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FROM BURDEN TO LEVERAGE: AN EXPLORATORY STUDY ON THE EMERGENCE OF THE AI-FLUENT TEACHER OF 2030

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ABSTRACT

The accelerating integration of artificial intelligence (AI) into educational settings has generated widespread expectations of workload relief for teachers. However, emerging evidence suggests a more complex reality in which AI tools may initially increase workload through additional cognitive demands, tool-learning requirements, and limited institutional support (Selwyn, 2022; Crompton & Burke, 2023). This exploratory mixed-methods study examines educators' experiences of AI-related workload changes and explores AI fluency, comprising operational, pedagogical, and critical dimensions, as a potential factor influencing whether AI is experienced as a burden or a lever. Data collected from 16 educators across primary, secondary, and post-secondary settings revealed higher confidence in operational fluency (37.5% high confidence) than in pedagogical fluency (25.0%) and critical fluency (18.8%). Organizational readiness also appeared limited, with 75.0% of respondents reporting the absence of an institutional AI policy and 68.8% reporting no AI-focused professional development during the preceding twelve months. Drawing on these findings, the study proposes the AI Transformation Model, a three-phase framework describing progression from adoption to fluency and redesign, and explores the emerging competency profile of the AI-Fluent Teacher of 2030. The findings suggest that sustainable workload transformation may depend not only on AI adoption but also on the systematic development of AI fluency supported by appropriate organizational structures and professional learning opportunities.

Keywords: *AI fluency, teacher workload, AI Workload Transformation, professional development, educational technology*

INTRODUCTION

Teacher workload has become one of the most pressing systemic challenges confronting educations globally. Meta-analyses of teacher stress and burnout consistently identify workload volume as a primary predictor of occupational strain, reduced instructional quality, and professional attrition (Skaalvik & Skaalvik, 2017; Kyriacou, 2001). In the United Kingdom, the Department for Education (2019) reported that primary teachers worked an average of 54 hours per week, with planning, marking, and administrative duties accounting for most of the non-contact time. Comparable patterns have been identified across OECD

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member states, where the Teaching and Learning International Survey consistently documents teacher workload as a barrier to professional sustainability (OECD, 2020). Against this entrenched structural problem, the emergence of artificial intelligence in educational contexts has been positioned as a potential corrective – a technological lever capable of automating routine tasks, personalizing learning at scale, and restoring professional capacity.

The promise of AI-mediated workload relief is neither wholly fabricated nor straightforwardly realizable. Early systematic reviews of AI applications in education, including Zawacki-Richter et al. (2019) and Luckin et al. (2016), identified substantial potential across domains, including automated feedback, adaptive learning systems, and intelligent tutoring. More recent analyses, however, have tempered this optimism. Crompton and Burke (2023) found that most empirical studies on AI in higher education focused on student-facing applications, with teacher-facing workload benefits remaining largely unexamined and often assumed rather than demonstrated. Selwyn (2022) argued that the recurring tendency to frame AI as an educational solution reflects broader patterns of techno-solutionism that consistently underestimate the social, institutional, and professional complexities of implementation.

A growing body of practitioner evidence points to a more troubling pattern still: in numerous documented cases, AI adoption has not reduced teacher workload but has added new layers of complexity, introduced additional tasks such as verifying AI-generated content, navigating ethical ambiguities, and managing student AI use, and created cognitive demands for which teachers are largely unprepared (Holmes et al., 2022; Kim & Kim, 2022). This paper argues that this pattern is not an artefact of technological inadequacy or individual incompetence, but rather the predictable consequence of deploying powerful AI tools into professional contexts where the requisite fluency to use them effectively has not been developed.

The paper's central argument is that the impact of AI on teacher workload is mediated by a critical and undertheorized variable: teacher AI fluency. Whereas AI literacy is typically defined as a threshold capacity to understand and use AI systems (Long & Magerko, 2020) and has attracted growing attention in the literature, this paper contends that literacy-level competency is insufficient to unlock AI's workload-transforming potential. What is required is fluency: a deeper, more integrated form of professional competency that combines operational proficiency, pedagogical intelligence, and critical awareness. It is this multidimensional fluency, rather than merely tool adoption, that determines whether AI functions as a burden multiplier or a professional lever.

