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A reflective professional learning model for university teachers using generative AI

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Annotation: This article proposes a reflective professional learning model for university teachers who use generative artificial intelligence in course design and teaching. A comparative analysis of five sources—the UNESCO Guidance for Generative AI in Education and Research, UNESCO's AI Competency Framework for Teachers, Knowles and colleagues' adult-learning principles, Schön's reflective-practice framework, and the OECD Teaching Compass—examines teacher agency, human oversight, iterative practice, and ethical/data governance. The coded synthesis identifies a recurring gap between broad competency statements and a practical cycle for evaluating AI-supported teaching decisions. The article proposes a six-step cycle: identify a pedagogical problem, select a bounded AI use, inspect outputs, redesign with human judgment, evaluate effects using learner evidence, and document a decision for reuse or discontinuation. A risk–benefit matrix distinguishes low-stakes preparation from decisions involving assessment, sensitive data, and student rights. No classroom trial or causal learning result is claimed; counts represent an author-coded source comparison. The model is intended as a professional-learning design that institutions can pilot with local policy, discipline-specific tasks, and ongoing review.

Keywords: teacher professional learning; generative artificial intelligence; adult learning; reflection; AI literacy; higher education.

Introduction

The present article addresses a question that is central to a reflective professional learning model for university teachers using generative AI: how can educators move from broad commitments to a defensible, observable design? The problem matters because a concept can be endorsed in policy or scholarship without specifying what a teacher, learner, or analyst should do. This paper therefore brings together a bounded set of influential sources and develops a practical analytic model. Its claim is deliberately limited: it offers a transparent synthesis and a proposition for further testing, not a causal estimate or a report of participant outcomes.

The topic is especially relevant in Uzbekistan, where educational institutions work across changing linguistic, cultural, disciplinary, and technological conditions. A model imported without adaptation may overlook local curriculum, access, institutional policy, and the knowledge communities learners bring. The analysis consequently treats local context as part of the research question. It does not assume a single learner profile or present national generalizations unsupported by data.

The paper has three objectives. First, it identifies how selected sources address the dimensions most relevant to the topic. Second, it reports an explicit cross-source coding matrix so readers can

inspect the basis of the synthesis. Third, it translates the pattern into a design sequence, an implementation matrix, and a set of questions for empirical follow-up. The contribution lies in connecting theory and policy to a replicable decision process.

Three research questions guide the work: (1) which dimensions receive explicit attention in the selected source set; (2) where does the comparison reveal an operational gap or tension; and (3) what design principles can address that gap while preserving the intellectual aims of the field? These questions structure the methods and results below.

Materials and Methods

The source set includes UNESCO's Guidance for Generative AI in Education and Research (2023), UNESCO's AI Competency Framework for Teachers (Miao & Cukurova, 2024), Knowles, Holton, and Swanson's adult-learning text (2015), Schön's The Reflective Practitioner (1983), and the OECD Teaching Compass (2025). The sources were chosen because they connect AI governance, teacher capability, adult learning, reflection, and professional agency. The analysis treats policy guidance and theory as complementary rather than equivalent evidence.

Four dimensions guided coding: teacher agency, human oversight, iterative reflective practice, and ethical/data governance. Explicit presence required direct guidance or a developed concept; partial presence indicated an implication without an actionable process; not explicit marked a dimension not developed in the examined source. The matrix is based on one analyst's reading and summarizes five sources only. A thematic count is reported as descriptive synthesis, not a psychometric scale or measurement of institutional practice.

Analytic framework and procedure

The unit of analysis was a source-level statement or concept relevant to one of the four dimensions listed in Table 1. Explicit, partial, and not explicit categories were used to prevent absence of a detailed procedure from being mistaken for rejection of a principle. During synthesis, the analyst compared the coded pattern with the intended educational task, noted contradictions, and drafted a design response. Counts are descriptive bookkeeping for this selected corpus. They are not inferential statistics, prevalence estimates, or evidence of effectiveness. A replication should specify exact editions, passages, coder training, and adjudication rules.

Ethical and evidentiary boundaries

No human participants, student records, classroom observations, or unpublished institutional data were collected for this article. The worked examples and proposed tools are illustrative. Citations identify the source base; interpretations and matrices are the author's synthesis. This distinction is necessary because a useful framework can be analytically original without being mislabeled as an intervention result.

Results and their discussion

Comparative document-analysis results

Table 1 presents the source-level crosswalk. "Explicit" means directly addressed in the examined source; "partial" indicates conceptual relevance without a full operational procedure; "not explicit" means that the dimension was not developed in the passages reviewed. Table values are judgments under the stated codebook, not independent ratings of source quality.

