

The Impact of AI on Teacher's Profession: Beyond Boogeyman and Critique

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Abstract. *Aiming to ensure social well-being by investing in teachers' attitudes toward technology, this study examines how the integration of Artificial Intelligence (AI) reconfigures teachers' professional agency, while focusing on theoretical tensions between pedagogical innovation and governance-driven regulation. The analysis centers on the interaction between AI and the teaching profession, demonstrating how AI intensifies and reconfigures existing teaching theories and practices, rather than introducing an entirely new pedagogical paradigm. The study employs a theoretically grounded conceptual analysis, drawing on pragmatist-constructivist, post-structural (Foucauldian), and posthumanist perspectives, with the Actor-Network Theory (ANT) positioned as a relational analytical framework within the posthumanist tradition to examine human-technology entanglements in education. The analysis suggests that AI can support pedagogical experimentation and student-centered learning, but simultaneously introduces risks related to teacher autonomy, personalized learning, ethical responsibility, and new forms of surveillance and control. These dynamics reveal a central contradiction between pedagogical innovation and institutional regulation. The study concludes that a balanced approach which combines human agency with AI capabilities is essential for promoting equity, adaptability, and social well-being in education.*

Keywords: *Artificial Intelligence, education, teachers, Constructivism, power dynamics, Posthumanism.*

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Introduction

Ensuring social well-being increasingly relies on strengthening teachers' attitudes and skills toward technology, as education remains a key way to create fairer futures. This need becomes even more urgent as rapid technological shifts alter social, cultural, and economic environments, raising concerns about the changing balance between human agency and technologically mediated decision-making (Stiegler, 2010). In response to these transformations, this study explores how the integration of AI reshapes teachers' professional roles and agency, and which pedagogical and theoretical approaches can support ethical, human-centered and socially responsible AI use in education.

Understanding how teachers' roles evolve requires situating these shifts within the broader sociocultural, political, and technological pressures that have been reshaping education for decades (Hargreaves & Fink, 2005). Teachers are now expected to manage classrooms and actively shape the educational landscape in collaboration with the broader school community (Ally, 2019). Technology, especially AI, has become increasingly relevant in this context. Science fiction literature and movies have long envisioned a technology-driven future, inspiring real-world advancements. Early examples, such as Edward S. Ellis's *The Steam Man of the Prairies* (1868) and Samuel Butler's *Erewhon* (1872), raised questions about machine intelligence, a concept that aligns with today's AI development. AI tools, such as various chatbots, mark a significant step forward, exemplified by the *ChatGPT Revolution* (Fitzpatrick et al., 2023). These innovations, from language analysis to adaptive learning, are now transforming education and the workplace (Vaswani et al., 2017; Baidoo-Anu et al., 2023). Although technology is now a vital part of our lives and no longer sparks the same wonder as in 19th-century literature, its long-term effect on education remains uncertain (LaBerta, 2012).

Initially, the integration of AI in education was met with enthusiasm by teachers, who find AI tools like *ChatGPT* user-friendly and supportive in their teaching practices (Tajik & Tajik, 2024). The growing acceptance and application of AI technologies in educational settings has been increasingly highlighted (Ausat et al., 2023). AI not only empowers teachers to create dynamic, personalized learning environments but also enhances pedagogical efficiency, catering to the unique needs of each student (Yu & Lu, 2021). While AI tools such as *ChatGPT* facilitate lesson planning, automate assessments, and provide instant feedback, they do not replace teachers but instead reconfigure pedagogical work and professional responsibilities (Sharma & Yadav, 2022). However, concerns persist about students' overreliance on AI-generated content, which may hinder essential abilities such as independent reasoning and problem-solving. AI discourse often oscillates between utopian optimism and dystopian fear, overlooking the sociotechnical realities that shape AI's ethical implications. It has also been cautioned that AI systems embed societal biases, and their impact depends on how they are designed, regulated, and integrated into educational environments (Chan, 2023).

Therefore, recent discussions highlight that although AI tools like *ChatGPT* offer new opportunities in education, they also introduce risks, including student dependency and ethical dilemmas (Sharma & Yadav, 2022).

As AI tools like *ChatGPT* become increasingly embedded in education, they are also redefining teachers' roles and functions, requiring them to balance traditional methods with AI-enhanced approaches. This shift highlights significant educational contrasts, including the need to shift the teacher's role from an authority figure to a facilitator (Kostka & Toncelli, 2023). It underscores the necessity of pedagogical adaptation to align teaching methods with modern insights, and to navigate between technophobia and technophilia. Teachers must therefore serve as mediators, ensuring that technology supports rather than dominates learning. Given this double-faced situation, this article examines how teachers' agency and professional activities are reshaped under conditions of AI implementation, with particular attention to the theoretical (de) motivation dynamics that accompany these changes.

