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USE OF ARTIFICIAL INTELLIGENCE BY TEACHERS FOR SCHOOL TASKS: AN APPLICABLE FRAMEWORK FOR TEACHER TRAINING

Dr. Muhammad Rafiq-uz-Zaman[1], Naveed Farah[2], Saima Afzal[3], Ayesha Kiren[4] & Qursam Fatima[5]

[1]Ph.D. in Education, Master Trainer, Punjab Education, Curriculum, Training & Assessment Authority (PECTAA), School Education Department, Bahawalnagar, Punjab, Pakistan. Email: mrzmuslah@gmail.com, ORCID ID: https://orcid.org/0009-0002-4853-045X

[2]Associate Professor, Department of Rural Sociology, University of Agriculture, Faisalabad
Email: n.farah@uaf.edu.pk

[3]Assistant Professor, Department of Sociology, BZU, Multan. Email: saimaafzal@bzu.edu.pk

[4]Lecturer, Institute of Agri. Extension, Education & Rural Development, University of Agriculture, Faisalabad
Email: ayesha.kiren@uaf.edu.pk

[5]PhD Scholar, Department of Rural Sociology, University of Agriculture Faisalabad,
Email: qursamfatima79@gmail.com

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ABSTRACT

Artificial Intelligence (AI), specifically Generative AI, is rapidly gaining integration into teachers' daily life, such as lesson planning, creation, differentiation, feedback and assessment, family communication and information analysis. This paper is a critical review of the developing evidence of those uses and proposes a useful framework for teacher training. The best conclusion is that AI can enhance teaching and pupil outcomes, rather than that it reliably does these things; there is not enough direct evidence to back up these claims. Instead, the evidence suggests a more specific conclusion: Task-anchored professional learning with structured scaffolding can enhance teachers' AI literacy, confidence, and the quality of AI-supported planning artefacts, particularly when it integrates technical foundations, pedagogical design, ethical reflection, guided practice, and reflection. The current theories have varying contributions. Neither a Technology-acceptance model, which is capable of answering the question of whether teachers will use tools, nor a TPACK-derived model, which is capable of explaining the professional knowledge teachers require to use the tools pedagogically, is sufficient without a human-centred governance and agency perspective. The proposed framework thus positions AI as a co-designed professional practice, rather than a topic for training in the use of tools. It is a process that unfolds from context to foundation, design, proof, classroom performance and evidence of competence, with institutional protection measures at its core. Further research is needed to determine whether such programmes have an impact on observed instruction, the validity of assessment, equity, workload and pupil learning over time.

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Corresponding Author Naveed Farah

Email: n.farah@uaf.edu.pk

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Introduction

The use of AI in schools is not about adding a new app to the technology landscape, but rather, a transformation of the way teachers do their jobs. A pre-generative-AI review, which was cited widely, identified opportunities for AI in planning, implementation and assessment, as well as for teachers to be involved in creating AI and for teachers to engage in the validation of AI-based assessment. Newer evidence indicates that generative systems have entered into regular production tasks, such as lesson planning, lesson materials, differentiated tasks, and rubrics, drafts of feedback, translation, and administrative correspondence, and that the ability to draft quickly makes such use appealing (Çelik et al., 2022; García & Kushki, 2026; Klieba et al., 2024)

The question about using AI in education is not only a question of yes or no, but also a question of how. The use of AI in education is not just a yes or no question, but a how question. It is what sorts of school activities can be enhanced, under what educational and administrative arrangements, and what teachers have to be prepared to learn in order to be held accountable for the outcome. The change is characterised by a division of labour in a systematic review of 42 empirical studies from kindergarten to grade 12.The change is described as a division of labour: routine tasks can be replaced, judgement requiring tasks can be reinforced, and new tasks can be delegated to AI. This takes a much more defensible position than assertions that AI will supplant teachers. (Liang et al., 2025) It focuses attention on the use of professional judgment, disciplinary knowledge, relationships and interpretation of student work, which are activities that do not lend themselves to a fluent output.