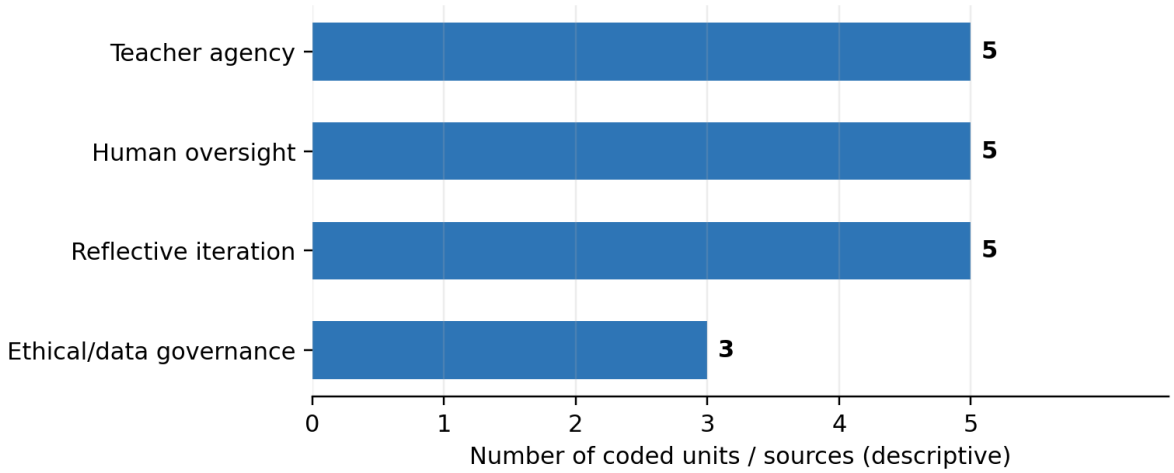
Table 1. Cross-source analytic matrix

Source	Teacher agency	Human oversight	Reflective iteration	Ethical/data governance
UNESCO GenAI guidance (2023)	Explicit	Explicit	Partial	Explicit

Source	Teacher agency	Human oversight	Reflective iteration	Ethical/data governance
UNESCO AI teacher framework (2024)	Explicit	Explicit	Explicit	Explicit
Knowles et al. (2015)	Explicit	Partial	Explicit	Not explicit
Schön (1983)	Explicit	Explicit	Explicit	Not explicit
OECD Teaching Compass (2025)	Explicit	Explicit	Partial	Partial

Across-source counts are teacher agency: 5 of 5; human oversight: 5 of 5; reflective iteration: 5 of 5; ethical/data governance: 3 of 5. The pattern identifies emphasis within the selected documents; it does not measure classroom prevalence or learner benefit.

Figure 1. Descriptive source counts by analytic dimension



Note. Counts are derived from the bounded corpus and codebook described in Materials and Methods; dimensions can co-occur.

Interpretive synthesis

Generative AI tools can produce fluent responses while remaining inaccurate, culturally mismatched, or inappropriate for a learning objective. Professional learning must therefore build judgment rather than tool familiarity alone. Teachers need opportunities to compare outputs with disciplinary standards, inspect bias and privacy consequences, and decide when non-use is preferable. Adult-learning theory emphasizes relevance to real problems, while reflective practice emphasizes revisiting action in light of consequences. These ideas imply that development should be embedded in course work, not delivered only as a one-off demonstration.

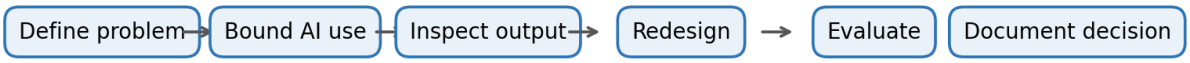
The source crosswalk showed explicit or partial teacher agency in five of five sources, human oversight in five, reflective iteration in five, and ethical/data-governance guidance in three. The dimensions are interpretive categories; the counts do not indicate how well institutions implement them. The result points to an implementation gap: competency frameworks can say what teachers should know, yet leave uncertain how an individual course team should test a specific use, record student-facing effects, and decide whether to continue.

The proposed six-step professional cycle begins with a teaching problem rather than a product. A teacher defines a concrete friction point, such as the time needed to generate differentiated examples. The teacher then selects a bounded AI task and states what must remain a human decision. Outputs are checked against course content, accessibility, bias, and data rules. The teacher redesigns the activity, gathers modest evidence such as error patterns or student explanations, and records the decision to adopt, modify, or stop. Each cycle produces a short reusable case for colleagues.

The risk matrix separates uses by consequence and reversibility. Drafting generic practice questions from public material is comparatively low risk when reviewed before use. Feedback suggestions that may influence a grade require stronger verification and disclosure. Automated judgments about student ability, high-stakes grading, or processing identifiable sensitive information require institutional approval and may be inappropriate under local rules. Risk depends on the data, learners, tool configuration, and decision authority; the table is a screening aid, not legal advice or a substitute for policy review.

