions concerning the limited involvement of educators in portions of the emerging research landscape.

The emergence of generative AI represents an important development because it changes the accessibility and scope of AI-supported educational activity.

Earlier educational AI systems were frequently developed for relatively specific functions. Generative AI systems are comparatively general-purpose. A single conversational system may assist with brainstorming, summarization, explanation, translation, instructional design, assessment construction, feedback, simulation, or reflective dialogue.

For teacher education, this changes AI from a technology that teachers may encounter within particular institutional systems into a technology with which teachers can interact continuously during professional learning and practice.

The educational question consequently shifts from **AI as an instructional technology** towards **AI as a participant in pedagogical and professional activity**.

This shift requires teacher education to reconsider what technological competence means.

4. Changing Expectations of Teacher Competence in the AI Era

Conventional approaches to teacher technology competence have generally emphasized teachers' ability to select and use digital resources appropriately for teaching and learning. Artificial intelligence introduces additional competencies because AI systems do not merely present information; they may generate, recommend, classify, predict, or transform it. Teachers therefore need to understand not only how to use AI systems but also how to interrogate their outputs.

UNESCO's AI Competency Framework for Teachers provides an important contemporary reference. The framework identifies competencies across five dimensions: a human-centred mindset, ethics of AI, AI foundations and applications, AI pedagogy, and AI for professional learning (Miao & Cukurova, 2024). This conceptualization has important implications for teacher education because it challenges a narrow interpretation of AI literacy as prompt-writing or technical proficiency. A teacher who can generate a lesson plan through AI but cannot evaluate its pedagogical suitability cannot be regarded as fully AI competent. Similarly, a teacher who produces assessment material efficiently but fails to identify bias, factual inaccuracies, inappropriate difficulty, or privacy implications demonstrates operational proficiency without sufficient professional judgement. AI competence in teacher education should therefore combine technological understanding with pedagogical reasoning, critical evaluation, ethics, and professional agency.

5. AI in Pre-Service Teacher Preparation

Pre-service teacher education provides an important environment for developing responsible AI practice because professional habits established during teacher preparation may influence later classroom practice.

Generative AI can support pre-service teachers in several areas. It can provide alternative explanations of complex concepts, generate examples, support brainstorming, assist with lesson planning, create hypothetical classroom situations, and provide opportunities for iterative feedback.

Emerging research suggests that pre-service teachers are already using generative AI both as a learning support and as a form of teaching assistant. Such use includes accessing explanations and resources as well as supporting lesson planning and assessment development.

However, frequency of use should not be equated with educational quality.

If pre-service teachers routinely delegate lesson design to AI before developing their own pedagogical reasoning, AI may reduce rather than strengthen opportunities for professional learning. Teacher preparation therefore needs to distinguish between **AI-assisted performance** and **AI-supported competence development**.

6. AI-Supported Lesson Planning and Pedagogical Design

Lesson planning represents one of the most visible applications of generative AI for teachers. AI systems can rapidly generate learning objectives, instructional activities, examples, questions, worksheets, differentiation strategies, and assessment ideas. For beginning teachers, such capabilities may reduce the cognitive burden associated with planning and provide exposure to alternative instructional possibilities.

However, producing a technically complete lesson plan is not equivalent to developing pedagogical competence. Lesson planning is itself a learning process through which pre-service teachers interpret curriculum, consider learner characteristics, sequence knowledge, anticipate misconceptions, select pedagogical strategies, and align assessment with intended outcomes. If these decisions are outsourced

without reflection, efficiency may be achieved at the expense of professional learning. A more productive teacher-education approach would therefore position AI-generated lesson plans as objects of critique.

Pre-service teachers might generate an AI-supported plan and then examine:

- Whether objectives are developmentally appropriate;
- Whether activities align with those objectives;
- What assumptions the plan makes about learners;
- Whether differentiation is meaningful;
- Whether cultural or contextual considerations are adequately represented;
- Whether assessment actually measures intended learning; and
- What should be modified through professional judgement.

