

Teacher leadership in AI-integrated K-12 classrooms: agency, identity, and authority

Norma Ghamrawi^a, Tarek Shal^b and Najah A.R. Ghamrawi^c

^aCollege of Education, Qatar University, Doha, Qatar; ^bSocial & Economic Survey Institute (SESRI), Qatar University, Doha, Qatar; ^cFaculty of Education, Lebanese University, Beirut, Lebanon

ABSTRACT

This study investigates how teacher leaders enact leadership within AI-integrated classrooms, highlighting the posthuman entanglements that shape their agency, identity, and authority. While AI's instructional uses have been widely examined, how AI integration reshapes teacher leadership – its practices, identities, and sources of authority – remains underexplored, particularly through posthumanist lenses. Using a multi-country qualitative interview study within an interpretive design, semi-structured interviews with teacher leaders from multiple Arab States were thematically analyzed to uncover five interrelated themes: recalibrated leadership practices, reconfigured professional identity, distributed agency, ethical ambivalence toward AI, and posthuman pedagogical imaginaries. Findings reveal that leadership is increasingly co-constituted through human – machine interactions, requiring new competencies in algorithmic reasoning, ethical discernment, and hybrid pedagogy. Rather than diminishing teachers' authority, AI integration redefines it – positioning teacher leaders as adaptive actors negotiating the boundaries between autonomy and automation. The study contributes to the emerging scholarship on digital transformation in education, offering both conceptual insights and practical implications for preparing teachers to lead responsibly and innovatively in sociotechnical learning environments.

KEYWORDS

Teacher leadership; teacher agency; teacher identity; AI-integrated classrooms; teacher authority

Introduction

The rapid advancement of digital technologies – particularly artificial intelligence (AI), machine learning, and algorithmic systems – has begun to subtly reshape the conditions under which educational leadership is conceptualised and enacted (Sposato, 2025). While leadership in education has traditionally been theorised as an exclusively human endeavour – anchored in relationality, vision, and professional agency – contemporary pedagogical environments are

increasingly characterised by human – technology assemblages. In such contexts, leadership practices are no longer confined to interpersonal dynamics alone but are entangled with algorithmic processes that mediate instructional decisions, data flows, and pedagogical authority (Knox 2020; Williamson and Eynon 2020). These developments do not displace human leadership, but they invite a critical re-examination of its contours in technologically saturated ecologies. However, less understood is how these technologies reshape the very nature of teacher leadership – its everyday practices, professional identities, and sources of authority.

In this emergent context, teachers are increasingly positioned not only as instructional leaders but as navigators of AI-mediated pedagogical ecosystems, wherein their decisions are informed, shaped, and sometimes constrained by machinic co-agents. Such environments challenge conventional notions of autonomy, expertise, and authority. Whereas prior research has foregrounded teacher leadership as a function of human agency – either distributed, transformational, or instructional – there is growing recognition that leadership must now be reconceptualized through posthuman ontologies that decentre the sovereign subject and attend instead to the intra-actions of humans, technologies, data, and discourses (Jandrić 2022; Knox 2020). In practical terms, ‘post-human ontologies’ foreground how leadership agency is produced in relation with material and digital actors rather than residing solely in the individual teacher. For example, when a teacher leader begins a lesson or a professional learning conversation by interpreting an AI dashboard’s flags or recommended interventions, the system’s outputs shape what becomes visible, urgent, and legitimate; thus requiring the teacher leader to mediate, validate, contest, or re-script algorithmic guidance in context.

Despite the proliferation of AI tools in educational settings, the literature remains predominantly focused on their instructional utility, ethical implications, and effects on student learning outcomes (Holmes, Bialik, and Fadel 2019). Little attention has been given to how these technologies reconfigure teacher leadership itself – not only in terms of practice, but in how leadership is experienced, embodied, and enacted within hybrid (human-AI) ecologies. Moreover, educational leadership studies have yet to fully engage with the theoretical provocations of posthumanism, particularly as it pertains to rethinking agency, responsibility, and professional identity in technologically mediated educational spaces (Snaza and Weaver 2015). Accordingly, this study advances existing teacher leadership and AI-in-education scholarship by bringing a post-humanist lens to the underexamined question of how teacher leaders’ agency, identity, and authority are reconstituted through everyday human-AI entanglements in AI-integrated classrooms.