To ground this argument empirically, the paper draws on data from an exploratory mixed-methods survey administered via JotForm to 16 practicing educators across primary, secondary, and post-secondary settings. While modest sample size precludes generalization, the study provides a theoretically grounded, practice-informed foundation for the conceptual framework developed herein, and its findings are interpreted as illustrative of patterns consistent with the broader literature.

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LITERATURE REVIEW

AI in Education: Promises and Contested Realities

The literature on AI in education has expanded rapidly over the past decade, and several authoritative reviews have mapped its scope and trajectory. Zawacki-Richter et al. (2019) conducted a systematic review of 146 studies on AI in higher education. They found that the field was dominated by applications related to profiling and prediction, assessment and feedback, and intelligent tutoring systems. Significantly, only a small proportion of studies addressed teachers' experiences of AI, and even fewer examined workload as an outcome variable. This gap reflects a broader tendency in educational technology research to prioritize student-facing outcomes over teacher-facing ones, a tendency that Selwyn (2019) has characterized as a persistent blind spot in the field.

Luckin et al. (2016), in their influential report Intelligence Unleashed, positioned AI as a transformative force capable of freeing teachers from administrative burdens and enabling more personalized, data-informed instruction. This optimistic framing has been broadly echoed by UNESCO (2021) and the OECD (2023), both of which have advanced frameworks for AI in education that foreground teacher empowerment alongside student learning. UNESCO's (2023) AI Competency Framework for Teachers is particularly significant as an institutional signal that AI fluency, not merely AI literacy, is now regarded as a professional imperative. However, critics have noted that these frameworks are aspirational rather than empirically grounded, and that the conditions required to realize their vision (sustained professional development, institutional support, and systemic redesign) are rarely addressed with adequate specificity (Gillani et al., 2023).

The emerging empirical literature paints a more cautionary picture. Gillani et al. (2023) examined teacher experiences of AI adoption across a sample of secondary schools and found that while attitudes toward AI were broadly positive, practical engagement was characterized by high levels of trial and error, inconsistent institutional support, and a pervasive sense of professional uncertainty. Holmes et al. (2022) similarly found that the most significant barriers to AI integration in teaching were not technical but professional: teachers lacked not the tools but the pedagogical frameworks and ethical guidance required to use them effectively. These findings are consistent with Mishra and Koehler's (2006) foundational TPACK framework, which established that effective technology integration requires the simultaneous development of technological knowledge, content knowledge, and pedagogical knowledge, a synthesis that does not emerge automatically from tool access alone.

Teacher Workload: Structure, Complexity, and Technology's Role

The structural dimensions of teacher workload have been extensively documented. Troman and Woods (2001) identified a threefold taxonomy comprising intensification (increasing volume within existing roles), extensification (expanding scope of professional responsibility), and complexification (growing cognitive and relational demands). All three dimensions have been intensified in digital and AI-mediated educational environments. Perryman and Calvert (2020) found that accountability pressures combined with expectations that teachers adopt new digital tools without commensurate reductions in other demands had created a compounding workload effect they termed the 'add-on trap.'

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Cuban (2001), reviewing a century of educational technology initiatives, concluded that technology has consistently promised to transform teaching while consistently failing to do so, largely because implementation failed to account for the professional and institutional conditions in which teachers work. More recently, Voogt et al. (2013) argued that sustainable technology integration requires not only teacher competency but also collaborative professional cultures, redesigned workflows, and leadership support.

A distinction of conceptual importance for this paper is between time load and cognitive load. Sweller’s (1988) cognitive load theory distinguishes among intrinsic load, extraneous load, and germane load. In the context of AI adoption, teachers face elevated extraneous load arising from unfamiliar interfaces, ambiguous outputs, and the absence of clear professional frameworks, which compounds rather than reduces the overall cognitive burden of professional practice.

AI Literacy and Fluency: Conceptual Distinctions

Long and Magerko (2020) proposed a comprehensive taxonomy of AI literacy competencies encompassing awareness, use, evaluation, and ethical reasoning. Ng et al. (2021) developed and validated a four-dimensional framework for AI literacy in K-12 education comprising know-and-understand AI, use-and-apply AI, evaluate-and-create with AI, and AI ethics. While these frameworks represent significant advances, they remain primarily threshold-oriented, focused on establishing the minimum conditions for informed AI engagement rather than on the deeper forms of professional integration that AI's transformative potential demands.