In this model, AI becomes a catalyst for pedagogical reasoning rather than a substitute for it.

7. Personalization and Adaptive Teacher Learning

AI also creates possibilities for greater personalization within teacher education. Pre-service teachers enter programmes with different disciplinary backgrounds, technological competencies, pedagogical knowledge, and professional experiences. Adaptive systems can potentially identify areas of difficulty and recommend targeted learning resources or practice. Such personalization may be particularly useful for complex professional competencies requiring repeated practice and feedback.

However, personalization should not be interpreted exclusively as algorithmic adaptation. Teacher learning includes collaborative dialogue, mentoring, observation, professional identity development, and participation in communities of practice. These dimensions cannot easily be reduced to individualized learning pathways.

AI-supported personalization should therefore complement rather than displace relational and collaborative forms of teacher education.

8. AI in Assessment and Feedback

Assessment is another area in which AI may significantly affect teacher education. AI systems can support question generation, rubric development, preliminary feedback, pattern identification, and analysis of written responses. Generative AI may also provide pre-service teachers with rapid formative feedback on lesson plans, teaching reflections, or instructional materials.

The principal advantage is immediacy. Traditional teacher-education programmes may struggle to provide intensive individualized feedback to every student at every stage of professional development. AI-supported feedback can create additional opportunities for revision. Yet automated feedback raises an important epistemic question: **Who determines whether the feedback is educationally sound?** AI-generated feedback may appear authoritative while containing inaccuracies or inappropriate assumptions. Teacher education must consequently develop students' ability to treat AI feedback as provisional rather than unquestionable. Assessment practices also require reconsideration because generative AI can produce essays, reflections, lesson plans, assignments, and other artefacts traditionally used as evidence of student learning. The challenge for teacher education is therefore twofold: using AI to strengthen assessment while simultaneously redesigning assessment so that genuine professional understanding remains visible.

9. AI, Simulation and Practice-Based Teacher Education

Teacher education has long faced a practical challenge: beginning teachers need opportunities to practise complex classroom decisions, yet experimentation in real classrooms has consequences for actual learners. Simulation technologies can provide an intermediate environment. Virtual and immersive environments have previously been used to support classroom-management and practice-teaching experiences (Billingsley et al., 2019). Generative AI may extend this approach by enabling dynamic classroom

scenarios, simulated student questions, parent-teacher conversations, differentiated learner profiles, and other interactive professional situations. A pre-service teacher might, for example, practise responding to a simulated misconception, handling a difficult classroom interaction, explaining a concept in multiple ways, or communicating with a hypothetical parent. The educational value of such simulations lies not in reproducing classrooms perfectly but in creating opportunities for deliberate practice followed by reflection. Human supervision nevertheless remains important. Simulated responses generated by AI should not be assumed to represent the full complexity of real learners or classroom relationships.

10. AI and Reflective Practice

Reflection is a central component of professional teacher development. Generative AI creates new possibilities for dialogic reflection because a teacher can describe an instructional situation, request alternative interpretations, identify possible causes of a classroom difficulty, or explore different responses. Used appropriately, AI may function as a reflective prompt rather than an evaluator. For example, after a teaching practicum, a pre-service teacher could use AI to generate questions concerning instructional decisions and subsequently compare those prompts with mentor feedback and personal observations. The danger arises when AI generates the reflection itself. Reflective writing is educationally valuable because the process requires teachers to reconstruct experience, identify assumptions, analyse decisions, and consider alternatives. If AI performs this intellectual work, the submitted reflection may become more polished while the underlying reflective competence becomes weaker. Teacher education should therefore distinguish between **AI for prompting reflection** and **AI for replacing reflection**.

