SHIKSHA SAMVAD
International Open Access Peer-Reviewed & Refereed
Journal of Multidisciplinary Research
ISSN: 2584-0983 (Online)
Volume-1, Issue-3, March- 2024
www.shikshasamvad.com

Impact of Artificial Intelligence on Teacher Professional Identity

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Abstract:

Artificial intelligence (AI) is poised to fundamentally reshape teaching and learning. Yet efforts to understand and act upon this transformation remain stymied by a pervasive focus on discrete AI technologies rather than the deeper shifts in professional identity that these technologies herald. Addressing this gap, the current research examines how AI reconfigures teachers' roles, authorities, and practices, presenting these changes as a remaking of the teaching profession. Three concepts from the professional identity literature frame this inquiry. First, the notion of professional identity encompasses the roles, beliefs, and communities that shape a teacher's self-conception, sense of legitimacy, and opportunities for collaboration. Second, AI is delineated as a set of generalized algorithms capable of generating, transforming, and augmenting multimodal content. Third, the concept of boundary objects highlights how diverse and often divergent interpretations of AI afford the profession's reconstitution while also giving rise to tensions and challenges. These analytical lenses facilitate two lines of examination: the ways in which AI transforms teaching practice and the identity implications that ensue. Both lines of analysis draw upon empirical evidence derived from interviews, surveys, and publicly available materials involving educational actors situated across diverse contexts.

Keywords: *Artificial intelligence, professional identity, AI technologies.*

1. Introduction

The emergence of AI technologies in education challenges the core foundations of the teaching profession. Teacher professional identity encompasses the personal journey of educators, including their roles, beliefs about their agency, and connections with peers. AI functions as a boundary object in educational contexts, aiding instructional choices while altering professional learning and practice roles. Empirical studies indicate substantial shifts in educator identities due to AI, impacting beliefs, values, perceived authority, ethical considerations, and adaptation pathways. This raises critical questions about agency within organizations, visibility of practices through pedagogical traces, and the responsibilities of adopting normative technology. Understanding AI's impact on teacher identity is in early stages, but it continues to influence pedagogical actions and sustainable practices. Teacher identity is viewed as a variable that interacts with factors shaping algorithmic behavior rather than a fixed attribute. While AI has significant potential to affect human practices, it struggles to predict desirable educational actions accurately. Theoretical and methodological approaches from the socio-material framework can provide insights into AI's effects. Although advancements have been made regarding educational technology in teacher education, comprehensive frameworks addressing various configurations remain limited. Exploring AI's influence on teacher professional identity is vital for this ongoing discourse. (El-Soussi, 2022)

2. Conceptual Framework

Professional identity includes teaching identity, reflecting the evolving nature of teachers' thoughts and actions shaped by their work experiences. It encompasses beliefs about teaching, self-perception as a teacher, and perceived perceptions from others. Primarily, this identity forms within formal education and professional training. Teachers interact with colleagues who share similar challenges and ideals, fostering communities of practice. Artificial Intelligence (AI), a branch of computer science focused on creating human-like intelligent machines, acts as a boundary object in education. It enables different communities to share practices and exchange ideas. AI's affordances—ways AI can mediate learning—adapt educational practices in Instruction, Assessment, and Feedback. While AI technologies are powerful, they require significant human support, enabling educators to further shape their beliefs and practices. Teaching artists engage with technological trends and adapt socio-technical infrastructures to enhance their creative work. (El-Soussi, 2022)

2.1. Professional Identity in Education

In education, professional identity refers to how educators view themselves and their recognition by others (Shin, 2019). A common framework identifies three interconnected components of teachers' professional identity: roles, practice, and communities (Beijaard et al., 2004). Roles involve teachers' perceptions of their responsibilities, practice includes their pedagogical beliefs and classroom methods, and community pertains to their relationships with peers that influence their

roles and practices. The rise of artificial intelligence (AI) in education has garnered significant attention, with a 20-fold increase in research since 2017. AI is now utilized across various educational settings, from primary to lifelong learning. While some argue AI personalizes learning, others express concerns over potential inequalities, privacy issues, and disruptions to traditional teacher-student dynamics. Professional identity reflects educators' self-understanding, perceived status, and the authority granted by education systems. Teachers define their identity through roles and practices shaped by governance, their agency in teaching, and involvement in professional learning communities (PLC). AI is transforming professional identity by changing teachers' roles, community engagement, pedagogical practices, and the recognition they receive, indicating a reconfiguration that empowers educators to redefine educational meaning. (El-Soussi, 2022)