Eshet-Alkalai (2004) argued that digital literacy, conceived as discrete skills, was inadequate as a professional goal because it failed to capture the integrative, context-sensitive, and dispositional qualities of genuinely fluent digital practice. This paper advances an analogous argument for AI fluency: that it must be understood as a fully integrated professional disposition, rather than a threshold competency, shaped by what Priestley et al. (2015) identify as the ecological dimensions of teacher professional agency, the interaction of competency, contextual conditions, and professional history.

The AI Workload Paradox: Emerging Evidence

While the term 'AI Workload Paradox' is original to this paper, the underlying phenomenon has been identified across a growing body of empirical work. Kim and Kim (2022) found that teachers who adopted AI marking tools reported initial increases in time spent on assessment-related tasks, due to the need to review, correct, and contextualize AI-generated feedback. Gillani et al. (2023) documented an 'adoption tax' which is a period of elevated workload during which teachers invested in tool learning without yet reaping efficiency gains. Darling-Hammond et al. (2020), while not addressing AI specifically, established that the absence of sustained, job-embedded professional development was the most consistent predictor of technology adoption failure in schools. This is a finding directly applicable to the AI context. Collectively, these studies suggest that the paradox is not anecdotal but a structurally predictable outcome of AI implementation in under-supported professional contexts.

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The AI Workload Paradox

This paper introduces the AI Workload Paradox as a formal conceptual construct to describe the counterintuitive phenomenon whereby AI adoption initially increases teacher workload before any sustained reduction is realized. The paradox operates across three analytically distinct dimensions: temporal, cognitive, and institutional.

The temporal dimension arises from the investment phase inherent in learning any new professional tool. Teachers who begin using AI spend substantial time navigating interfaces, formulating prompts, evaluating outputs, and developing iterative strategies required to produce usable results. Unlike consumer technology, professional AI tools require contextual calibration where teachers must learn not only how a tool works in general, but how it responds to the specific demands of their subject, year group, and institutional context. This calibration process is time-consuming and, in the absence of structured support, largely self-directed.

The cognitive dimension is more subtle and more consequential. Drawing on Sweller's (1988) cognitive load framework, AI adoption imposes significant extraneous cognitive load on teachers who lack the fluency to manage it efficiently. Every AI-generated output requires professional evaluation: Is this content accurate? Is it appropriately pitched? Does it reflect the diversity of learners? Is it ethically appropriate? These questions demand active professional judgement and cannot be delegated to the AI itself. The cognitive labor of oversight and curation is real and sustained, contributing to the experience of increased workload even where time-on-task may be nominally decreasing.

The institutional dimension is perhaps the most tractable but most neglected. In the absence of clear policies on acceptable AI use, student data governance and academic integrity, teachers adopting AI tools bear the full cognitive and ethical burden of navigation alone. Survey findings from this study confirm that the majority of respondents were operating in precisely such environments, with 75.0% reporting no institutional AI policy. Across all three dimensions, the underlying dynamic is the same: AI shifts work rather than eliminates it, and the direction of that shift is shaped by the degree of fluency the teacher brings to their practice.

Defining AI Fluency in Teaching

This paper proposes AI fluency as a three-dimensional professional construct that moves beyond the threshold orientation of AI literacy frameworks (Long & Magerko, 2020; Ng et al., 2021) toward a more integrated conceptualization of professional competency. The three dimensions operational fluency, pedagogical fluency, and critical fluency are theoretically interdependent and jointly necessary for the full realization of AI's workload-transforming potential.

Operational fluency denotes the technical dimension of AI engagement: the capacity to use AI tools with efficiency and intentionality, to construct prompts that elicit high-quality outputs, and to integrate AI affordances into daily professional workflows. This dimension corresponds to the technological knowledge component of Mishra and Koehler's (2006) TPACK framework, though it is conceptualized here as more deeply procedural and

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contextually situated, extending beyond platform familiarity to adaptive prompting competency transferable across tools.