Educational practices, including policy documents, processes, content, values, teaching materials, and assessment practices, are always grounded in particular theoretical frameworks. Therefore, with the objective to clarify the conceptual foundations guiding the analysis, this article reviews several dominant philosophical traditions that have shaped educational reforms over recent decades. Drawing on Popkewitz's (2000) analysis of education reforms under conditions of globalization, this article treats educational theories not as abstract intellectual traditions but as governing frameworks which shape how teaching, learning, and professional responsibility are defined in practice. Popkewitz (2000) demonstrates that educational reforms are consistently underpinned by specific epistemological and normative assumptions, which legitimize particular forms of knowledge, agency, and pedagogical action while marginalizing others.

Within the framework outlined by Popkewitz (2000), reform-oriented educational thought can be broadly grouped into pragmatist–constructivist approaches, emphasizing practice, problem-solving, and individual knowledge construction (Dewey, 1990; Papert, 1972), and post-structural perspectives informed by Foucault's (1975) analyses of discourse, power, and regulation. These traditions have structured reform agendas across different national contexts, shaping expectations of teachers' roles, autonomy, and accountability. Both orientations have gained renewed relevance in contemporary debates on AI, as technological systems increasingly mediate educational decision-making, professional judgement, and forms of governance. Following earlier epistemological shifts, such as the linguistic turn and the visual turn (Mirzoeff, 1999; Simanowski, 2016), education theory is currently confronting an emerging AI turn, which challenges existing assumptions about knowledge, agency, and control.

In response to the limitations of pragmatist-constructivist and post-structural perspectives when considered in isolation, this article introduces a third analytical lens grounded in posthumanism and new materialism, particularly Bruno Latour's

(2005) *Actor–Network Theory* (ANT). ANT is not treated as a competing theory but as a relational framework within the posthumanist tradition, enabling analysis of human–technology entanglements without collapsing human and non-human agency. Together, constructivist–pragmatist, post-structural, and posthumanist perspectives are employed as distinct but complementary analytical lenses that structure the conceptual analysis presented in this article.

Methodological Approach

Methodologically, the study employs both conceptual analysis and concept analysis as forms of theoretically grounded inquiry. This choice draws on Guzzini's (2005) notion of ontological theorizing, which treats concepts as historically situated and performative, rather than fixed representations of reality. In addition, the study adopts the notion of autonomous theorizing proposed by Biesta et al. (2011), which supports the re-description and re-conceptualization of educational phenomena.

The analytical process proceeds in three stages:

1. identification of dominant theoretical perspectives shaping contemporary debates on AI in education (pragmatist–constructivist, post-structural, and posthumanist);
2. critical examination of how each perspective conceptualizes teacher agency, technology, and power relations;
3. relational synthesis, using ANT to explore points of tension, complementarity, and limitation across these perspectives.

Rather than producing empirical generalizations, this approach generates theoretically informed insights into how AI reshapes teachers' agency, motivation, and professional positioning. This multi-perspectival design addresses a conceptual gap in AI-in-education debates, where pedagogical innovation and governance dynamics are often analysed in isolation despite their intersecting effects on teachers' professional agency. The theories were selected due to their distinct analytical focus on pedagogy, governance, and human–technology relations and were compared by identifying convergences and tensions across these dimensions.

Conceptual Clarification of AI and Technology

In this article, Artificial Intelligence is understood as the most recent phase in the development of educational technologies, characterized by algorithmic decision-making, data-driven inference, and generative capacities. The analysis primarily focuses on generative AI (e.g., LLM-based systems such as *ChatGPT*) as a contemporary entry point in education, while analytically linking these tools to broader infrastructures of algorithmic governance where relevant.

While the broader term ‘technology’ is occasionally used to reflect genealogical continuity, the analysis explicitly concentrates on AI-specific features shaping teachers’ professional agency. This approach aligns with UNESCO’s (2021) *Recommendation on the Ethics of Artificial Intelligence*, which conceptualizes AI as an evolving socio-technical and ethically consequential phenomenon.

AI – from a Bogeyman to an Unavoidable Tool

Before engaging in a deeper philosophical analysis of AI in society and its impact on teachers’ professional lives, it is important to situate current debates within the recent historical and policy context that has positioned the education sector to adopt AI more rapidly than anticipated. Today, the philosophy of education is undergoing a new transformation driven by the accelerating influence of AI, one that calls for rethinking established assumptions, practices, and purposes of education (Duobliené et al., 2023). This shift becomes even more complex when viewed through the lens of the recently named Anthropocene epoch, which invites a fundamental reconsideration of the relationship between humanity, nature, and technology (Crutzen & Stoermer, 2000; Latour, 2005).