This study addresses this lacuna by exploring teacher leadership through a posthumanist lens, attending to the entangled relationships between teachers and AI systems in shaping pedagogical decision-making and authority.

Adopting a multi-country qualitative interview study, the research investigates how teacher leadership is co-produced in AI-integrated contexts, foregrounding the lived experiences and sociomaterial dynamics that characterise this emerging configuration of influence. It was guided by the following research questions:

1. How do teachers enact leadership in AI-integrated educational contexts?
2. What new forms of agency, identity, and authority emerge through human – AI entanglements?

Literature review

Teacher leadership

Teacher leadership broadly refers to teachers who take on proactive roles beyond their own classrooms to influence school-wide practices and improve student learning (York-Barr and Duke 2004). Unlike formal administrative positions, teacher leadership can be informal and is rooted in pedagogical expertise and peer collaboration (Katzenmeyer and Moller 2009). Key characteristics of teacher leaders include a clear vision for instruction, strong communication and collaboration skills, and a commitment to continuous improvement (Ghamrawi, 2018; Ghamrawi et al., 2023a, 2023b; Lumpkin, Claxton, and Wilson 2014; Warren 2021). In practice, teacher leaders may mentor new teachers, lead professional development, coordinate curriculum across grade levels (Ghamrawi, Shal, and Ghamrawi 2025a, 2025c). By leveraging their classroom experience and credibility with peers, teacher leaders act as catalysts for instructional innovation and school reform (Ghamrawi, Shal, and Ghamrawi 2025b, Ghamrawi et al., 2025d; Harris and Jones 2019).

The significance of teacher leadership is well documented. Research over several decades indicates that empowering teachers as leaders contributes to positive educational change and improved student outcomes (Hammad, Polatcan, and Morad 2024; Harris and Jones 2019; Shen et al. 2020). Teacher leaders often facilitate professional learning communities and model effective practices, creating a culture of shared expertise and collective responsibility for student success (Bond 2022; Hammad et al. 2024; Youngs and Evans 2021). This distributed leadership approach – where leadership is shared among administrators and teachers – has become increasingly important in modern school improvement efforts (Youngs and Evans 2021). It recognises that principals alone cannot shoulder all instructional leadership, and that teachers' close contact with students gives them unique insights to lead pedagogical change (Ghamrawi et al., 2025e).

However, grappling with a teacher-leader identity can be complex. Teachers stepping into leadership roles often face tensions: they must balance collegial

relationships with the authority needed to lead peers, and navigate role ambiguity if leadership responsibilities are not formally recognised (Cooper 2023). In some cases, principals may hesitate to share leadership, or school cultures may resist change initiated by teacher peers (Carpenter, Shelton, and Schroeder 2022). Supportive principals who trust and encourage teacher initiative are critical for successful teacher leadership (Ghamrawi, Shal, and Ghamrawi 2026; Hammad et al. 2024; Hammad, Polatcan, and Morad 2024). When given trust and autonomy, teacher leaders can flourish – but without structural support and professional recognition, teachers may retreat from leadership efforts to avoid conflict (Cooper 2023).

Notably, during the COVID-19 pandemic, many teachers naturally assumed greater leadership by innovating remote teaching strategies and forming virtual communities of practice to support each other (Ghamrawi et al. 2024b). This crisis demonstrated the latent capacity of ‘ordinary’ teachers to become leaders when circumstances demand; yet sustaining those leadership gains post-crisis has proven difficult (Ghamrawi et al. 2024). In summary, teacher leadership is a powerful ‘sleeping giant’ in education (Katzenmeyer and Moller 2009), essential for school improvement but contingent on a nurturing environment and clear role definition. The advent of AI in education now adds a new dimension to this landscape, challenging teachers to redefine their leadership in an era of intelligent machines.