Pedagogical fluency denotes the capacity to integrate AI into purposeful, learning-centred design. A pedagogically fluent teacher uses AI to design richer learning experiences, scaffold differentiation, and align AI outputs with specific learning objectives, exercising professional judgement about when AI adds value and when it does not. This dimension maps onto the pedagogical content knowledge and TPACK integration components identified by Mishra and Koehler (2006) and draws on the design-oriented framing of teacher expertise advanced by Darling-Hammond et al. (2020). It is the dimension most consistently absent from current AI professional development, which tends toward tool training rather than curriculum integration (Holmes et al., 2022).

Critical fluency denotes the evaluative and ethical dimension of AI engagement. Critically fluent teachers approach AI-generated content with informed skepticism, evaluating accuracy, identifying bias, navigating academic integrity questions, and modelling responsible AI use for students. This extends the critical evaluation competency in Long and Magerko (2020) and the AI ethics dimension in Ng et al. (2021), positioning ethical reasoning as a central professional disposition rather than an ancillary skill. The key claim of this section is that all three dimensions are necessary conditions for workload transformation. Operational fluency without pedagogical fluency produces efficient but educationally shallow AI use; without critical fluency, it produces ethically exposed practice. The integration of all three is achievable only through sustained, contextualized professional development, enabling the professional agency required to transform AI from a novelty into a sustainable lever.

From Burden to Leverage: Transforming Teacher Work

The mechanism by which AI fluency transforms teacher workload is not elimination but reconfiguration. AI does not remove tasks from the teacher's professional repertoire; it changes their nature, demands, and sequencing. Across the core domains of teacher work, AI-fluent engagement produces a qualitatively different experience of professional practice-characterized by what this paper terms a shift from task execution to task orchestration.

In lesson planning, the shift is from solitary, time-intensive material creation to AI-assisted co-design. Before AI fluency, lesson planning demands the simultaneous management of curriculum alignment, resource development, activity sequencing, and differentiation-identified across multiple national surveys as the most time-consuming component of non-contact work (OECD, 2020). With operational and pedagogical fluency, the teacher defines learning goals and contextual parameters, evaluates AI-generated draft structures, and exercises professional judgement about what best serves specific learners. Cognitive investment shifts from laborious creation to critically engaged curation.

In assessment and feedback, AI fluency enables teachers to deploy AI as a first-draft feedback generator while maintaining professional oversight, personalization, and relational context. The teacher's role shifts from the mechanical work of scoring to the higher-order work of interpreting learning patterns, designing responsive interventions, and engaging students in dialogue about their progress (Perryman & Calvert, 2020). In differentiation, AI fluency

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enables the rapid generation of differentiated material variants, scaffolded texts, modified task demands, and enrichment extensions that the teacher then reviews and contextualizes. Across all domains, the teacher remains central, not despite AI but because of the distinctly human capacities such as professional judgement, relational intelligence, and ethical reasoning that AI cannot replicate, consistent with the human-in-the-loop model of AI-augmented professional practice (Holmes et al., 2022; UNESCO, 2021).

The AI-Fluent Teacher of 2030

The professional profile of the AI-fluent teacher as it may emerge by 2030 is not a utopian vision of frictionless efficiency, but a reasoned extrapolation from current developmental trajectories in AI capability, educational research, and professional practice. The most fundamental transformation is a shift in professional identity: from content deliverer to learning designer. As AI assumes increasing responsibility for material generation, teacher expertise is redirected toward the architecture of learning experiences, such as designing conceptual structures, identifying generative provocations, and engineering the conditions under which deep learning occurs. This aligns with Darling-Hammond et al.'s (2020) characterization of the most effective teachers as learning architects, and positions AI as an enabler of a professional identity consistently associated with greater impact and satisfaction (Hattie, 2009).

New competencies emerge as central to this reimagined profile. Prompt design, such as the capacity to construct precise and contextually appropriate queries, becomes a professional skill analogous to the craft of questioning that characterizes accomplished teaching (Hattie, 2009). Data-informed decision-making, supported by AI-generated learner analytics, becomes an everyday professional practice rather than an occasional leadership exercise. Ethical mediation of AI use, guiding students, parents, and colleagues through the complex terrain of AI in learning becomes a core responsibility. Crucially, workload in this projected profile is not eliminated but redistributed and elevated: repetitive, low-judgement tasks are progressively delegated to AI, freeing teacher cognitive capacity for the high-judgement, relational, and creative work that research identifies as both most impactful for students (Hattie, 2009) and most meaningful for teachers (Skaalvik & Skaalvik, 2017). Table 1 illustrates the anticipated shift in educators' roles by 2030.