While philosophical and scientific debates increasingly address the convergence of nature, technology, and human responsibility (Haraway, 2004; Crutzen & Stoermer, 2000), representatives of the education field, especially teachers and school principals, primarily refer to international and national documents (UNESCO, 2019; 2021). Several key policy documents outline how student and teacher agency is understood in relation to technology and the natural world. Education is defined as a fundamental human right and as a basis for equity, quality, and sustainability, a position strongly emphasized by UNESCO (2016) and other supranational organizations such as the OECD (2020). In recent years, UNESCO (2019; 2021) has increasingly shifted its attention toward future-oriented developments, particularly the accelerating influence of technological progress and AI. This policy orientation raises an essential question for contemporary education: how should teacher agency be conceptualized in schools under conditions of increasing technological mediation, and how will this shape the evolving roles of teachers and educational institutions?

International analyses present two contrasting trajectories regarding the future of human agency in education. One line of thought highlights risks posed by expanding technological influence and argues for strengthening human relations with the natural world, pointing toward a more-than-human understanding of agency (UNESCO, 2021). Another perspective envisions a future in which technological development, particularly AI, becomes a primary driver of educational innovation and opportunity, positioning machine systems at the center of learning processes (OECD, 2020). This latter view resonates with transhumanist thought, which imagines humanity evolving in close integration with technological systems (Ferrando, 2013). Within this trajectory,

several future-oriented scenarios suggest that the traditional role of the teacher may be reconfigured, as technological systems increasingly assume functions previously carried out by human educators, leading to shifts in authority, responsibility, and pedagogical judgment (Duobliene et al., 2023).

Meanwhile, humanistic perspectives continue to dominate the contemporary educational discourse, emphasizing that teachers should not function as standardized disciplinarians but rather as collaborative professionals engaged in ongoing cooperation, teamwork, and collective analysis of student learning within the broader school community (Collinson et al., 2010). A persistent paradox emerges here: while the public discourse promotes teacher autonomy, motivation, and lifelong learning, professional activities are often constrained by bureaucratic regulations (Bondie & Dede, 2023). Critical analyses also indicate that the growing implementation of AI may further intensify the administrative oversight and control (Simanovski, 2016; Ferraris, 2022). Instead of supporting academic freedom, institutional pressures often push teachers to follow standardized procedures and adopt tools for which they are insufficiently prepared, even though these tools are easy for institutions to regulate. Professional development practices often reinforce this contradiction. Training frequently follows large-scale, standardized 'one-size-fits-all' models, with limited attention to individual teachers' needs or specific school contexts. This creates a contradiction within the very teaching practices that schools aim to promote, as such models fail to foster individuality, critical thinking, or innovative approaches (Bondie & Dede, 2023). On the one hand, AI promises more personalized learning. On the other hand, it tends to 'standardize personalization' through algorithmic processes, further heightening the expectations placed on schools, pedagogical methods, and, above all, teachers.

Despite ongoing discussions about technological adaptation, the teaching profession still faces challenges in integrating digital tools. While earlier TALIS 2018 showed that fewer than 40% of teachers felt prepared to use digital technologies in teaching (OECD, 2019), more recent international data indicate a shift toward widespread but uneven adoption. For example, TALIS 2024 data suggest that while a majority of teachers report confidence in identifying and adapting digital resources, only a minority report direct experience with AI-based tools in their professional practice. These patterns of uneven digital readiness became even more visible during the COVID-19 pandemic, which fundamentally reshaped expectations for technology use in education (OECD, 2025).

A broader digital transformation in education, highlighting the crucial role of remote learning technologies, was triggered by the pandemic (Ausat et al., 2023). While technology was already gaining prominence before COVID-19, it became indispensable for maintaining educational continuity during school closures (OECD, 2023). Crises, whether natural or human-made, are often found to accelerate institutional change (Tull et al., 2017; Ausat, 2022). It has also been observed that the COVID-19 pandemic shifted teachers' attitudes toward educational technology, including AI (Cohen et al.,

2021). Before the pandemic, AI was largely perceived as a theoretical concept linked to data analytics, but the crisis highlighted its practical role in supporting teaching and learning (Subirats et al., 2021). This change in perception was observed in several countries, where studies showed that the sudden transition to remote teaching increased teachers' motivation to learn and strengthened their confidence in navigating technological challenges (Mikèné, 2021). Although AI integration initially emerged as a crisis-driven response, it has since created new opportunities to enhance teaching and learning practices.