The review answers four questions: (1) How are teachers using AI in school; (2) What is the strongest evidence on capability building; (3) What are the best theories and competency models to explain the responsible use of AI; and (4) What should be included in an applicable training framework? Emphasis is on primary and secondary schools, and on using higher-education and preservice evidence in a carefully considered manner that highlights mechanisms of teacher learning. The definition of "AI" encompasses generative language and multimedia systems, adaptive platforms, learning analytics, intelligent tutoring systems, and AI-supported assessment; the definition of "school tasks" encompasses preparation, teaching, assessment, administration, and professional learning.

Review Approach and Evidence Base

This is a very important review of the literature taking a narrative approach and was retrieved on 16 June 2026 from the databases Semantic Scholar, OpenAlex and PubMed. The intersections of teachers, schools, generative AI, professional development, AI skills, AI literacy, AI-TPACK, adoption, ethics, and assessment were found in searches. The synthesis emphasizes systematic reviews, competence-framework analyses, quasi-experimental/mixed-methods interventions, and school-based studies. It provides information on 49 different sources.

The evidence base is limited and not comprehensive. The vast majority of the sources retrieved were abstracts or long records and the review does not make any inferences that could be reported regarding procedures, attrition, and magnitude of effects or causal pupil impacts. Many primary

studies are short-term, qualitative, one-site, cases, or preservice. There are limitations here that should not be ignored: increases and decreases in self-reported confidence and intention do not necessarily translate into lasting improvements in observed teaching, assessment quality, workload or learning outcomes. They are however valuable in uncovering tasks that occur regularly, obstacles, and likely professional-learning avenues.

From AI as a Specialist Technology to AI as Everyday Teacher Work

The Task Landscape

Recently, a validated Spanish tool has been developed to classify teachers' implications with AI generative tools into six dimensions: student assessment, student empowerment, attention to diversity, teacher management, creation of teaching materials, and student motivation. In qualitative studies and surveys, the most common early uses are those prior to classroom instruction, including idea generation, lesson plans, quizzes and rubrics, instructional materials, grammar and translation support and administrative communication. (Pelicano-Abiero & Escote, 2026; Rempillo & Despi, 2026) This pattern is not surprising. The tasks are meaningful, they can be performed individually by teachers before presenting them to the pupils, and an initial draft of the text can be adapted to the requirements of the curriculum.

Other pedagogically more meaningful uses are also identified in the evidence, such as differentiated material, formative assessment, feedback, visualization, project-based learning, and the interpretation of learner data. The contributions of AI in these areas are outlined in a systematic review: Improved identification of pupil needs in planning, immediate feedback and intervention in implementation, and automated assessment of texts. Among the items that teachers greatly valued in a STEM professional-development setting were: valuing; having learners engage in formative tasks; visualisation of abstract content; and project design. (Çelik et al., 2023) These are good affordances, but they do not occur automatically with a prompt, they need to be accompanied by other elements, such as the teacher's specification of the curricular purpose, their assessment of output accuracy and appropriateness, their prediction of learner responses, and their determination of what needs to be mediated by the human.

Empirical studies always reveal a disconnection between pedagogical integration and functional use. In a qualitative study with 211 Slovak in-service teachers, 67,9% of the segments were coded for technical uses of AI tools, while 32,0% were coded for pedagogically deeper uses of AI tools: 42,6% reported using AI to prepare teaching materials, and 13,2% for differentiation. Likewise, an 80-teacher study identified that content development and planning were well-functioning, with limited engagement in using the tool for learning analytics or reflective pedagogical inquiry. It is not to say that the technical use is not important, but preparation work can ease up the pressure of time (Lestari et al., 2026). Instead, it is all about the maturity of the adoption of AI being overstated because of adoption measures.