2.2. Artificial Intelligence in Educational Contexts

Today's education faces challenges from emerging technologies, especially digital technologies and AI, which significantly affect education alongside economic and social development. AI applications enable personalized learning, automate tasks, and analyze student engagement in real-time. Teachers are increasingly using AI for personalization, assessment, and feedback, yet educational authorities worry about AI diminishing teacher agency and roles. Teaching goes beyond rules; it involves sharing beliefs, emotional understanding, and building lasting connections, aspects that AI cannot replace. While some educators fear a reduction in their status, AI supports teachers with analysis and decision-making tools. By recognizing patterns through algorithms, AI enhances human cognition rather than replacing it. Machine learning addresses complex teaching issues, providing individualized analyses based on various data sources. As a boundary object, AI influences pedagogical decisions, governance, and professional learning. The automatic collection of student data allows for the creation of advanced AI services tailored to different contexts. (R. Kshirsagar et al., 2022)(Zhu & Ren, 2022)

3. AI as a Boundary Object in Teaching Practice

Artificial intelligence technologies in learning environments enable teachers to maintain shared understanding of their evolving practices. AI is now viewed as a pedagogical tool that influences instruction, assessment, and feedback. Such tools help teachers in decision-making about teaching methods, monitoring student progress, and gaining insights into their pedagogical approaches. Initially, teachers used AI-driven assessment to enhance their practice, but later collaborated with AI to create a community-centered pedagogy. This AI pedagogy fostered cooperation among teachers and allowed for adapting to a diverse student population needing personalized support. Support systems integrated complementary skills while preserving individual professional identities. Teachers gained agency through AI technologies, addressing community needs while keeping instruction focused on students' experiences and real-world problems. Each teacher

maintained strong ownership of their practice, ensuring formative evaluation was a key aspect. Collaboration occurred within networks of practice aligned with their values, and access to AI-driven tools strengthened professional sharing; however, teachers aimed to enhance their autonomy amidst the advantages AI technologies offered. (Schiff, 2021)

3.1. Roles of AI in Instruction, Assessment, and Feedback

Artificial intelligence (AI) is playing an increasingly important role in education by conducting instructional and educational assessments, providing guidance for young learners, tracking students' learning progression, and supporting various aspects of teaching and research. The use of AI as a teaching support and content analysis tool is gradually evolving, expanding to its application in computerized educational assessments and student character evaluations (Zhu & Ren, 2022).

AI is now used extensively for various educational activities like compiling educational resources, analyzing curriculum text and content, and providing literature review and summary writing for research. The applications of AI in education have evolved from teaching assistance to education evaluation, material compilation, and pedagogical practice analysis. AI can provide guidance on curriculum and subject, thus helping define teachers' professional roles and transforming teachers' role cognition and identity when competing assignments can be handled automatically to free more workload.

3.2. AI-Enhanced Pedagogical Autonomy and Collaboration

AI technologies serve not only as instructional aids but also enhance pedagogical autonomy and collaboration. By making instructional, assessment, and feedback practices more visible, AI encourages collective reflection on teaching, allowing teachers to keep control over their pedagogical choices. It can spotlight elements of shared practice within broader curricular frameworks, fostering collaboration among educators despite varied classroom contexts. AI creates opportunities for practices to be communal rather than individual, although legal, logistical, and normative barriers still hinder collaborative approaches. Utilizing AI increases the likelihood of collaboration around shared learning goals, with teachers maintaining ownership of their practices while engaging more with colleagues. Coaching and mentorship highlight the limitations of individual knowledge in addressing pedagogical variations. Additionally, AI can assist in selecting relevant teaching materials, easing the burden of workload and promoting pedagogical change. (Schiff, 2021)