Table 1: Role Transformation of the AI-Fluent Teacher of 2030

Domain	Current Role	AI-Fluent Role (2030)
Instructional Identity	Content deliverer	Learning designer
Assessment	Marker	Feedback strategist
Knowledge Role	Authority figure	Critical thinking facilitator
Professional Mode	Isolated practitioner	AI-augmented professional
Task Orientation	Task execution	Task orchestration
Primary Workload	Repetitive production	Strategic curation and oversight

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The AI Workload Transformation Model

The AI Workload Transformation Model (AWTM) is proposed as a three-phase conceptual framework describing the trajectory from AI adoption to AI leverage (Table 2). The model draws on the technology adoption literature (Puentedura, 2006; Voogt et al., 2013), the professional agency framework of Priestley et al. (2015), and the empirical patterns identified in the survey data reported in the findings section. Its three phases: Adoption, Fluency, and Redesign are defined by the relationship between the teacher's fluency profile and their experience of AI-mediated workload.

Phase 1: Adoption (Burden) is characterized by high time load and high cognitive load, often compounded by limited institutional support. Teachers in this phase are engaged in exploratory, trial-and-error AI use marked by cognitive overhead, the absence of established prompting strategies, and unclear professional frameworks. This is the phase in which the AI Workload Paradox is most acutely experienced. Consistent with Cuban's (2001) historical analysis, this phase is frequently characterized by frustration, skepticism, and tendencies to revert to pre-AI practice.

Phase 2: Fluency (Transition) marks a meaningful shift in the teacher's relationship with AI. Operational efficiency improves as prompting becomes more refined; pedagogical and critical fluency begin to develop alongside operational proficiency. This phase represents the pivotal inflection point in the model and the moment at which AI begins to function as a tool of leverage rather than burden. The transition is not automatic; it requires sustained professional development and structured collaborative reflection, conditions that Darling-Hammond et al. (2020) identify as necessary for the internalization of any new professional competency.

Phase 3: Redesign (Leverage) represents the fullest realization of AI's transformative potential. Teachers in this phase have moved beyond efficiency gains within existing task structures and are engaged in the fundamental reconfiguration of professional workflows corresponding to the Redefinition level of Puentedura's (2006) SAMR model. Workload is qualitatively transformed, and professional identity is reshaped to reflect the strategic orchestration role. The model is conceptualized as a dynamic cycle rather than a linear progression. As new AI tools emerge, teachers may re-enter earlier phases for specific applications or domains of practice.

Table 2: The AI Workload Transformation Model - Phase Summary

Phase	Characteristics	Workload Profile	Teacher Focus
1: Adoption (Burden)	Trial-and-error use; limited guidance; high frustration	High time load; High cognitive load	Tool exploration; Skill-building
2: Fluency (Transition)	Selective use; growing confidence; emerging efficiency	Stabilizing cognitive load; Decreasing time load	Purposeful integration; Reflection
3: Redesign (Leverage)	Fundamental workflow redesign; strategic orchestration; role transformation	Elevated cognitive quality; Sustainable reduction	Strategic oversight; Task orchestration

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METHODOLOGY

Research Design

This study adopted a cross-sectional, mixed-methods design, combining quantitative descriptive statistics with qualitative thematic analysis to provide an exploratory picture of AI fluency levels and organizational readiness among practicing educators. A mixed-methods approach was selected on the grounds that the research objectives required both the breadth afforded by quantitative measurement and the contextual depth afforded by qualitative response analysis (Creswell & Plano Clark, 2018). Given the small and purposive nature of the sample, quantitative findings are reported descriptively and are not intended to support inferential statistical claims; rather, they serve as a structured lens through which to illuminate practitioner experiences consistent with the conceptual framework developed in preceding sections.

Sampling and Participants

Participants were recruited using a purposive sampling strategy (Patton, 2015), targeting practicing educators who had some awareness of, or experience with, AI tools in their professional practice. Purposive sampling was selected as appropriate given the study's focus on a specific professional population with relevant experiential knowledge. Recruitment was conducted via professional networks and educational social media communities. To preserve participant anonymity, geographic identifiers were not collected; participants were recruited across an international community of practice without disclosure of national affiliation.