The emergence of AI in K-12 education

Artificial Intelligence in education (AIED) has rapidly shifted from speculative discourse to operational reality in K–12 classrooms. Encompassing intelligent tutoring systems, adaptive learning software, and conversational agents, AI technologies now perform cognitive and procedural functions once reserved for teachers – personalising instruction, automating feedback, and identifying learning gaps (Chen et al. 2020; Zhai, 2025). These affordances are framed primarily around enhanced personalisation, administrative efficiency, and data-informed intervention (Hwang et al. 2020; Liu et al. 2021). AI-driven systems, such as chatbots and natural language processors, have demonstrated modest but notable improvements in student motivation and performance (Fidan and Gencel 2022; Hwang and Chang 2023). Moreover, tools like speech-to-text translators and predictive analytics have been used to support multilingual learners and anticipate at-risk students’ needs, thereby contributing to educational equity (Nazaretsky et al. 2022; Robinson 2019).

Yet, these benefits are accompanied by unresolved tensions. Scholars and intergovernmental bodies caution that the rapid deployment of AI outpaces policy, ethical, and pedagogical deliberation (UNESCO 2021; Xia et al. 2022). Concerns include data privacy, algorithmic bias, and the deprofessionalization of teachers. AI systems often rely on opaque algorithmic logics and large-scale data harvesting, raising ethical concerns regarding consent, surveillance,

and the erosion of human judgment (Borenstein and Howard 2021). There is growing apprehension that overreliance on AI may reorient education toward technocratic efficiency, sidelining the relational, affective, and creative dimensions of teaching (Shum and Luckin 2019). Furthermore, a persistent gap exists between AI's technological promise and teachers' readiness to integrate these tools meaningfully, with many teachers lacking adequate training or involvement in AI design processes (Chen et al. 2020; Salas-Pilco, Xiao, and Hu 2022). In response, UNESCO (2021) and the OECD (e.g. Vincent-Lancrin and Van der Vlies 2020) advocate for human-centered AI integration that foregrounds teacher agency, ethical governance, and inclusive pedagogical aims.

In K–12 schooling, AI integration carries distinctive implications for teacher leadership because teachers work with minors under heightened expectations for safeguarding, fairness, and data protection, while often operating within standardised curricula, assessment regimes, and school- or system-level platform decisions (Ravikumar et al., 2026). Recent K–12 scholarship also shows that, alongside personalisation benefits, GenAI use raises recurrent practical concerns – such as privacy risks, student dependence, and the need for clearer guidance and capacity-building – which intensify teachers' leadership work as sense-makers and ethical gatekeepers in everyday practice (Alfarwan 2025; Varlamis et al. 2026).

In higher education contexts, studies similarly suggest that the leadership, affective, and institutional tensions associated with AI adoption are not confined to K–12 settings. Educators describe AI integration as entangled with institutional pressures, affective strain, and uneven support – conditions that can shape perceived autonomy and leadership enactment (Hamamra, Khlaif, and Mayaleh 2025; Hamamra et al. 2025; Khlaif et al. 2025). This work shows that engagement with generative AI is patterned not only by perceived usefulness but also by enabling conditions and institutional facilitation, alongside technostress and workload frictions (Ayyoub et al. 2025; Khlaif et al. 2025), and it surfaces concerns about dependency and the outsourcing of professional judgment (Alhur et al. 2025). Psychoanalytic perspectives further frame algorithmic mediation as reshaping subjectivity and authority, reinforcing why AI may be experienced as more than a tool in professional life (Hamamra and Uebel 2025).

AI's impact on teacher roles and leadership

The infusion of AI into K-12 settings is beginning to reshape the roles of teachers and, by extension, the nature of teacher leadership. Traditionally, teacher leaders gain authority from their instructional expertise and ability to connect with students and colleagues (York-Barr and Duke 2004). AI tools potentially alter the classroom dynamic by taking over certain tasks or providing insights that were once the sole purview of teachers. This raises a pivotal question:

does AI amplify or diminish teacher leadership? Emerging evidence suggests that teachers themselves are divided in their perceptions. In a recent phenomenological study exploring teachers' experiences in AI-enabled schools, participants were roughly split between two viewpoints – one group feared a *regressive* effect on teacher leadership, while the other anticipated an *expansive* effect (Ghamrawi et al. 2024).