11. AI Literacy as a Core Teacher Competence

As AI becomes increasingly embedded in educational environments, AI literacy should become an explicit component of teacher preparation. However, AI literacy should not be reduced to knowing how to use popular tools. Teachers require at least four forms of understanding:

Technical understanding concerns basic awareness of what AI and generative AI systems do and their limitations.

Pedagogical understanding concerns when and why AI can contribute to learning.

Critical understanding concerns evaluating accuracy, bias, reliability, evidence, and limitations.

Ethical understanding concerns privacy, fairness, transparency, intellectual ownership, accountability, and human agency.

Together, these forms of literacy allow teachers to move from being consumers of AI-generated content towards critical professional users of AI.

12. AI and Continuing Professional Development

The implications of AI extend beyond pre-service teacher education.

Rapid technological change means that knowledge acquired during initial teacher preparation may become outdated relatively quickly. AI competence therefore requires continuous professional learning.

Generative AI itself may support this process by helping teachers access explanations, explore new pedagogical approaches, develop resources, and engage in self-directed professional learning. Recent research on teachers' self-directed professional development suggests that GenAI can function as an accessible professional-learning resource when used critically.

However, individualized AI-supported professional learning should not replace institutional professional development or professional communities.

Teacher learning is strengthened through dialogue, collaborative inquiry, observation, mentoring, and shared professional experience. AI should extend these opportunities rather than isolate teachers within individualized technological environments.

13. Ethical Challenges of AI in Teacher Education

13.1 Accuracy, Hallucination and Epistemic Responsibility

Generative AI systems may produce plausible but incorrect information.

This presents a distinctive challenge for beginning teachers, who may lack sufficient disciplinary or pedagogical expertise to recognize subtle errors.

Teacher education must therefore develop epistemic responsibility: the habit of verifying AI-generated claims, tracing evidence, comparing sources, and accepting professional accountability for material ultimately used in teaching.

13.2 Algorithmic Bias

AI systems are shaped by training data, design decisions, and broader social structures. Their outputs may reproduce stereotypes or underrepresent particular languages, cultures, communities, or perspectives.

Teachers require the ability to recognize such limitations, particularly when using AI to generate examples, scenarios, learner profiles, or assessments.

13.3 Privacy and Data Protection

Teachers may be tempted to enter student information into AI systems when requesting assistance with feedback, differentiation, or behavioural issues. This creates substantial privacy concerns. Responsible AI education should therefore explicitly address what forms of student information should never be shared with external systems and how institutional data policies should guide professional practice.

13.4 Academic Integrity

Generative AI complicates traditional distinctions between independent and assisted work. Teacher education programmes need clear policies concerning acceptable AI assistance, disclosure, citation, assessment, and authorship. Blanket prohibition may be increasingly difficult to enforce, but unrestricted use may undermine learning. The more sustainable response is likely to involve transparent expectations combined with assessment designs that make reasoning and professional judgement visible.

14. Equity and the Digital Divide

AI is sometimes presented as a technology capable of democratizing access to high-quality educational resources. This potential should be considered alongside the possibility that AI may reproduce or intensify existing inequalities. Access to reliable internet connectivity, suitable devices, advanced AI platforms, digital literacy, and institutional support remains uneven. Language represents another dimension of inequality. AI performance may differ substantially across languages and sociocultural contexts, particularly where training data are limited. Teacher education institutions should therefore avoid assuming that AI integration is automatically inclusive. Equitable AI integration requires attention to access, affordability, accessibility, linguistic diversity, cultural relevance, and institutional infrastructure.

15. Human–AI Collaboration and the Question of Teacher Agency

One of the most important questions surrounding AI in teacher education concerns the future role of the teacher. Technologically deterministic narratives sometimes imply that increasingly capable AI systems will progressively replace educational tasks previously performed by teachers. Such an interpretation misunderstands teaching as a profession. Teaching involves relational judgement, ethical responsibility, contextual understanding, emotional responsiveness, curriculum interpretation, care, creativity, and accountability. These qualities cannot simply be reduced to information generation or pattern recognition. The more productive relationship is therefore not:

Teacher → AI Replacement

but: **Teacher Expertise + Critical AI Use → Augmented Professional Practice**

AI may generate possibilities, but teachers should determine their pedagogical value. AI may identify patterns, but teachers should interpret their meaning. AI may generate feedback, but teachers remain responsible for its appropriateness and consequences. Human agency must therefore remain central to AI-enabled teacher education.