A total of 16 educators completed the survey instrument. Table 3 presents the demographic profile of the sample. Participants were drawn from primary (n = 4; 25.0%), secondary (n = 8; 50.0%), and post-secondary or higher education settings (n = 4; 25.0%). Experience profiles included early-career teachers (0–5 years; n = 4; 25.0%), mid-career teachers (6–15 years; n = 7; 43.8%), and experienced practitioners (16+ years; n = 5; 31.3%). Gender distribution was 56.3% female, 37.5% male, and 6.3% preferring not to specify. The author acknowledges that the small sample size constitutes a significant limitation of the study, restricting the generalizability of findings; the results are therefore interpreted as exploratory and theoretically illustrative rather than definitive.

Table 3: Demographic Profile of Survey Participants (n = 16)

Category	Demographic Variable	n	%
School Sector	Primary	4	25.0
	Secondary	8	50.0
	Post-secondary / Higher Education	4	25.0
Teaching Experience	0–5 years (Early-career)	4	25.0
	6–15 years (Mid-career)	7	43.8
	16+ years (Experienced)	5	31.3
Gender	Female	9	56.3
	Male	6	37.5
	Prefer not to specify	1	6.3

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Instrument Design

The survey instrument was designed by the author and administered via JotForm, a cloud-based form creation and data collection platform enabling structured quantitative and qualitative data capture. The instrument comprised four thematic sections: (i) participant demographics; (ii) AI fluency assessment; (iii) AI use patterns and professional practice; and (iv) organizational readiness. The AI fluency section was structured to capture evidence across all three dimensions of the framework- operational, pedagogical, and critical fluency- using five-point Likert-type scales (1 = Not at all confident; 5 = Highly confident), alongside open-ended response fields for contextual elaboration. The organizational readiness section included binary (Yes/No) items regarding institutional AI policies and professional development access, supplemented by open-ended elaboration prompts. Content validity was established through review by two expert informants with backgrounds in educational technology and AI in education, who assessed the alignment between items and theoretical constructs. Minor revisions were made to two items following this review. Given the exploratory scale of the study (n = 16), formal reliability testing was not conducted; instrument items were instead anchored in validated constructs from existing AI literacy frameworks (Long & Magerko, 2020; Ng et al., 2021).

Data Analysis

Quantitative data from Likert-scale items were analyzed using descriptive statistics, including frequencies and percentages, to characterize the distribution of AI fluency levels and organizational readiness across the sample. Given the small sample size, mean scores are reported with appropriate caution and no inferential comparisons across sub-groups are advanced. Qualitative data from open-ended items were analyzed using Braun and Clarke's (2006) reflexive thematic analysis method, involving systematic familiarization, open coding, theme development, and interpretive synthesis. Thematic analysis was conducted iteratively, with emerging themes cross-referenced against quantitative patterns to identify convergences. All participation was voluntary and anonymous; no personally identifiable information, including national or institutional identifiers, was collected or retained.

RESULTS AND FINDINGS

AI Fluency Levels Across Three Dimensions

Table 4 presents the distribution of self-reported AI fluency levels across the three dimensions, classified by confidence rating. Responses were grouped into three bands: Low confidence (ratings 1–2), Moderate confidence (rating 3), and High confidence (ratings 4–5). Given the small sample size, all figures are reported as raw frequencies alongside percentages for transparency.

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Table 4: AI Fluency Levels by Dimension (n = 16)

Fluency Dimension	Low Confidence (Ratings 1–2) n (%)	Moderate Confidence (Rating 3) n (%)	High Confidence (Ratings 4–5) n (%)
Operational Fluency	3 (18.8%)	7 (43.8%)	6 (37.5%)
Pedagogical Fluency	6 (37.5%)	6 (37.5%)	4 (25.0%)
Critical Fluency	8 (50.0%)	5 (31.3%)	3 (18.8%)

(Scale: 1 = Not at all confident; 5 = Highly confident)

Operational fluency was the most developed dimension, with 6 out of 16 respondents (37.5%) reporting high confidence. Pedagogical fluency was notably lower, with only 4 respondents (25.0%) reporting high confidence and the largest proportion was 6 respondents (37.5%) reporting moderate confidence. Critical fluency was the least developed dimension, with the majority of respondents (8; 50.0%) reporting low confidence and only 3 (18.8%) reporting high confidence. These patterns, while based on a small exploratory sample, are directionally consistent with the broader literature indicating that operational AI use outpaces pedagogical and critical competency development among educators (Ng et al., 2021; Gillani et al., 2023).