Design model and practical application

Figure 2. Proposed process model



The sequence is a planning aid. Educators should adapt the steps to course aims, participant age, disciplinary norms, local resources, and applicable institutional guidance. It is not a validated instrument and should not replace professional judgment.

Table 2. Operational design and evidence to collect

Stage	Tool or evidence	Analytic purpose
Define	Teaching problem and intended benefit	Use case remains bounded
Inspect	Output check and data category	Errors and privacy risks surfaced
Evaluate	Learner evidence and stop condition	Decision to continue is justified
Document	Short team case record	Learning can inform colleagues

Extended analytical implications

Professional learning should begin from a teacher's real pedagogical need because a technology-first workshop can encourage use before purpose is established. The first question is not which model is most capable but which learning problem remains difficult with current practice. Teachers can then specify the desired change, the learners affected, and evidence that would indicate improvement. This framing makes it possible to decide that an AI tool adds little value.

Choosing not to use a tool is a valid professional decision when its risks, extra workload, or pedagogical mismatch exceed its potential benefit.

The boundary between assistance and decision authority deserves particular attention. A system may draft quiz items, suggest feedback phrasing, or reorganize public course materials, but the teacher remains responsible for accuracy, fairness, and alignment. The more a use influences access, evaluation, or a student's educational trajectory, the stronger the need for human review and institutional oversight. Review should occur before learners are affected, and teachers need a route to correct a harmful outcome. A disclaimer that a tool can make errors is not an adequate governance process.

Reflection is most useful when it compares intention with observable consequences. A teacher may intend to save preparation time but discover that checking generated examples takes longer than writing them. A differentiated prompt may increase access for some learners and introduce stereotypes for others. The learning record should capture intended benefit, actual time cost, output problems, learner response, and the decision made. A brief note can be more useful than a lengthy log if it records the evidence needed to repeat or discontinue the practice.

The risk matrix can be applied during course planning. First, identify whether the task uses public, internal, or identifiable data. Second, identify the consequence if the output is wrong or biased. Third, identify who checks the output and when. Fourth, state what happens if the check fails. A task involving public generic material and teacher review may be reversible; use involving confidential student work can create exposure that cannot be undone. This sequence helps teachers raise a specific question with data-protection or academic-integrity staff rather than making assumptions about policy.

Adult professional learning is social as well as individual. Teachers benefit from comparing cases with colleagues in the same discipline, since the meaning of an error depends on subject matter. A language instructor may inspect register and bias; a laboratory instructor may check units and scientific validity; a teacher educator may examine whether an example reflects diverse classroom contexts. Peer review should not become a performance contest in which staff are rewarded for using AI. Shared inquiry should legitimize cautious experimentation and informed non-use.

Student communication is part of the design. When AI materially shapes a task, students need to know what the system does, whether their inputs are retained, what assistance is permitted, and how they can ask for an alternative. Teachers should not promise privacy or accessibility features they have not verified. Transparent boundaries can also protect academic integrity: the teacher distinguishes permitted support from work that must demonstrate a learner's own reasoning. These statements should be consistent with institutional policy and updated when the tool or rules change.

The model's six steps can be assessed with a compact professional portfolio containing a lesson plan, a redacted prompt or workflow, a verification checklist, a short reflection, and the decision to continue, modify, or stop. Portfolio assessment should reward quality of judgment, including the identification of a use that should not proceed. It should avoid measuring competency by the number of tools used or the volume of generated materials. The purpose is improved professional reasoning and student learning, not visible adoption for its own sake.

A research pilot could recruit instructors from contrasting fields and follow two or three cycles over a semester. Data may include teacher logs, lesson artifacts, student task performance, workload estimates, and interviews about decisions to revise or discontinue. Researchers should separate tool capability from instructional design and identify the model version and settings. Because products change quickly, a useful study records the date and conditions of use. Institutional review should address student data, consent, and power relations between teacher and learner.

Discussion

The model treats teacher agency as the capacity to frame a problem, understand tool limits, and retain responsibility for educational decisions. Human oversight is not simply a final proofreading step: it includes deciding whether the system should be involved and whether a proposed use changes the teacher–student relationship. Reflective documentation can prevent each teacher from rediscovering the same failures and can support institutional learning. At the same time, documentation should avoid collecting unnecessary learner data or converting exploratory practice into surveillance.

Universities can organize short peer inquiry groups around a shared teaching problem. Each group can use a one-page protocol recording the intended benefit, affected learners, data category, output-check procedure, evidence to review, and stop condition. Training should include discipline-specific examples and a route for escalating privacy, accessibility, or assessment concerns. Students should receive plain-language notice when AI materially shapes a learning activity or evaluation. Any deployment should comply with current institutional and national requirements, which may change over time.