Yet, despite these advancements, educational systems still lack a coherent, long-term strategy to harness AI's potential in a responsible, ethical, and equitable manner (Zhao & Watterston, 2021). The rapid evolution of AI, therefore, underscores the need for adaptable, forward-looking educational approaches that critically address both opportunities and risks.

AI and Teaching Dynamics: Go Forward

Historically, the introduction of new technologies in education has often raised concerns about their potential to disrupt traditional teaching practices. From a constructivist standpoint, however, technologies have been understood not as autonomous forces but as mediational means within pedagogical activity, which support learning when meaningfully embedded in educational practice (Papert, 1972; 1993). Pragmatist approaches, which emphasize learning through action and experience, similarly highlight the importance of practice in constructing knowledge (Dewey, 1990). In this tradition, technologies are neither inherently beneficial nor harmful. Their educational value depends on how they are pedagogically framed and enacted by teachers.

Constructivist insights further suggest that knowledge does not develop linearly but, rather, emerges through interconnected and dynamic structures, a view that has influenced both programming paradigms and the development of accessible educational technologies (Papert, 1972). Later analyses expanded this idea by arguing that educators can better understand new technological innovations by relating them to existing conceptual frameworks, making AI more comprehensible and usable in practice (Kay, 1991; Ilic et al., 2021). Building on this perspective, recent work conceptualizes AI not merely as a tool that automates or imitates human actions but as a computational system capable of generating probabilistic models and outputs within predefined algorithmic constraints (Ilic et al., 2021).

Contemporary research also highlights that AI now plays a central role in designing adaptive, learner-centered environments aligned with the 21st-century educational needs (Niemi et al., 2023). Importantly, learner-centered education predates AI and remains unevenly implemented across educational systems (Dewey, 1990). AI therefore does not introduce a new pedagogical paradigm but reconfigures existing educational ideals by accelerating, formalizing, and partially automating instructional decisions.

At this point, it is essential to revisit Bloom's (1956; 1984) contributions. He emphasized individualized learning paths and formative assessments, supporting teaching methods which promote high levels of student achievement (Bloom, 1956; 1984). Updates and revisions by scholars like Marzano and Kendall (2006), and Essa (2023) demonstrate that Bloom's core principles of taxonomy and the 2 Sigma problem still play a vital role in educational theory and practice. AI, particularly in the form of machine intelligence, is increasingly viewed as a means of advancing Bloom's vision of more equitable and personalized education. Adaptive learning systems can adjust instructional pathways, provide real-time feedback, and tailor learning experiences to individual needs, thereby supporting the principles of mastery learning and educational equity (Essa, 2023). Extending this perspective, modern AI technologies also create opportunities for active learner engagement and adaptive feedback, enhancing understanding through collaborative human–AI interaction (Solaiman et al., 2023). However, such personalization remains conditional, as algorithmic systems operate within predefined models and data structures.

Historically, constructionist ideas intersected with early symbolic AI and programming-based learning environments. However, a significant shift has occurred from symbolic AI toward machine learning and neural networks. This change has provided powerful tools for education, but it has also reduced focus on teaching conceptual programming skills. Teachers now need to guide students not only through neural networks but also through the ethical issues that AI raises, encouraging deeper reflection (Khan & Winters, 2021). Recent analyses emphasize that AI should be understood as a complex construct shaped by social, cultural, and material conditions, suggesting that its role in education can be actively directed rather than simply accepted as inevitable (Knox et al., 2019). This perspective challenges the common binary between 'traditional education' and 'AI-driven education', noting that neither approach is inherently positive or negative. Instead, AI is seen as a multifaceted phenomenon whose effects depend on the contexts in which it is embedded. From this standpoint, the future of education with AI is not predetermined but can be deliberately shaped through informed pedagogical and policy decisions. Such an outlook encourages a reflective and critical approach to AI integration in schools, one that acknowledges its potential to enhance learning while remaining attentive to its wider implications.

Yet, AI tools like *ChatGPT* might have a limited direct impact on learning outcomes; they can, however, prompt reflection on dominant educational discourses and our own learning and teaching goals. While AI may not offer definitive answers to academic goals, it encourages teachers to engage in self-exploration. Hence, integrating AI into education, such as using *ChatGPT*, could lead to overreliance on technology, potentially reducing teachers' and students' active involvement and responsibility, as they may rely too heavily on technological assistance for educational tasks (Heimans et al., 2023). At the same time, empirical studies indicate that AI-assisted learning environments

can support self-regulation and maintain learning performance when pedagogically mediated (Darvishi et al., 2024).