Efficiency, Workload and the "Co-Planner" Claim

While many teachers find efficiency and creativity advantages, available evidence of workload needs to be considered with caution. In a pilot across five English primary schools, average weekly planning time decreased from 10 to 4.75 hours (52.5%) and all teachers said they were confident in lesson planning at follow-up compared to 50% at baseline. The study also found that time saved was frequently reallocated to other needs, a workload paradox that does not allow faster drafts to result in less total workload. (Carson et al., 2026) (Carson et al., 2026)

There are some small qualitative studies which help to explain this paradox. Teachers can get a pretty good first draft within a short time frame, but then they have to spend time ensuring claims are accurate, ensuring tasks meet a curriculum, ensuring language and examples are understandable, ensuring bias or accessibility, and ensuring students can successfully use the task. Three weeks of mixed-methods research with 28 in-service teachers co-developing learning tasks revealed problems with inefficient interactions, low-quality tasks, weak distributed cognition, and negative feedback loops in teacher side factors; insufficient context and pedagogical guidance and accuracy, context, sequence, and usability issues in system side factors. Therefore, AI can have some valid potential as a co-planner when the time spent for validation is made visible rather than invisible re-remediation in the school. (Cao et al., 2026)

Adoption is Patterned, Not Universal

Adoption of teachers is not uniform. In 2025, 13.5% of the 289 teachers surveyed considered themselves to be intensive users of computers, 30% occasional users and 43.5% non-users, with the most frequent uses of computers for information retrieval and translation, and advanced educational uses marginal. Tomczyk & Majkut (2025) found that 72% of the variance in intention and 30% of the variance in actual use was explained by the constructs modelled; perceived usefulness and digital competence were significant factors. In a study of 367 primary and secondary teachers in Hong Kong, the same factors—self-efficacy, perceived usefulness, attitudes, and subjective norms—were shown to be significant in the intention to use generative AI (Tomczyk & Majkut, 2025). (Kong et al., 2024)

Willingness is translated into action through institutional conditions. The findings from a structural-equation analysis of 428 secondary teachers showed that perceived usefulness and social influence had a significant effect on the intention to adopt, whereas facilitating conditions were important factors in determining actual classroom use. A sample of 285 teachers in basic education indicated that 69% provided no training in digital applications or AI applications. This is too simple a personal-deficit explanation to hold: Teachers cannot make responsible decisions if they have access to approved tools, technical support, time, school policies, and leadership.

What Does Training Change? Strongest Evidence and Its Limits

A Convergent, But Still Early, Intervention Signal

There is a tentatively encouraging signal from structured learning from the best available intervention studies. A quasi-experiment, involving 259 preservice EFL teachers, showed that the structured intelligent-TPACK intervention positively affected the intelligent-TPACK dimensions and higher-order AI use in lesson planning, and resulted in lower perceived pressure and higher perceived usefulness. The comparison is relevant because it is not only being exposed to the concept that is tested; it is also being given guidance, being given the tasks to choose from, and having a knowledge structure that makes sense.

A process-mining study of 33 preservice teachers was conducted in a separate study to compare the AI-mindset-plus-tools condition to the tools-only condition. The former resulted in higher number of iterations in prompting, reviewing and refining, and lesson plans on a TPACK-informed rubric were significantly higher. This provides a possible explanation: training alters the interaction from the linear retrieval of an answer to critical and pedagogically positioned revision (Tran et al., 2025). It is not yet proof that pupils are learning more but is more substantial than pupil enthusiasm alone.

The findings from the schools are similar, though with some hangers. 8-week programme for 51 K-12 teachers in the UAE (TPACK and Kolb's experiential cycle) reported greater knowledge pre to post with a mean score change from 74.71 to 93.14 and an effect size of $|d| = 0.869$; teachers also reported more confidence in their design, more differentiation in design, and fewer concerns about curricular alignment. A 13-week AI-TPACK program with eight elementary and secondary science teachers had a positive impact on AI awareness for seven teachers and to increase the level of implementation for four or five teachers in specific domains. These two studies are encouraging but generalisable given the small samples, limited time frame, and the potential novelty effect.