Further analytical interpretation

Professional learning should begin from a pedagogical need, because a technology-first workshop can encourage use before purpose is established. Teachers can identify the friction point, learners affected, desired change, and evidence that would indicate improvement. This framing also makes non-use a valid decision when risk, workload, or pedagogical mismatch exceed potential benefit. Tool familiarity alone is not a measure of professional judgment.

The boundary between assistance and decision authority matters. A system may draft practice questions or reorganize public course material, but the teacher remains responsible for accuracy, fairness, and alignment. The more a use affects assessment or a learner's opportunities, the stronger the need for verification and oversight. Review should occur before learners are affected, and teachers need a correction route. A generic disclaimer about possible errors is not an adequate governance procedure.

Reflection compares intention with observable consequences. A teacher may intend to save time but spend longer checking examples. A differentiated prompt may improve access for some learners and introduce stereotypes for others. A learning record should capture intended benefit, total time cost, output problems, learner response, and the decision to continue, modify, or stop. Brief documentation is useful when it records evidence needed for future decisions without retaining unnecessary student data.

Risk screening can ask whether a task uses public, internal, or identifiable data; what happens if an output is wrong; who checks it and when; and what happens if verification fails. A task using generic public material may be reversible, while entering confidential student work may create exposure that cannot be undone. Teachers should raise specific questions with data-protection or academic-integrity staff instead of assuming local policy.

Workload and equity belong in evaluation. Tools may save first-draft time but add review, adaptation, and student-support work. Outputs may omit local knowledge or assume device access. A realistic pilot records preparation, delivery, verification, and follow-up time, and asks which learners benefit and who bears risks. Professional learning should include examples where the best decision is to replace generated content with teacher-created material.

A governance-ready case record can identify the tool and version, date, task, data type, verification steps, known errors, learner notice, and decision. It need not store student prompts or personal content. Since products and rules change, periodic review is necessary. Future pilots should document the conditions of use and assess feasibility before making claims about learning effects.

Table 3. Evidence trace supporting the coding decisions

Source or scene	Evidence anchor	Reason for interpretation	Analytic use
UNESCO GenAI guidance	Human-centered governance	Supports privacy and validation	Risk
UNESCO teacher AI framework	Competency domains	Supports capability and reflection	Agency
Knowles et al.	Adult-learning principles	Supports relevance and problem-centered learning	Learning design
Schön	Reflection in/on practice	Supports iterative review	Reflection
OECD Teaching Compass	Teacher agency	Supports contextual judgment	Agency

Reproducibility and operational codebook

Replication requires recording the version and date of each policy framework because AI recommendations and institutional requirements change. The present comparison operates at the source level and codes explicit, partial, or absent discussion. An absent code does not mean a framework opposes a practice. The table summarizes the coding dimensions and excludes technical measures that would require a separate validation study. More than one dimension can be present in a source. Counts indicate coverage in the selected documents, not teacher competence or institutional implementation.

Table 4. Operational definitions and boundary cases

Dimension	Operational rule	Boundary / exclusion
Teacher agency	Source positions teachers as decision-makers who frame and evaluate use.	Tool operation skill alone is insufficient.
Human oversight	Source assigns review or responsibility to a person.	A generic warning does not define oversight.
Reflective iteration	Source supports repeated review of practice and consequences.	One-time training alone is partial.
Ethical/data governance	Source addresses privacy, rights, bias, or accountable use.	Ethics language without practical safeguards is partial.

Implementation and evaluation considerations

A useful professional-learning session can be organized around a paired case rather than a list of tools. Each teacher brings one course task, states the learning objective and constraints, and drafts a non-AI baseline. The group then tests one narrowly bounded AI-supported option and checks the output against subject knowledge, accessibility, student privacy, and workload. Institutional leaders can make reflective practice feasible by providing protected collaboration time, approved guidance on data, and a route for reporting incidents without blame. They should also clarify who authorizes high-stakes uses and who is accountable for correcting errors. Professional autonomy requires access to reliable information and a real ability to decline a tool that conflicts with educational aims. The framework's emphasis on teacher judgment therefore has organizational implications: individual responsibility must be matched by institutional support and clear governance.

Conclusion

Effective professional learning for generative AI requires teachers to investigate pedagogical problems, retain human judgment, and examine consequences with evidence. The comparative source analysis motivates a six-step reflective cycle and a risk screen that links tool use to data,

stakes, and reversibility. The framework should be treated as a pilotable design proposition. Its effectiveness, feasibility, and equity implications remain open empirical questions.

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