4. Empirical Evidence on Identity Transformation

AI significantly impacts professional identity by transforming instruction, assessment, and feedback. AI-generated lesson plans encourage teachers to analyze student responses and refine queries using feedback. Professional learning communities thrive on collaboration, fostering shared practices and pedagogical discourse. While AI enhances pedagogical autonomy by addressing

teaching specifics, feedback from models enriches reasoning and reveals patterns in decision-making. Effective AI integration promotes inquiry into pedagogical principles, emphasizing collaborative learning. Although AI may restrict autonomy in goal-setting, it adapts across diverse contexts. A teacher's identity remains intertwined with beliefs and values, promoting ongoing learning engagement. The dynamic relationship between AI engagement and pedagogical understanding creates iterative cycles, as shifts in authority influence professional identity. Visibility and its effects on student learning are vital to identity formation, with teachers managing their branding in physical and digital contexts while confronting injustices and AI-related biases. Technological advancements recalibrate balances without sacrificing core educational values. Ethical AI usage is crucial, requiring educators to explore opportunities and mitigate biases to combat inequity. Addressing systemic inequalities necessitates teaching ethics, focusing on equitable access and understanding within the AI landscape. The integration of technology shapes professional identity and learning trajectories, with systemic reforms distinguishing current experiences from past initiatives. Collaborative efforts target systemic coherence in teaching, with attention shifting toward time allocation, decision-making on technology, and mobile access. Concerns around climate, welfare, and freedom expand the educational landscape. This trajectory theme reemerges, as early-career focus on technology transitions toward broader professional growth, remaining personalized yet evolving within the community. (Zhu & Ren, 2022)(El-Soussi, 2022)

4.1. Teacher Beliefs, Values, and Professional Authority

The rapid evolution of Information and Communication Technology (ICT) alongside the COVID-19 pandemic has urged teachers to adopt digital pedagogies, particularly Artificial Intelligence (AI). This integration of AI has transformed traditional teacher identity, which is often referred to as "teacher professional identity" or simply "teacher identity." Teaching, one of the oldest professions, holds significant weight in education, although the concept of teacher identity remains ambiguous in research, despite its relevance to educational reforms. Research has shown that teacher identity is shaped by contextual and societal influences. With AI bringing constant changes to education, the focus shifts to how AI impacts teachers' beliefs, values, and professional authority—key aspects of their identity. Teacher beliefs encompass their self-view and perceptions related to children's development, learning processes, and classroom management. Teacher professional values guide how educators prioritize and conduct themselves in the teaching and learning environment. These values play a crucial role in shaping teacher identity and affect various decisions made during instruction. Over time, teachers' values can evolve as they navigate their professional journeys. Additionally, professional authority is vital for teacher identity as it underscores educators' legitimacy and recognition within the educational community. It facilitates access to roles and

responsibilities in teaching, emphasizing the importance of professional recognition in educational practices. (Schiff, 2021)(El-Soussi, 2022)

4.2. Ethical and Equity Considerations

While the affordances of AI may enrich individual and collaborative pedagogical practice, they also introduce ethical and equity-related considerations that can unsettle professional identity. AI systems developed for educational environments have been found to reproduce social biases, namely, discrimination in access to education opportunities and personal wellbeing (Latham & Goltz, 2019). Moreover, access to and the ability to leverage AI systems represent growing divides between educational institutions and professionals dedicated to equitable education, as well as among teachers who draw on justice-oriented pedagogies (Schiff, 2021). The notion of justice functions as an essential comparator through which professional identity is evaluated amid the increasing entanglement of AI in pedagogical practice and collaborations. Framing professional identity transformation in terms of justice illuminates the professional landscape arising for educators who have renewed or retained their teaching commitments despite AI-enhanced pedagogical autonomy and new forms of collaborative engagement.

4.3. Professional Learning and Adaptation Trajectories

Artificial Intelligence (AI) transcends traditional knowledge boundaries and manifests in various disciplines, educational contexts, and professional development. Its adoption is driven by the need for reforms and skills, but changes to teacher professional identity are equally essential. AI adoption in professional development emphasizes (1) implementing AI in education, (2) fundamental skills for utilizing AI, (3) integrating AI into educational frameworks, and (4) enhanced teacher life-cycle support through competence audits and preparation. AI transforms teacher identity throughout different learning phases, supporting tasks related to learning facilitation and equity. Collaborative practices amplify agency, fostering co-design, sharing, and peer supervision. Accompanying philosophical shifts include competence moving from pedagogical aspects to broader societal implications, reflecting a transition from ontology to epistemology and from constructivism to connectivism. Similar patterns occurred as educators in the Computer-Based Era focused on office competencies rather than pedagogy. (El-Soussi, 2022)