16. Critical Synthesis and Research Gap

The literature establishes that AI offers substantial opportunities for teacher education. It can support personalization, resource development, formative feedback, simulations, reflective dialogue, assessment, and professional learning. At the same time, the literature reveals a conceptual problem. Much discussion continues to focus on **what AI can do** rather than **what teachers must know and be able to judge when AI can do it**.

This distinction is crucial.

Technological capability does not automatically produce pedagogical value. Generating a lesson plan does not establish that the lesson is educationally appropriate. Producing feedback does not establish its validity. Generating personalized resources does not ensure inclusion. Automating professional tasks does not necessarily strengthen professional competence.

International competency frameworks have begun to address this challenge by emphasizing human-centred and ethical AI competence. Nevertheless, teacher education requires a pedagogically focused model connecting technological understanding, instructional decision-making, critical evaluation, ethics, and professional agency.

The present paper addresses this conceptual need through the proposed AI-Enabled Teacher Education Framework.

17. The AI-Enabled Teacher Education Framework (AI-TEF)

AI-TEF conceptualizes responsible AI competence in teacher education through five interconnected dimensions:

AI Understanding → AI-Supported Pedagogy → Critical Evaluation → Ethical Responsibility → Human-AI Professional Agency

17.1 AI Understanding

Teachers require foundational understanding of AI systems, their applications, limitations, and the basic principles underlying AI-generated outputs.

The objective is not to transform every teacher into an AI developer but to ensure that teachers understand enough about AI to make informed professional decisions.

17.2 AI-Supported Pedagogy

Teachers should be able to identify situations in which AI meaningfully contributes to teaching and learning. This requires alignment among AI use, curriculum objectives, learner needs, pedagogy, and assessment. The relevant question is not simply “Can AI perform this task?” but “Does using AI improve the educational process or outcome?”

17.3 Critical Evaluation

Teachers must critically examine AI-generated information, recommendations, materials, and feedback. This includes checking factual accuracy, pedagogical suitability, bias, contextual relevance, evidence, and potential unintended consequences.

17.4 Ethical Responsibility

Teachers should understand privacy, fairness, transparency, accountability, intellectual ownership, inclusion, and responsible data use. Ethical judgement should be embedded throughout AI-supported pedagogy rather than treated as a separate technical topic.

17.5 Human–AI Professional Agency

The highest level of AI competence involves determining when to use AI, how much authority to delegate to it, when to modify or reject its recommendations, and when human interaction or judgement is educationally indispensable.

Professional agency therefore represents the integrating dimension of the framework.

The framework can be summarized as:

Dimension	Central Question	Intended Competence
AI Understanding	What can this AI system do and not do?	Informed AI literacy
AI-Supported Pedagogy	Why should AI be used here?	Pedagogical integration
Critical Evaluation	Can this output be trusted and used?	Critical AI judgement
Ethical Responsibility	Is this use fair, safe and responsible?	Ethical AI practice
Human–AI Professional Agency	What should remain under human judgement?	Responsible professional autonomy

AI-TEF therefore shifts the emphasis from **using AI tools** towards **making professionally justified decisions about AI**.

18. Implications for Teacher Education Institutions

Teacher education institutions should move beyond isolated workshops introducing individual AI tools. AI competence should be integrated across curriculum, pedagogy, assessment, practicum, and professional ethics. Institutions should establish clear policies concerning acceptable AI use, student data, academic integrity, disclosure, and accountability. These policies should remain sufficiently adaptable to respond to rapidly changing technologies. AI integration should also be aligned with programme outcomes rather than treated as an additional technological requirement.