Design quality is not eliminated with increased participation. The online German teacher-training programme shows that 436 teachers, who were evaluated for attitudes, and 291 teachers, who were evaluated for AI literacy, achieved significant improvements. The results of the first cohort of 25 and second cohort of 19 in-service STEM teachers in a 14-week graduate course showed that self-efficacy and knowledge of the UNESCO competency dimensions increased, but trust in AI did not.The results for both first ($N = 25$) and second ($N = 19$) cohorts of in-service STEM teachers in a 14-week graduate course indicated that self-efficacy and understanding of the UNESCO competency dimensions increased, but trust in AI did not. The latter is useful: a good programme should instigate measured confidence and criticality, not blind acceptance. (Alexander et al., 2026)

What Training Should Not Claim

So far, the literature is not ready for three common claims. First, most interventions assess artefacts, attitudes, confidence, or literacy, but not observed learning, teaching or equity. An examination of 19 studies that focused on teacher development and artificial intelligence revealed positive overall

impacts, but not consistent studies designs, absence of a common framework, limited use of indirect assessment methods, and a lack of attention to teachers' attitudes.An examination of 19 studies on artificial intelligence in teacher development yielded generally positive results but with varying designs, a lack of a common framework, reliance on indirect assessment and limited attention to teacher attitudes. Second, individuals' self-reported competence can be higher than actual performance (Cho et al., 2025). All five scales of preservice teachers' self-reported intelligent-TPACK, representing both technology and content, showed growth in a mixed-methods study of 37 preservice teachers; however, growth in self-reported TPACK for the rubric of lesson plans was small, and growth in content-specific technology selections was modest. Third, a training effect is not a causality statement about AI itself: often there is a mentoring effect, a collaboration effect, a novelty effect, a curated tools effect, a time for working on artefacts effect. Third, a training effect is not a causality statement about AI itself: there's often a mentoring effect, a collaboration effect, a novelty effect, a curated tools effect, a time for working on artefacts effect.

The right conclusion is thus tentative: well-designed professional development for AI has the potential to augment proximal teacher outcomes, particularly knowledge, self-efficacy, reflective practice and planning artefacts, but it is an empirical question whether it can achieve sustainable results in teaching and learning outcomes for pupils.

Theories and Competency Models: Complementary, Not Interchangeable

Adoption Theories Explain Uptake

Teachers' decision to use a tool may be motivated by the Technology Acceptance Model (TAM) and Unified Theory of Acceptance and Use of Technology (UTAUT). In the Hong Kong study, usefulness, self-efficacy, attitudes and subjective norms were correlated with behavioural intention. In the Philippines, usefulness and social influence became the predictors for intention, and infrastructure and support for actual use (Kong et al., 2024). These theories can be used for needs assessment for implementation and for implementation strategy: legitimate task benefit, build confidence, establish peer norms, and eliminate practical barriers.

They are not adequate as theories of learning. A teacher may find a chatbot helpful and convenient to use, but generate wrong, unbalanced, or substandard content. Adoption is not a measure of quality in education. A single metric of training success – adoption intent – can lead to rewarding the wrong usage.

TPACK, AI-TPACK and Intelligent-TPACK Explain Professional Knowledge

The models derived from the concept of TPACK provide the best conceptual language for the quality of integration as they combine technology with pedagogy and disciplinary content. The results of the empirical intelligent-TPACK study showed that technological knowledge was useful to teachers in making decisions about AI, but it was not enough alone; technological knowledge was useful only when used with pedagogical knowledge. AI-TPACK work also shows that core knowledge and composite knowledge are good predictors of teachers' AI-TPACK. (Ning et al., 2024)

These extensions build on the more generic "digital skills" and specify the need to select and adapt the use of AI for a specific disciplinary concept, a specific class of students, a specific teaching approach, and a specific assessment purpose. A content-and-pedagogy demand for checking source fabrication, a content-and-pedagogy demand for checking causal explanations, and a content-and-pedagogy demand for designing feedback, even if all these teachers are using the same model, are different. This is supported by evidence gathered from 67 South Korean elementary teachers, whose AI confidence was lowest for AI content knowledge, then AI-relevant technology and pedagogy, and then resulting competencies, which were of instructional design, learning-environment redesign, code/data/AI literacy, and ethics. (K. Kim & Kwon, 2023)

One issue with the limitations is that early models of AI-TPACK can under-specify power, governance and professional agency. A thorough analysis of 42 competence-model studies revealed that cognition, technical understanding, ethical reflection, and pedagogical use were highly stressed, while motivation and volition, social aspects, and the instruction of AI were comparatively ignored. AI is not just a technology of the classroom; it can gather or infer knowledge, generate imprecise knowledge statements, influence assessment practice, and change control. Ethics and agency should therefore be made operational in task decisions and not an add-on feature of a competence model.