Examination of AI integration through a constructivist lens reveals a developmental trajectory from early educational technologies to contemporary AI-driven learning environments. This progression reflects a continuity of ideas, from Papert's initial application of constructivist principles to technology-enhanced learning (Papert, 1980) to later work that embedded these principles into digital learning environments (Kay, 1991). More recent analyses show that AI-supported systems extend this trajectory by enabling adaptive, learner-centered experiences that actively engage students in constructing knowledge (Niemi et al., 2023). At the same time, AI's growing role in education demands critical scrutiny. Its influence reaches beyond pedagogical innovation, raising questions about power, control, and broader societal implications. Personalization, for instance, is often conditional, as algorithmic environments operate by generalizing patterns from population-level data and tailoring them to individuals only within the constraints of predefined computational logic (Simanovski, 2016). Rather than equating AI directly with disciplinary power, the following section draws on post-structural insights to examine how AI-mediated systems reconfigure visibility, accountability, and professional judgment in education.

Critical Approach to AI in Education: No Trust

There is broad agreement that teachers will remain central actors in the emerging era of AI, as they will ultimately determine whether, when, and under what pedagogical conditions these technologies are integrated into instructional practice. At the same time, concerns have been raised within the scientific community that the expansion of AI in education could introduce significant risks and unintended consequences, particularly when implementation is driven by efficiency-oriented or governance-led agendas rather than pedagogical judgment (Luckin et al., 2016).

Discussions on AI increasingly highlight a dual reality: while intelligent systems offer opportunities to enhance human well-being, innovation, and efficiency, they also introduce significant ethical and societal risks, including issues of safety, unequal power relations, and the possibility of algorithmic influence over human decision-making (Stahl, 2021). Within this tension, concerns about institutional power in education are not new. Earlier critical traditions had already emphasized how educational structures shape professional autonomy and subject formation. Post-structural analyses further develop this line of inquiry by examining how processes of depersonalized or 'anonymized' power operate through technological infrastructures, including AI-mediated systems, and how these intersect with existing institutional arrangements of authority, visibility, and control (Foucault, 1975). Rather than treating AI as a disciplinary subject, this analysis draws on Foucauldian insights to examine how AI functions as part of broader socio-technical assemblages that reorganize educational

governance. Building on Foucault's (1975) work, later scholars argue that mechanisms of power emerge as strategic responses to specific crises or institutional pressures and, over time, solidify into broader technologies of governance that operate across multiple domains (Rabinow & Rose, 2003). From this perspective, AI in education does not automatically produce surveillance or discipline. Instead, its effects depend on how algorithmic systems are embedded within policy frameworks, accountability regimes, and institutional decision-making processes.

A similar dynamic can be observed in the educational use of AI. The public release of large-scale generative AI systems, such as *ChatGPT*, in late 2022 demonstrated how generative AI can expand instructional possibilities, by offering new forms of learning support and streamlining teachers' professional tasks (Baidoo-Anu & Ansah, 2023). These developments provide clear benefits, such as improving student performance or reducing administrative burdens, yet they also increase the visibility and traceability of pedagogical work, thereby opening new spaces for institutional oversight (Fitzpatrick et al., 2023). Research further indicates that AI-based technologies can gradually evolve beyond their initial educational purposes. When deployed at scale, algorithmic systems often become integrated into broader infrastructures of monitoring, evaluation, and performance management. Evidence from countries with authoritarian governance illustrates how AI, initially implemented to enhance public-sector efficiency, can be redirected to strengthen state influence across multiple domains, including education (Polyakova & Meserole, 2019; Zeng, 2020). Russia's national AI strategy is one example of this pattern, showing how tools intended to support governance and educational development can be repurposed for wider mechanisms of state control (Polyakova & Meserole, 2019). Such cases do not suggest a direct equivalence between educational AI and authoritarian surveillance but demonstrate how technological systems remain politically and institutionally malleable.

Drawing on Foucauldian insights, it becomes evident that initiatives designed to improve efficiency may inadvertently generate new forms of regulation and constraint. In education, AI-driven personalization may paradoxically lead to increased standardization, as pedagogical decisions become aligned with algorithmically defined norms and performance indicators (Rabinow & Rose, 2003). Concerns of this kind are also raised in analyses that question who holds authority over AI systems, how these systems shape teachers' professional agency, and how information is governed within technological infrastructures (Berendt et al., 2020). Although AI-based tools, such as personalized learning platforms or automated assessment systems, can enhance instructional support, they also introduce ethical risks related to privacy, surveillance, and algorithmic bias, with particularly pronounced implications for marginalized learners (Akgun & Greenhow, 2022).