AI Use Patterns and the Adoption Phase

Table 5 presents the frequency distribution of AI use patterns across the sample. Respondents were asked to identify, from a structured list, the professional activities for which they had employed AI within the preceding three months.

Table 5: AI Use Patterns in Professional Practice (n = 16)

AI Use Case	n	% of Respondents
Generating lesson content or activity ideas	13	81.3%
Drafting or editing written communications	10	62.5%
Producing differentiated materials	7	43.8%
Generating or structuring feedback on student work	6	37.5%
Creating assessments or examination questions	5	31.3%
Data interpretation or learner analytics	2	12.5%
Pedagogically integrated, outcome-aligned AI use	3	18.8%

The data reveals a clear hierarchy of AI use, with content generation (81.3%) and communication drafting (62.5%) dominating practice, consistent with Phase 1 (Adoption) of the AWTM. By contrast, data-informed decision-making (12.5%) and pedagogically integrated AI use (18.8%) were substantially less prevalent. The gap between surface-level operational use and pedagogically purposeful use suggests that tool access is a necessary but far from sufficient condition for workload transformation.

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Organizational Readiness

Table 6 presents the key organizational readiness indicators. Findings reveal a consistently under-prepared institutional environment across the sample.

Table 6: Organizational Readiness Indicators (n = 16)

Indicator	**Yes n (%)**	**No n (%)**
The institution has a formal AI use policy	4 (25.0%)	12 (75.0%)
Received AI-focused professional development in the last 12 months	5 (31.3%)	11 (68.8%)
Leadership has communicated clear expectations about AI use	5 (31.3%)	11 (68.8%)
AI is used integrated into school improvement or strategy plans	3 (18.8%)	13 (81.3%)

Three-quarters of respondents (75.0%; n = 12) reported that their institution had no formal AI use policy, and the majority (68.8%; n = 11) had received no AI-focused professional development in the preceding twelve months. The near-absence of AI from institutional improvement plans (81.3%; n = 13) is particularly notable, suggesting that AI adoption is being experienced as an individual professional initiative in the absence of systemic institutional commitment, a pattern historically predictive of technology integration failure (Cuban, 2001). While the small sample limits the generalizability of these figures, their directional consistency with the broader literature (Gillani et al., 2023; Darling-Hammond et al., 2020) lends credence to the interpretation that structural under-preparedness is a pervasive rather than exceptional condition.

Qualitative Findings: Thematic Analysis

Thematic analysis of open-ended responses yielded four primary themes; each illustrated with interpretive synthesis of participant responses.

Theme 1: The Invisible Overhead. The most prevalent theme described the significant but unacknowledged time investment required to learn, calibrate, and maintain AI use. Multiple respondents reported spending time outside contracted hours experimenting with AI tools without immediate productivity gains, a pattern that captures the temporal dimension of the AI Workload Paradox and was most pronounced among participants in the early stages of AI adoption.

Theme 2: Confidence Without Competence. Several respondents reported a subjective sense of confidence in using AI that was not matched by the quality or pedagogical appropriateness of the outputs they produced. This pattern of high operational self-efficacy combined with low pedagogical and critical awareness is consistent with the fluency

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asymmetry identified in quantitative findings and suggests that operational confidence may generate a false sense of professional readiness that inhibits deeper fluency development.

Theme 3: Ethical Isolation. Respondents consistently expressed discomfort with ethical questions arising from AI use, particularly around student data, academic integrity, and the disclosure of AI-generated content, while reporting that their institutions did not guide on these matters. Many described formulating personal ethical frameworks through individual reflection alone, representing both a workload burden and a professional risk that the critical fluency dimension of the proposed framework is designed to address.