Human-Centred and Critical Perspectives Set the Normative Boundary

The UNESCO AI Competency Framework for Teachers provides a general international benchmark for teachers' capacity to adopt a human-centred mindset, understand the ethics and use of AI, and understand the foundations and applications of AI, alongside teacher capacities in AI pedagogy and AI for teacher development—structured by developmental levels. Challenged by its key tenets of human agency, inclusion, non-discrimination, and linguistic and cultural diversity, it is not possible to have an efficiency-only view of quality (Zainuddin et al., 2025). (Miao & Cukurova, 2024)

Critical and human-centred perspectives go further by asking who benefits, what is being left out and what kinds of knowledge does the system value, and does AI offer more or less pupil thinking and teacher agency? The RAIL-Ed proposal combines these concerns into the technical fluency, critical evaluation, human-AI collaboration, contextual awareness, ethical reasoning, and empowered agency. It is a conceptually rather than outcome-validated framework, but the core idea is intriguing: the same generative affordance has the potential to enhance or displace learning, depending on the educator's literacy and design.

Synthesis of the Theoretical Disagreement

The theories address different questions and cannot be reduced to a single set of questions. Adoption models include: Will teachers use it? TPACK derived models ask can they integrate it appropriately for content, pedagogy and learners? Human centred models question who, under what safeguards, is responsible for this use? All three are necessary to have a defensible teacher-training program. Without pedagogical knowledge, skill and imagination, technical fluency is tool-led activity; without the understanding of AI and task practice, pedagogical design can hide

errors; without ethical principles and task practice, it is declaratory; without institutional support, favourable attitudes can result in no reliable practice.

An Applicable Framework for Teacher Training

Design Principles

The proposed framework—Task-grounded, Human-centred AI Competence (THAIC)—combines the action-oriented aspects of intelligent-TPACK approach to professional development with the human-centred aspects of the UNESCO framework. It also reacts to findings on the need for technical training alone to be inadequate, and how to be successful in integrating it into the school community also demands pedagogical knowledge, attitudes, organisation and learning. It is not a proven causal model, but a design synthesis (Aravantinos et al., 2026).

There are five principles that guide THAIC:

1. **Start with a consequential school task, not a platform.** Create a real-world task related to planning a lesson for a specific class, designing different versions of a task, creating a clear feedback plan, or reformulating an assessment. This renders the fit of a task–tool object examinable. (Hsu, 2026)

2. **Consider outputs as provisional evidence.** Teachers are responsible for checking for accuracy, content, representation, appropriateness and source for all facts. The process is Generate, Inspect, Adapt, Disclose and Retain human accountabilities. (Pelicano-Abiero & Escote, 2026)

3. **Make the process of ethical questioning an ongoing process, rather than a standalone module.** Every artefact is accompanied by checkpoints of Privacy, Bias, Accessibility, Copyright, Academic Integrity and Accountability. (Hsu, 2026)

4. **Instruct sharing of professional judgment.** Ensure that active learning, worked models, coaching/expert support and feedback with reflection are incorporated (not only independent tool exploration). (Doğan, 2026)

5. **Not just confidence, assess enacted competence.** The gap between self-report and lesson-plan quality can be evidenced through the use of portfolios, annotated prompt-output trails, observation, and reflection, which addresses the documented gap between self-report and lesson-plan quality. (Melese, 2026)