Most importantly, institutions should provide opportunities for pre-service teachers to experiment with AI under conditions that require critique, verification, reflection, and pedagogical justification.

19. Implications for Teacher Educators

Teacher educators occupy a critical position in the transition towards AI-enabled teacher preparation.

They require professional development not merely in operating AI systems but in designing educational experiences through which future teachers develop critical AI competence.

Teacher educators can model responsible practice by making AI use transparent, demonstrating verification processes, discussing limitations, and explaining why particular professional decisions should or should not be delegated to AI.

Assessment practices will also require redesign. Tasks should increasingly emphasize contextual reasoning, iterative development, oral explanation, practicum evidence, critical commentary, and reflection on AI-assisted processes.

20. Future Research Directions

Several areas require further empirical investigation. First, longitudinal research should examine whether AI integration during pre-service preparation influences teachers' later classroom practice. Second, research should distinguish between AI-supported task performance and genuine development of pedagogical competence. Third, empirical studies should investigate which forms of AI-supported feedback most effectively strengthen reflective practice and professional judgement. Fourth, greater research is required on the effects of sustained GenAI use on beginning teachers' independent lesson planning, writing, critical thinking, and pedagogical reasoning. Fifth, culturally and linguistically diverse contexts require greater attention. AI models developed predominantly through globally dominant languages and datasets may perform differently within local educational environments. Sixth, research should examine how AI competence can be meaningfully assessed within teacher education. Finally, AI-TEF itself requires empirical validation across different teacher education programmes and national contexts.

21. Limitations

This paper is a critical narrative review and conceptual synthesis rather than a systematic review or meta-analysis. Consequently, it does not claim exhaustive coverage of the rapidly expanding literature concerning AI and teacher education.

The field is also changing exceptionally quickly. Specific technologies and applications discussed in current scholarship may evolve or become obsolete, although broader questions concerning pedagogy, ethics, critical evaluation, and professional agency are likely to remain relevant. Furthermore, the AI-Enabled Teacher Education Framework proposed here is conceptual and requires empirical validation.

Finally, teacher education systems differ considerably across countries. Institutional capacity, technological infrastructure, teacher preparation structures, regulatory environments, and cultural contexts will influence how the framework can be implemented.

22. Conclusion

Artificial intelligence is reshaping the technological environment within which teachers learn and work, but its most important implications for teacher education extend beyond technology itself. The central challenge is professional. Future teachers must learn to operate in environments where machines can generate explanations, lesson plans, assessments, feedback, educational resources, and recommendations within seconds. The availability of these capabilities changes what teachers can do, but it does not eliminate the need for teachers to understand why educational decisions are made or to accept responsibility for their consequences.

Teacher education should therefore resist two extremes: uncritical technological enthusiasm and categorical technological rejection. The educational objective should instead be the development of teachers capable of using AI selectively, critically, creatively, ethically, and transparently. The AI-Enabled Teacher Education Framework proposed in this paper conceptualizes this capacity through five interconnected dimensions: AI Understanding, AI-Supported Pedagogy, Critical Evaluation, Ethical Responsibility, and Human-AI Professional Agency. The framework places professional judgement at the centre of AI integration. From this perspective, the future of teacher education is not primarily about preparing teachers to compete with artificial intelligence. Nor is it about transferring increasing portions of professional practice to automated systems. It is about preparing educators who understand the capabilities and limitations of AI sufficiently well to decide when technology should assist teaching, when its outputs should be challenged, and when educational decisions must remain fundamentally human.

AI may consequently change the instruments of teaching without diminishing the significance of the teacher. If teacher education maintains human agency, pedagogical purpose, ethical responsibility, and critical judgement at its centre, artificial intelligence can function not as a replacement for teacher expertise but as a resource through which informed professional practice may be extended.

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