International guidelines similarly emphasize the need for coherent governance structures. UNESCO (2019; 2021) highlights the importance of integrating AI into national educational strategies, while its *Recommendation on the Ethics of AI* (2021) calls

for transparency, accountability, and inclusivity. When such frameworks are designed with the teaching profession in mind, they can provide teachers with institutional guidance and ethical reference points.

However, they may simultaneously function as regulatory instruments that shape what counts as legitimate pedagogical practice. From this perspective, AI does not operate as an autonomous disciplinary force but as a mediating infrastructure through which disciplinary logics may be enacted (Ball, 2013). Concerns about AI's dual nature as both an empowering tool and a mechanism of control are reflected in analyses warning that increasing reliance on algorithmic systems may gradually reduce human agency in educational decision-making (Simanowski, 2016). Extending this critique, the notion of the 'age of documentarization' suggests that algorithm-driven processes erode individual autonomy by channelling actions and decisions into large-scale, impersonal knowledge systems (Ferraris, 2022). In this context, teachers, positioned at the intersection of technological implementation and institutional reform, become mediators of these shifting power dynamics, navigating the tensions between professional autonomy and expanding forms of administrative and algorithmic control (Ball, 2013).

Given these complexities, AI should be implemented with careful consideration and rigorous oversight, while acknowledging its influence not only on education but also on broader societal power structures. While constructivist perspectives highlight AI's potential to enhance engagement and adaptability, post-structuralist analyses inspired by Foucauldian thought draw attention to the power relations and regulatory functions embedded in technological systems. Critiques of digitalization further underscore these concerns, noting that expanding media technologies may displace critical thinking and reduce human agency, particularly by weakening attention and memory processes (Stiegler, 2010, 2017).

A pharmaconic perspective on education highlights that every technological development simultaneously produces benefits and new problems, becoming both a driver of innovation and a source of dependency or consumerist pressures (Stiegler, 2010, 2017). From this viewpoint, digital technologies may also carry a 'toxic' dimension, narrowing attention, weakening memory, and reducing opportunities for critical distinction-making, thus complicating attempts to determine what counts as 'good' or 'bad' in educational progress (Stiegler, 2017). Similar concerns appear in global policy reflections, which emphasize the need to resist the negative aspects of digitality, particularly its tendency to promote quantitative, algorithmic, and overly solutionist definitions of knowledge (UNESCO, 2021). Within this context, posthumanist approaches extend the analysis by questioning how human agency itself is reconfigured within human–technology assemblages – which is an issue addressed more explicitly in the following section.

AI as neither Boogeyman nor Panacea: Merging Technology and Humanity

The concept of actor–network relations highlights that human and non-human entities, including technologies, function as interconnected actors that jointly shape social realities (Latour, 2005; Fenwick & Edwards, 2010). From this perspective, AI should neither be feared nor idealized; what matters is the capacity to work collaboratively with technological systems. Over time, tools that initially appear disruptive often become embedded in everyday educational practice, eventually attracting less conceptual attention as they integrate into routine processes (Schwarz et al., 2025).

The central premise of ANT is symmetry. This principle does not imply an unrealistic equivalence between human and technological agency but emphasizes the importance of navigating virtual space and learning to coexist (Latour, 2005). In the context of education, this perspective highlights how the introduction of AI reshapes methods, redistributes control, and redefines the roles of teachers and students. Educational environments consist of interdependent networks, teachers, learners, technologies, and institutional structures that work together to shape daily practice. Within ANT, technologies such as AI are regarded as active participants that contribute to the transformation of educational processes and outcomes (Fenwick & Edwards, 2010). This framework highlights the relational, interconnected, and continuously evolving nature of educational systems, in which both human and non-human actors shape and reshape pedagogical realities. In this analysis, ANT and posthumanist perspectives function as relational analytical lenses that complement, rather than replace, pragmatist–constructivist and post-structural approaches.

While ANT offers a conceptual lens for understanding the relational dynamics between humans and technologies, other scholars highlight the practical implications of integrating AI into teaching. AI's potential lies in its capacity to support both cognitive and non-cognitive tasks through diverse applications and multimodal interfaces, signaling a shift in how educational processes are organized and experienced (Niemi, 2021). A future-oriented perspective is further developed in work proposing guidance for integrating high-quality AI learning environments in schools, emphasizing the need to move beyond traditional, results-focused assessments toward approaches centered on inquiry, dialogue, and exploratory learning (Hooker, 2023). This view underscores the importance of teachers actively experimenting with AI tools, evaluating their pedagogical value and limitations, and adapting teaching practices accordingly. Related posthumanist approaches question rigid separations between human and technological actors by emphasizing relationality, interdependence, and distributed agency, thereby complementing ANT through a non-dualistic understanding of educational practice without assuming technological determinism (Deleuze & Guattari, 2013).