Theme 4: Pockets of Transformation. A smaller sub-group of respondents who broadly corresponded to those with higher pedagogical and critical fluency scores described qualitatively different experiences of AI. These participants characterized AI as a genuine professional asset that had reduced the most draining elements of their work. Critically, this group was more likely to report access to structured professional development and to use AI in a collaboratively designed and pedagogically purposeful way, pointing toward the institutional and professional conditions that support progression to Phase 3 of the AWTM.

RECOMMENDATIONS AND IMPLICATIONS OF THE STUDY

For Schools and Educational Institutions

The institutional implication of these findings is a reorientation of professional development from tool training to fluency development. Survey evidence confirms that most educators are operating in the Adoption phase of the AWTM, experiencing the Workload Paradox without the fluency or institutional support required to progress beyond it. Schools should design sustained, embedded AI fluency programs that build operational, pedagogical, and critical dimensions progressively over time. Professional development must be contextualized within subject-specific pedagogy; generic AI training divorced from curriculum context is unlikely to develop the pedagogical fluency identified in this study as the critical gap. Consistent with Darling-Hammond et al. (2020), effective professional learning in AI should be job-embedded, collaborative, and sustained rather than episodic and platform-focused.

For School and System Leaders

Leaders must recognize that AI-related work during the Adoption phase represents a legitimate and measurable professional cost, not a discretionary activity. Workload policies that add AI expectations onto existing demands without redesigning workflows reproduce the add-on trap that Perryman and Calvert (2020) identify as characteristic of failed technology initiatives. Leaders who establish formal policies on ethical AI use by addressing the gap identified in 75.0% of sampled institutions, and who actively redesign workflows to incorporate AI, create the structural conditions in which Phase 2 and Phase 3 of the AWTM can be achieved. Investment in AI professional development should be framed not as a technology expenditure but as a teacher wellbeing and workforce sustainability intervention.

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For Professional Development Providers and Teacher Educators

Pre-service programs should embed AI fluency development across subject method courses, positioning prompt design, pedagogical integration, and ethical reasoning as core professional competencies rather than elective digital skills. UNESCO's (2023) AI Competency Framework for Teachers provides a valuable structural resource and should be integrated into national professional standards frameworks. In-service providers should attend carefully to the phase of the AWTM in which their target audience operates, designing interventions calibrated to the specific demands of each phase. Assessment of AI fluency development in pre-service programs should employ portfolio and practice-based methods that capture the integrative, contextually sensitive character of fluency rather than tool-specific certification.

CONCLUSION

This paper has argued that the relationship between AI and teacher workload is neither straightforwardly ameliorative nor inevitably burdensome but is mediated by a critical and undertheorized variable: AI fluency. The AI Workload Paradox, the counterintuitive phenomenon whereby AI adoption initially increases workload before any sustained reduction is realized, is a structurally predictable outcome of deploying powerful tools into professional contexts where the requisite fluency has not been developed. This finding is consistent with the broader historical pattern of educational technology implementation identified by Cuban (2001) and confirmed across multiple national and sectoral contexts.

The paper's central conceptual contribution is the three-dimensional AI fluency framework, comprising operational, pedagogical, and critical dimensions which moves beyond literacy-threshold conceptions (Long & Magerko, 2020; Ng et al., 2021) toward a more integrated professional competency model. Exploratory survey data from 16 practicing educators confirmed significant deficits in pedagogical fluency (25.0% high confidence) and critical fluency (18.8% high confidence), despite comparatively higher operational confidence (37.5%). The majority of respondents were operating in institutions without formal AI policies, professional development provision, or leadership communication around AI use, structural conditions that sustain the AI Workload Paradox and demand systemic rather than individual-level responses.

The AI Workload Transformation Model provides a phased developmental framework from adoption through fluency to redesign that serves both as a diagnostic tool for understanding individual and institutional positioning and as a design resource for professional development and policy. The projected profile of the AI-Fluent Teacher of 2030 suggests a future in which workload is redistributed from mechanical execution toward strategic orchestration, relational engagement, and ethical leadership. Future research should examine the AWTM longitudinally with larger, more diverse samples, tracking individual teacher trajectories across phases and identifying the specific professional development interventions most effective in supporting phase transition. The ultimate question for educational systems navigating AI is not whether AI will change teaching, but whether the investments required to develop teacher AI fluency at scale will be made before the burden becomes insupportable.

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