On one hand, some teachers worry that heavy integration of AI could erode their autonomy and professional authority (Chounta et al. 2022; Ghamrawi et al. 2024). If AI systems dictate instructional content, pacing, or assessment, teachers may feel reduced to facilitators who simply implement algorithm-driven recommendations. Ghamrawi et al. (2024) report teachers' concern that they might be 'relegated to monitoring and troubleshooting technological systems rather than focusing on meaningful interactions with students' (p.8), leading to a devaluation of their leadership role. In this view, the teacher's expertise and decision-making could be undermined if, for instance, an AI tutor provides answers or if analytics software 'decides' which students need help – areas that traditionally showcased teacher initiative. Teacher leaders pride themselves on being curriculum innovators and instructional coaches; they fear that if AI provides standardised solutions, it could stifle the collaborative creativity that is central to teacher-led innovation (Shum and Luckin 2019).

Additionally, there is also an emotional and relational aspect: effective teacher leaders build trust and rapport with students and colleagues, something that cannot be mechanised. The concern is that an increased algorithmic presence might reduce human-to-human interaction time, making it harder for teachers to exercise mentorship and empathy, key elements of their leadership (Cooper 2023; Sergeeva, Faraj, and Huysman 2020). Furthermore, teachers cautious of AI note the risk of becoming overly dependent on AI recommendations, which could deskill them over time or narrow their professional judgment (Ghamrawi et al. 2024; Liu et al. 2021). These apprehensions align with broader calls for AI ethics in education, such as Borenstein and Howard (2021) who emphasise that without careful implementation, AI might introduce new ethical dilemmas and challenges that teachers are not yet trained to handle, potentially disempowering teachers in decisions about fairness, transparency, and student welfare.

On the other hand, many teachers see AI as a powerful tool to augment and expand teacher leadership capacities rather than replace them. AI's ability to automate time-consuming tasks – such as grading quizzes, recording data, or generating reports – can liberate teachers to focus on high-impact leadership activities like instructional design, coaching, and one-on-one mentoring (Bates 2020; Bryant et al. 2020). Teachers in the Ghamrawi et al. (2024) study who held an optimistic view noted that AI-driven administrative support freed them to 'focus on instructional leadership, mentoring students, and driving innovation in the classroom'(p. 9), ultimately enabling them to be

more effective leaders. In this perspective, the teacher remains the pedagogical expert and decision-maker, using AI as an assistant. For example, an AI system might flag students who are struggling in real time, but it is the teacher leader who interprets that data, strategizes interventions, and mobilises colleagues to address the issues (Nazaretsky et al. 2022).

AI can thus empower teacher leaders with richer insights – via learning analytics dashboards or predictive models – to inform evidence-based practice and school improvement efforts (Robinson 2019; Shum and Luckin 2019). Several studies highlight that AI can facilitate greater collaboration and resource-sharing among teachers. Intelligent platforms might curate high-quality lesson materials or suggest effective strategies, which teacher leaders can then disseminate and customise for their context (Hwang et al. 2020; Xia et al. 2022). In essence, the teacher leader's role could shift more towards being a *coach and curator* of learning resources, guiding both students and fellow teachers in leveraging AI-enhanced tools (Chounta et al. 2022). Teachers with positive attitudes towards AI emphasise that it can amplify their 'superpowers' by handling routine tasks and providing actionable data, which in turn helps them mentor colleagues and innovate in pedagogy (Chounta et al. 2022; Ghamrawi et al. 2024a). This aligns with the notion of teachers as lead learners – embracing new technologies themselves and leading by example in their adoption (Liu et al. 2021). It is notable that teachers who have had more exposure to AI and adequate training are more likely to see its benefits for leadership, indicating that experience and knowledge shape perceptions (Nazaretsky et al. 2022).