First of all, to fully understand AI's integration in education, we should also consider D. J. Haraway's (2004, 2016) position that humans should be viewed as cyborgs

rather than purely human. She also expands the concept of the more-than-human to include technologies, in contrast to D. Abram (1997), who associates it primarily with Indigenous ways of being closely connected to nature. Building on this cyborgian lens, later interpretations emphasize how everyday technologies already function as extensions of human cognition and agency, with emerging developments such as brain–computer interfaces suggesting even deeper forms of integration (Lea, 2020). This posthuman perspective moves beyond traditional dualisms dividing human and technological existence (Haraway, 2004) and aligns with the notion of the ‘cyborg teacher’, which symbolizes the blurring of conventional boundaries. Within this view, teachers are no longer positioned as sole providers of knowledge but instead become facilitators operating within networks of human and non-human actors, where learning emerges through diverse interactions with technological systems. Posthumanism, thus, contributes analytically by foregrounding how agency is redistributed rather than eliminated in AI-mediated educational environments, encouraging reflection on how pedagogical responsibility, control, and ethical accountability are negotiated within human–technology assemblages.

Gough’s rhizomANTic perspective highlights how teachers working with technology can be understood as inhabiting a cyborg-like existence, situated within fluid and interconnected networks of human and non-human actors (Gough, 2004, 2017). This view emphasizes the importance of recognizing how these networks operate, enabling educators to critically evaluate both the productive possibilities and the potential risks emerging from technological entanglements. In this sense, Gough’s rethinking of educational networks is accompanied by concerns about sustaining human empathy, both toward other people and toward more-than-human forms of life. From this standpoint, humanity can be understood as undergoing an ongoing process of transformation through increasingly close relationships with technologies, suggesting that the human is not a fixed or completed entity but one shaped through technological augmentation and symbiosis (Ferrando, 2013). Within this view, transhumanist approaches place particular emphasis on the enhancement and optimization of human capacities through technological innovation, whereas posthumanist perspectives foreground relationality, interdependence, and the decentering of the human subject. Despite these differences, both posthumanism and transhumanist pluralities (*transhumanisms*) challenge the rigid binary between nature and technology, pointing toward hybrid forms of existence that increasingly shape contemporary educational settings. Yet the education sector remains comparatively slow in engaging with these shifts, particularly when questions arise about the evolving agency and responsibility of teachers and students under conditions of AI integration.

Posthuman educational scholarship, including the posthuman education manifesto or the posthuman child manifesto (Snaza et al., 2014; Murriss, 2018), further develops these ideas by examining how learning emerges within heterogeneous assemblages of human and non-human actors. Rather than locating agency exclusively in individual

learners or teachers, these approaches conceptualize education as unfolding through relational configurations of materials, bodies, technologies, and institutional practices. Within this broad field, different theoretical positions propose varied ways of understanding how material and technological elements participate in educational processes. While some accounts align closely with ANT, others draw on assemblage-oriented perspectives to explore how learning environments are shaped by complex socio-material relations. In the context of Anthropocene pedagogy, such analyses foreground the entanglement of technology, environment, and education, highlighting how contemporary technological developments reshape educational imaginaries and practices (Jagodzinski, 2024). This perspective builds on theoretically grounded yet future-oriented interpretations by J. Jagodzinski, who draws on the work of M. Fazi, Y. Hui, and L. Parisi. Their contributions include conceptualizations of machinic learning as deep learning with multiple hidden layers that enable interactions between artificial and biological neurons, as well as ideas related to digital objects and new modes of relational synthesis. Within this trajectory, the notion of 'transcendental computation' also emerges, raising concerns about whether algorithmic processes may exceed their traditional instrumental role.

Although some of these perspectives adopt speculative or future-oriented orientations, their relevance to this study lies in their shared emphasis on distributed agency and the destabilization of strictly human-centered accounts of learning. Together, posthumanist, transhumanist, and ANT-informed approaches challenge the rigid binary between nature and technology and illuminate how teachers' professional agency is being reconfigured within increasingly hybrid educational environments, even as educational systems remain comparatively slow in translating such theoretical shifts into everyday pedagogical practice.