5. Challenges and Tensions

Under the influence of AI, teachers face a twofold challenge: a perceived erosion of professional agency and a complex relationship with transparency and interpretability. In many countries, education policies endorse teachers' autonomy and self-governance, recognizing the deep-seated professional expertise that informs teachers' everyday decisions. AI can threaten this agency by introducing decision-support systems that either displace pedagogical authority or restrict the range of options considered (Schiff, 2021). In other contexts, however, an increasing reliance on AI could

reshape professional agency by changing its very nature, prompting teachers to adapt to new forms of collaboration both within and beyond their schools. Beyond professional agency, trust constitutes a core element of teachers' evolving relationship with AI. Teachers need to understand how AI systems process data, especially when their conclusions are presented as opinions rather than straightforward predictions. The extent to which teachers regard AI-generated decisions with confidence partly depends on their ability to discern such internal processes (El-Soussi, 2022).

5.1. Threats to Professional Agency

The rise of advanced AI systems, especially generative large language models, has raised concerns among teachers about the erosion of their professional autonomy and expertise. While these AI tools can generate and curate learning content, educators feel their unique pedagogical roles are diminishing. Many express a changing self-conception, moving away from traditional teaching rooted in subject knowledge. They fear a transition from "knowledge workers" in education to mere "monitors," focusing more on motivation than on deep subject engagement. Additionally, AI tools may further limit teachers' agency by controlling instructional decisions. AI-Assisted Instruction Technology allows students to access and understand information independently, reducing the need for teacher mediation. Furthermore, some systems can automatically choose resources, create lesson plans, and design assessments without human input. Analysts note a "minimalist" trend in teaching, marked by repetitive, low-preparation "Drive-by" pedagogy. They argue that AI applications initially meant to support teachers in planning have ended up diminishing their pedagogical authority. (Schiff, 2021)(Tredinnick, 2016)

5.2. Trust, Transparency, and Interpretability

Artificial intelligence (AI) systems often operate as 'black boxes', obscuring crucial aspects of model use, data handling, and the AI process, which includes data collection, cleansing, selection, and transformation. This lack of transparency creates frustration among educators seeking clarity on AI decisions, model accuracy, and pedagogical impacts. Many prevailing AI models are difficult for teachers and experts to understand, leading to irreversible educational outcomes. For AI to be trustworthy, a transparent environment is essential, where explicit policies outline access levels and the pedagogical consequences of AI decisions. Such transparency fosters trust and reflects the institution's commitment to responsible AI use, serving as a significant differentiator in the ed-tech sector. Ongoing assessment of AI's pedagogical impact allows educators to monitor its effects and anticipate future trends. Access to this information enhances understanding of students and addresses growing inequities in classrooms, particularly among underrepresented demographic groups in AI courses across the institution. (Ali Chaudhry et al., 2022)

5.3. Professional Ethics and Data Governance

Confidentiality, privacy, accountabilities, and professional behaviors are key facets of ethical standards in teaching. AI systems manipulate data for pattern recognition, significantly affecting classroom data. Engaging with educational AI raises ethical concerns related to personal data belonging to students or their communities. It's crucial for AI developers and educators to ensure respect during data recording, sharing, storing, and analyzing. Issues of individual ownership of student inputs in Teacher AI interactions are often overlooked, making clarifying permissions essential. AI systems form impressions of students based on instructional exposures and evaluation interactions, impacting classroom engagement and decision-making. Formal online engagement can enhance collective knowledge and push for ethical educational practices reflecting both student and teacher needs. Professional development should incorporate explorations of ethics alongside pedagogical guidance. Educational systems must define norms for responsible use of AI, covering operation and interactions. The evolving landscape of educational AI necessitates continuous teacher awareness. Professional roles involve shared, spontaneous interactions, emphasizing the need for clear ethical norms and professional strategies. Integrating formatted documents and relevant codes complements local jurisdictional dynamics. A teacher's responsibilities should align with professional jurisdictions, fostering a formal educational approach to professional development. Teaching configurations should capitalize on educational technology to build confidence in their usage while accommodating local needs. Permissions for classroom-audio materials underline the importance of legal compliance in educational content deployment. Educational institutions must adapt to new developments and ensure responsible teaching practices. These initiatives should clarify their funding requests and establish parameters for system use, fostering an ethically responsible educational environment. (Latham & Goltz, 2019)