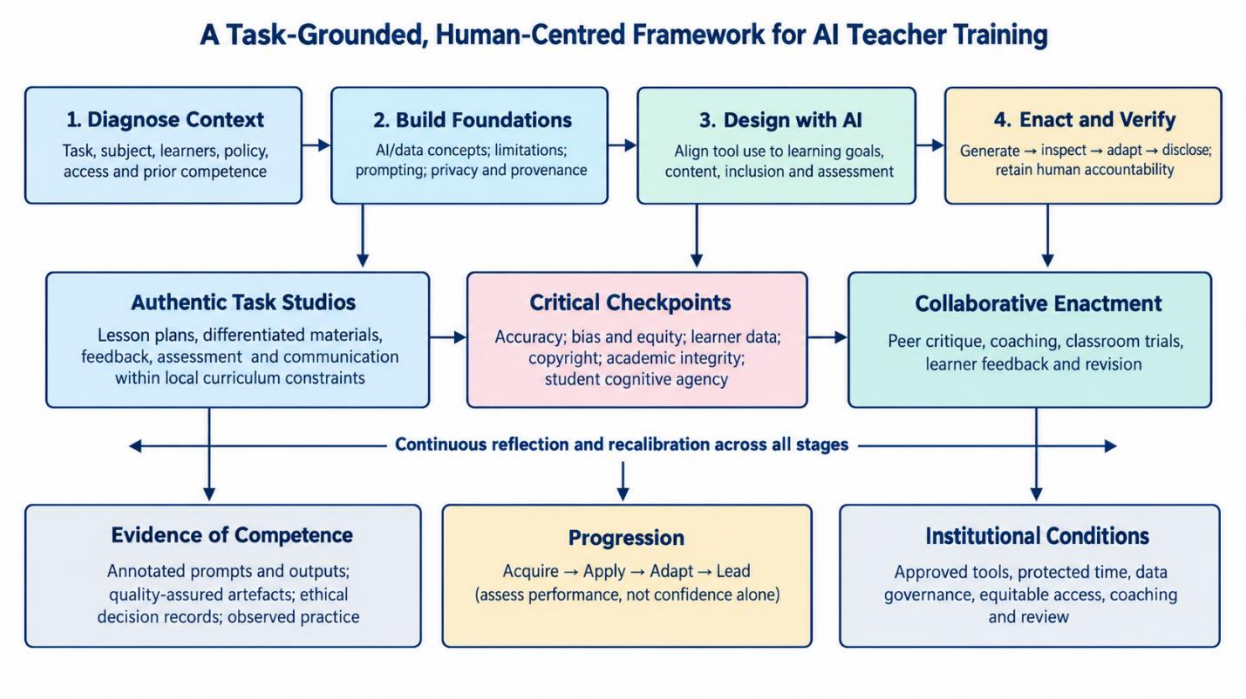


Figure 1: THAIC framework: a proposed, task-grounded and human-centred sequence for AI teacher training. The model synthesises AI-TPACK/i-TPACK, human-centred AI competency, task-based professional learning, and evidence-centred assessment. (Çelik, 2023; Doğan, 2026; Miao & Cukurova, 2024; Ober et al., 2026)

Sequence and Learning Activities

Stage 1: Diagnose context. Set the criteria for the subjects, age, language, curricular demands and existing school policy, data sensitivity, access limits, and teachers' previous experiences. These cannot be predicted in a generic course. There is reason to suggest a local readiness audit prior to rollout because of the reported importance of facilitating conditions and the diversity of user groups. (Gabunilas & Naval, 2026; Tomczyk & Majkut, 2025)

Stage 2: Build foundations. Teachers require an understanding of how AI outputs are created and why they may not be accurate, unbiased, complete or relevant. They should be taught to implement prompt construction, source and output verification, data handling, tool selection, and an understanding of authorized assistance and undue delegation. This suggests the technical, evaluative, ethical, and pedagogical aspects coming together within frameworks. (Draganov, 2025; Fang, 2025)

Stage 3: Design with AI. The subject / grade specific studios are used for the work of participants. They design and edit a specific artefact (e.g. an inquiry sequence, multi-level reading texts, a feedback guide or an assessment task) using AI, and provide a justification for the creation of the

artefact and why pupils' thinking will be at the centre. This approach to lesson design is exemplified in a 2025 study on the use of generative AI by teachers when designing environmental-science lessons; while teachers utilized generative AI to develop concepts and components of lessons, they still had to ensure the quality and ensure that the responses matched their lesson vision. (W. J. Kim, 2025)

Stage 4: Establish and validate. Teachers carry out a clear quality assurance process: verify against reliable sources; examine stereotypes, omissions and reading level; assess inappropriate input of pupil data; test validity and integrity of assessments; acknowledge that they have used AI as needed locally; rewrite for local culture and needs. This stage implements accountability for humans, but does not assume this from a general ethics lecture.