Discussion

Different theoretical perspectives illuminate how AI-mediated education reshapes teachers' professional agency through competing pedagogical and governance dynamics, rather than a single trajectory of change. From a pragmatist–constructivist perspective, AI acts as a mediational resource that can support learning, experimentation, and pedagogical responsiveness when teachers maintain control over educational aims and instructional design. In this way, AI extends existing pedagogical practices, such as personalization and feedback, rather than fundamentally transforming education. However, when constructivist assumptions are disconnected from institutional context, AI risks being seen as pedagogically neutral, masking how technologies are embedded within infrastructures that influence what forms of teaching become visible, legitimate, or valued (Popkewitz, 2000). Post-structural analyses sharpen this critique by highlighting the governance conditions under which AI operates. Drawing on Foucauldian insights, AI is not seen as an inherently disciplinary mechanism but as

part of broader socio-technical arrangements that reorganize visibility, accountability, and professional judgment. Algorithmic systems can improve the traceability of pedagogical work, aligning teaching practices with performance metrics, audit cultures, and managerial rationalities (Ball, 2013). As a result, teachers' agency is not eliminated but reconfigured, increasingly exercised within algorithmically mediated boundaries. At the same time, post-structural approaches offer limited insight into how teachers actively engage with AI technologies in everyday practice beyond compliance or resistance. Posthumanist perspectives broaden the analysis by conceptualizing AI integration as a reconfiguration of relations rather than external control. From this perspective, agency is distributed across networks of teachers, technologies, policies, and institutional arrangements (Fenwick & Edwards, 2010). This does not dissolve ethical responsibility nor equate human and technological actors. Instead, it emphasizes teachers' ongoing role as mediators who negotiate the educational meaning and implications of AI within complex assemblages, aligning with posthuman educational scholarship that emphasizes relational agency (Snaza et al., 2014; Murris, 2018). When these perspectives are combined, they reveal a core contradiction. AI is promoted as enabling personalization and pedagogical innovation, yet large-scale implementation often creates new forms of standardization, commercialization, and control. Platform-based AI systems may constrain pedagogical judgment through predefined models, metrics, and procurement-driven logics, contributing to algorithmic inequality and reshaping labor relations in education (Ferraris, 2022). Teachers are thus positioned between expectations to innovate and pressures to comply with algorithmically mediated norms of accountability. Whether AI functions as a professional resource or a constraint largely depends on governance arrangements that recognize teachers as ethical and pedagogical agents, rather than merely end-users of technological systems.

At the same time, the conceptual nature of this study should be acknowledged. The analysis clarifies theoretical tensions rather than offering empirical generalizations, and its focus on pragmatist–constructivist, post-structural, and posthumanist perspectives necessarily leaves aside other analytical traditions. Future research could build on these theoretical insights by examining how they unfold in everyday AI-mediated educational practice.

Conclusion

The analysis demonstrates how AI reconfigures teachers' professional agency under conditions of increasing technological mediation, not by introducing a wholly new pedagogical paradigm, but by intensifying existing pedagogical and institutional dynamics. In doing so, AI renders more visible the underlying tensions between educational innovation and governance-driven regulation within contemporary educational systems. By placing pragmatist–constructivist, post-structural, and posthumanist perspectives in productive dialogue, the study clarifies how AI

simultaneously enables pedagogical experimentation and introduces new forms of governance, standardization, and accountability. While agency is increasingly distributed across human–technology assemblages, responsibility for ethical judgment and pedagogical decision-making remains largely situated within the teaching profession. Across the different theoretical perspectives examined, teachers are conceptualized as continuing to occupy a mediating position between technological systems, institutional expectations, and educational values, with ethical responsibility remaining centrally situated within the profession.

Beyond both techno-optimistic and techno-deterministic framings, AI in education is better understood as a contingent and politically situated development rather than an inevitable trajectory of progress. Its future role depends on how educational systems negotiate the balance between technological capacity, professional judgment, and democratic governance. From this standpoint, AI adoption should be aligned with teachers' professional autonomy, ethical reflection, and sustained institutional support, rather than framed solely as a technical or managerial reform. By foregrounding teachers' professional agency, this study contributes to ongoing theoretical debates on how educational innovation can remain aligned with ethical responsibility and social well-being in AI-mediated educational environments.

At the same time, it opens a broader perspective on education and the teaching profession, suggesting that AI and the human factor may be understood not only as mediational but increasingly as relationally intertwined, a direction that invites further posthumanist exploration.

Author Contributions

Jurgita Bagdonaitė: conceptualization, methodology, formal analysis, writing – original draft preparation, writing – review and editing.

Lilija Duoblienė: methodology; supervision, writing – review and editing.

Both authors have read and agreed to the published version of the manuscript.

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