In other words, AI's impact on teacher leadership is not predetermined; it largely depends on implementation context and educator agency. If AI is imposed top-down without teacher involvement, it risks alienating teachers and diminishing their leadership. However, if teachers are centrally involved in selecting, shaping, and guiding AI use, these technologies can become empowering tools in the teacher leader's toolkit (Vincent-Lancrin and Van der Vlies 2020). As Ouyang and Jiao (2021) note, the paradigm of 'AI in Education' must be complemented by 'Education for AI' – meaning teachers (and students) need to be educated about AI to use it wisely. This calls for teacher leaders to step up as change agents who pilot AI innovations, provide feedback to developers, and ensure that the adoption of AI aligns with sound pedagogical goals.

Despite the growing attention to AI in education, several gaps remain in relation to teacher leadership in AI-integrated K–12 settings. First, recent synthesis work suggests that GenAI research in K–12 is still comparatively emergent and is often organised around tools, learning outcomes, and implementation challenges, with less sustained attention to how AI reshapes leadership as lived practice – particularly the reworking of agency, identity, and authority in teachers' everyday influence work (Alfarwan 2025). Second, although the wider AIED evidence base is expanding rapidly, reviews indicate that it

remains uneven in stakeholder coverage (with comparatively less focus on leadership actors) and geographically concentrated, which limits the field's ability to explain how leadership is configured in diverse systems and regions (Mustafa et al. 2024). Third, K–12 educators' AI adoption is repeatedly shown to be mediated by institutional capacity, professional learning conditions, and local constraints – yet these enabling conditions are rarely theorised as part of leadership itself, rather than treated as background 'implementation factors' (Kim 2025). Taken together, these gaps justify the present study's regional focus and motivate the use of posthumanist and sociomaterial theory to conceptualise teacher leadership as co-constituted through entanglements of teachers, AI systems, data infrastructures, and institutional discourses, providing the analytic bridge to the theoretical framework that follows.

Theoretical framework

This study theorises teacher leadership in AI-integrated classrooms as a relational, sociomaterial, and increasingly posthuman praxis in which agency, professional identity, and authority are co-constituted by entanglements of human actors, AI systems, data infrastructures, and institutional discourses. Posthumanist and sociomaterial perspectives can be critiqued for overextending non-human agency and for underplaying the institutional and policy forces that shape technology adoption (Council of Europe 2024; Rosiek 2024). Here, AI systems are treated as participating in practice without being moral agents: teacher leaders remain accountable for pedagogical and ethical judgment, including when they endorse, contest, or re-script system outputs (Scott and Orlikowski 2025). 'Entanglement' is therefore examined as produced within institutional conditions – mandates, governance arrangements, accountability pressures, and vendor narratives – so the analysis keeps responsibility, children's rights, and institutional power in view (Council of Europe 2024; International Task Force on Teachers for Education 2025; UNESCO 2024).

Against this backdrop, the framework begins from established accounts of teacher leadership as a process through which teachers, individually and collectively, influence colleagues, principals, and wider communities to improve teaching and learning (Bond 2022; Harris and Jones 2019; Katzenmeyer and Moller 2009; York-Barr and Duke 2004). In this tradition, teacher leadership is enacted in practice rather than guaranteed by position: teachers lead by mentoring peers, orchestrating curriculum work, modelling pedagogy, and fostering collaborative cultures that support instructional improvement. Such work is inherently distributed and contingent on organisational conditions such as trust, recognition, and structures that open space for teacher agency (Harris and Jones 2019; Katzenmeyer and Moller 2009; York-Barr and Duke 2004).

AI-integrated classrooms, however, recalibrate the terrain on which these forms of influence unfold. Research on artificial intelligence in education

shows that intelligent tutoring systems, learning analytics, and algorithmic recommendation engines increasingly inform diagnosis, pacing, feedback, and intervention, promising personalisation and efficiency while embedding new forms of data-driven governance (Holmes, Bialik, and Fadel 2019; Hwang et al. 2020; Williamson and Eynon 2020). Empirical studies indicate that teachers perceive AI both as a potential support for practice and as a source of constraint or opacity (Chounta et al. 2022; Ghamrawi et al. 2024, Ghamrawi, Shal, and Ghamrawi 2025b; Nazaretsky et al. 2022). Policy and ethics frameworks similarly stress that the educational value of AI depends on implementation choices, transparency, and the safeguarding of teacher and learner agency (Shum and Luckin 2019; UNESCO 2021; Vincent-Lancrin and Van der Vlies 2020). Taken together, this literature suggests that leadership in AI-rich environments cannot be understood solely as human actors ‘using tools’; it must be situated within sociotechnical assemblages in which algorithms participate in shaping what counts as evidence, risk, need, and success.