Stage 5: Cooperative classroom implementation. Teachers trial low-risk uses of the curriculum aligned artefact and gather pupil and peer feedback, review what has changed in participation and thinking and adapt the artefact. The qualitative evidence from the elementary schools reflected a continuing journey of reflective professional development which facilitated technologically, pedagogically, and content area professional growth. (Wolfe & Ciampa, 2026)

Stage 6: Evidence, progression and institutionalisation. Evaluate using artefacts, decision logs, validation notes and observation and recording of enactment. The development may proceed from Acquire (understand and use in a safe way to create artefacts for supervised task), to Apply (produce artefacts for supervised task), Adapt (contextualise and justify supervised task use in the classroom), to Lead (coach peers and audit uses, and co-design local policy). This is consistent with the UNESCO based development logic of acquire/deepen/create in the teacher-preparation literature. (Zainuddin et al., 2025)

Minimum curriculum and assessment architecture

Training component	Observable performance evidence	Why it is necessary
AI foundations and prompt literacy	Annotated prompt iterations that specify learner, curriculum, constraints and success criteria	Novices' basic prompts differ from the strategic prompts used by pedagogically knowledgeable teachers. (Yip, 2026)
Pedagogical and disciplinary design	AI-assisted lesson, task or feedback artefact aligned to an explicit learning objective and adapted after critique	Structured, rather than self-directed, intelligent-TPACK training improved higher-order lesson-planning use. (Jiang & Li, 2026)
Verification and epistemic judgment	Claim-check log, source comparison, correction and explanation of residual uncertainty	AI-supported task co-design reveals accuracy, context, sequence and quality problems that teachers must detect. (Cao et al., 2026)

Ethics, equity and governance	Privacy/bias/integrity checklist and a documented tool-use decision	Teacher AI competence includes fairness, privacy, transparency, accountability, equity and sustainability considerations. (Hsu, 2026)
Assessment redesign	Assessment plan that specifies permitted AI use, process evidence, feedback roles and human adjudication	Automated feedback shifts teacher work toward interpreting, validating and mediating outputs. (Zhang et al., 2026)
Reflection, coaching and continuation	Peer-review record, classroom trial reflection, and next-cycle goal	Training studies and reviews converge on practice, feedback, reflection and ongoing support rather than one-off workshops. (Al-Ali & Miles, 2025; Doğan, 2026)

Practical implications

For schools, leaders.

Schools should not start by making blanket decisions to use AI or blanket decisions to ban AI. They should develop sanctioned tools policies and data-governance policies, protected time for validation and curriculum adaptation, a pathway for reporting harm or uncertainty, and equitable access to infrastructure and support. The collection of survey artifacts relevant to the relationship between enabling conditions and usage, coupled with ongoing concerns about privacy, policy ambiguity and infrastructure, suggests that governance is an essential element of responsible scale, not something that can be tackled after the fact as a compliance exercise. (Gabunilas & Naval, 2026; Lestari et al., 2026)

Leaders should also differentiate between decisions of low risk and high risk productivity assistance. Generic materials may be a sensible training initial; decisions have to be made about the grade, pupil support, discipline, and learner profiling needs and they do require evidence, open processes and human review. According to the available literature, teachers' engagement with AI is not only about "fear of AI", but also about reliability, alignment with the curriculum, students' over-dependence, privacy, and responsibility. (Rempillo & Despi, 2026; Trozo et al., 2026)