6. Implications for Policy and Practice

A diverse range of educational institutions and systems implement policies and initiatives to encourage effective AI integration, both as a strategic imperative and as a means of responding to teachers' identities and actions in a rapidly changing environment. Broadly, there remains a need to shape the digitalisation agenda, support teachers, further the discourse around the use of educational technology, and maintain the integrity of the teaching profession (Schiff, 2021). By facilitating an ongoing dialogue with key stakeholders, particularly educators themselves, policymakers at all levels can help ensure that educational AI initiatives support continued professional learning and identity transformation; encourage school-level practices that promote the integrity of teaching identities and the pedagogical use of AI; and mitigate the risks associated with AI technologies, including concerns around safety, data governance, and empowering the few at the expense of the many (RIINA et al., 2020). Teacher learning requires policies and practices that support the rethinking of pedagogical approaches, strategies, and competencies, while integrating AI tools into

formative assessments for advanced students in the early stages of designing assignments and those seeking to improve the quality of learning materials.

7. Future Directions

As the introduction to this work notes, insufficient attention has been paid to the potential impact of artificial intelligence (AI) on teacher professional identity, yet the growth of new generative AI and smart machine tools warrants further investigation. The implementation of AI in education may alter teachers' conception of their professional identity; utilisation of AI tools by teachers shapes how they practise. Drawing from international evidence, areas of scholarship, and professional discourse, this section identifies possible avenues for future inquiry about the evolving relationship between AI and teacher professional identity.

Several directions warrant exploration. Of particular interest are cross-country comparisons of the implications of new AI tools for teachers' functioning and identity. Existing research provides insights on the consequences of various digital technologies on professional roles and belonging in different national jurisdictions (e.g., Watts et al., 2019), yet analogous empirical accounts of AI's influence on identity are lacking. Methodologically, there is a need for longitudinal investigations that trace the shifting intersection between AI and teacher professional identity over time. Although surveys indicate that AI is increasingly being incorporated into classroom practice (e.g., Rijnaard et al., 2021), few studies monitor how educational technologies pertain to professional identity at distinct points in teachers' careers. Furthermore, further consideration of the ethical dimensions associated with new AI tools and professional identity is merited. The emergence of AI in educational settings gives rise to significant ethical challenges beyond those commonly encountered with earlier technologies, yet these issues have yet to be deliberated among diverse teaching professionals (Schiff, 2021). Therefore, the ethical aspects linked to AI and teacher professional identity remain fertile ground for continued investigation.

8. Conclusion

The educational landscape is expected to undergo significant changes, creating new demands for educators. The teacher's role will evolve in areas such as pedagogy, assessment, technology integration and curriculum design. Teachers' professional learning, agency, and authority will adapt due to national policies and local decisions, shaped by training, school culture, community engagement, opportunities for peer observation, time allocation, AI partnerships, and professional lifecycles. Critical challenges regarding professional identity are surfacing, particularly related to equity, agency, learning, trust, and ethics. Teaching remains a deeply meaningful profession, with evidence showing these trends both transform teachers' identities and enable them to maintain integrity in their roles. The adoption of AI in education introduces changes that pertain to professional identity, serving as an analytical framework for understanding these developments. AI

technologies act as boundary objects in a teaching network involving educators and computational agents. Teachers adjust to changes reflecting their evolving beliefs and objectives, progressing through distinct phases of learning characterized by shifts in their professional identity. While many have yet to incorporate AI into their work, early studies are beginning to reveal AI's impact on professional identity in the teaching field. The pandemic has intensified issues of equity and justice, underscoring the importance of teachers' roles in addressing bias, access, and opportunity, prompting further exploration of these potential consequences. (Schiff, 2021)(El-Soussi, 2022)

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SHIKSHA SAMVAD

An Online Quarterly Multi-Disciplinary
Peer-Reviewed or Refereed Research Journal
ISSN: 2584-0983 (Online) Impact-Factor, RPRI-3.87
Volume-01, Issue-03, March- 2024
www.shikshasamvad.com
Certificate Number-March-2024/41

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"Impact of Artificial Intelligence on Teacher Professional Identity"

Published in 'Shiksha Samvad' Peer-Reviewed and Refereed Research Journal and E-ISSN: 2584-0983(Online), Volume-01, Issue-03, Month March, Year- 2024, Impact-Factor, RPRI-3.87.

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