For teacher, education providers

While AI should be available as an elective course, it should be integrated throughout all methods courses, subject pedagogy, practicum, and assessment; not as a separate technical elective. Emphasis is placed on critical examination, equity, ethics and culturally responsive use, in addition to application, in educator-preparation scholarship. (Black et al., 2024) A practicum policy should be clear about what is acceptable for candidates to do and should require them to keep the authorship of decisions regarding pedagogical approaches and interests, and should encourage mentor teachers to discuss real constraints. A similar percentage (about three-quarters) of those

preservice teachers who responded to the practicum study reported using AI chatbots for lesson planning activities, primarily to save time and to assist with idea generation, while curriculum alignment, accuracy, reliability and over-reliance were still issues of concern. (Cai & Hewitt, 2026)

For teachers

The most defensible professional posture is neither passively adopting nor boldly rejecting. Teachers should leverage AI's power to broaden options, and then engage in pedagogical authorship, setting the purpose of learning, giving context, comparing options, checking facts and representations, tailoring to learners, maintaining appropriate cognitive strain, and making it clear that material AI support has been used. There are a handful of small qualitative studies which repeatedly point to a distinct human-led mode in which they engage in critical evaluation and learning, rather than passively adopting content created by AI. (Yip, 2026)

Major Disagreements and Unanswered Questions

There is more consensus in the literature regarding what teachers need as opposed to what AI achieves. There are four disagreements which will warrant explicit treatment.

Productivity versus workload. While AI can help cut down on drafting time, validation, revision, policy adherence and new types of assessment can make up for the saved time. There is currently limited long-term evidence and self-reported evidence. There is limited long-term and self-reported evidence. (Carson et al., 2026; Madarang & Magtalas, 2026)

Personalisation versus equity. Research often views AI as a path to differentiation, but little is done to measure the accuracy of generated materials across learner groups, as well as their accessibility, cultural relevance, or effectiveness. There is some endorsement of human agency, non-discrimination, however limited evidence of implementation. (Miao & Cukurova, 2024; Nkopuruk, 2026)

Automation versus professional agency. The human-centred accounts see the teacher as an orchestrator and validator in the process, while other accounts are oriented towards automation and efficiency. Comparative evidence on what school arrangements support agency is limited, and systematic reviews suggest that agency is potentially compromised if teacher authority isn't also shifted, and that inequity could arise if it is. (Lameras & Arnab, 2021; Liang et al., 2025)

Literacy versus competency. Teachers might be aware of or confident about the concepts of AI but not have the capacity to plan, assess and defend their classroom practice. Curriculum and measurement should reflect literacy as a knowledge base, not as a competence in a context-specific professional enactment. (Hsu, 2026; Ober et al., 2026)

The priority research agenda then follows. Researchers should: (1) evaluate multi-site, longitudinal, controlled studies of task-grounded programmes, alongside tool-only and business-as-usual conditions; (2) measure observed practice as well as artefact quality, validation accuracy, assessment integrity, workload and pupil outcomes (not just self-report); (3) test across subjects,

school phases, languages, disability status, and resource conditions; (4) explore high stakes uses separately from low risk preparation tasks; (5) co-design with teachers, pupils and communities; and (6) report transparently on versions of the tools, data-handling procedures, prompts, task conditions and outcome measures. The need for empirical validation is particularly strong as many existing competence frameworks are conceptual, and empirically-based frameworks provide more detailed but local descriptions. (Mikeladze et al., 2024)

Conclusion

Presently, teachers are adopting AI as mainly a drafting and support tool for their school work. Based on the evidence, there is a cautious optimism for structured professional learning—interventions may increase AI literacy, self-efficacy, attitudes, reflective use and increased planning quality for some measures. It is not yet showing an improvement which is consistent in classroom practice, workload, equity and the learning of pupils.

The problem of the central training is then not the access to tools. It is the evolution of responsible professional judgement that emerges from the interplay of knowledge about the content of AI, pedagogy, the specific discipline, ethical considerations, and the contexts in which the educational institution operates. An applicable framework that THAIC offers is: diagnose local context; build foundations; design authentic task artefacts; enact verification and ethical checkpoints; trial and revise collaboratively; and assess evidence of enacted competence in a developmental progression. The success of its use should be measured not by the amount of AI used, but whether teachers can explain, evaluate, adapt, and refuse to use AI, if it is possible, in the name of meaningful and equitable learning.

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