To address this complexity, the study draws on posthuman and sociomaterial perspectives that reconceptualize agency and practice as emergent from entangled relations between human and non-human elements. Posthumanist scholarship in education (Jandrić 2022; Snaza and Weaver 2015) questions humanist assumptions of sovereign control and foregrounds the more-than-human conditions under which educational practice is produced. Agential realism theorises agency as an effect of ‘intra-actions’ among bodies, technologies, discourses, and matter, while sociomaterial analyses (Fenwick 2010; Orlikowski & Scott, 2015) show how tools, platforms, and artifacts are constitutive of everyday professional work, not external add-ons. Applying these insights to AI-integrated schooling, AI systems are conceptualised here as actants that help configure what becomes visible (through dashboards and predictive flags), actionable (through recommended interventions), and legitimate (through the aura of data-driven objectivity). They do not replace human judgment, but they reframe its conditions of possibility.

Within this framework, teacher leaders’ *agency* is understood as entangled and negotiated. AI can amplify agency by surfacing patterns, targeting support, and offloading routine tasks, thereby extending the reach of instructional leadership (Bryant et al. 2020; Ghamrawi et al. 2024, Ghamrawi, Shal, and Ghamrawi 2025b; Holmes, Bialik, and Fadel 2019; Hwang et al. 2020). At the same time, mandated platforms, opaque algorithms, and institutional reliance on system outputs can narrow discretion or pressure teachers to defer to ‘what the data says,’ generating experiences of constraint and de-skilling. Rather than treating AI as inherently empowering or disempowering, the framework attends to how teacher leaders appropriate, contest, or re-script algorithmic recommendations in context, and how these micro-practices redistribute agency across human – AI configurations.

Likewise, *Professional identity* is treated as a dynamic construction formed within these assemblages. As AI systems participate in generating explanations, feedback, and instructional options, teacher leaders are repositioned from exclusive expert-knowers toward roles as mediators, data interpreters, designers of hybrid learning environments, and ethical gatekeepers of AI use (Chounta et al. 2022; Ghamrawi et al. 2024, Ghamrawi, Shal, and Ghamrawi 2025b; Nazaretsky et al. 2022). This shift can open new forms of leadership – such as spearheading responsible AI integration or mentoring colleagues in critical data literacy – while also provoking uncertainty about what distinguishes human expertise in AI-saturated settings. Following posthuman and sociomaterial thinking, these identity negotiations are read not as purely psychological struggles but as effects of material-discursive arrangements: platform logics, policy imperatives, vendor narratives, and professional norms that script what a ‘future-ready’ teacher leader should be (Facer and Selwyn 2021; Snaza and Weaver 2015).

Finally, the framework reconceives *authority* as algorithmically mediated and distributed. Traditional epistemic authority – grounded in pedagogical knowledge, experience, and relational trust – now coexists with algorithmic authority, wherein AI outputs may be treated as privileged indicators of truth or risk (Shum and Luckin 2019; Williamson and Eynon 2020). Teacher leaders occupy the junction where these regimes meet: they decide when to endorse or challenge system recommendations, how to translate them to staff, students, and parents, and how to align or resist policy expectations anchored in datafication. Their leadership thus involves continuous negotiation of whose judgment counts – their own, the system’s, or the institution’s – and under what conditions. Authority, in this view, is not ceded to machines but reconfigured across human – AI – institutional assemblages.

By integrating classical teacher leadership scholarship with AI-in-education research and posthumanist/sociomaterial theory, this framework positions teacher leadership in AI-integrated classrooms as a distributed, relational, and reflexive praxis. It underpins the study’s focus on how teacher leaders describe recalibrated practices, shifting identities, and contested authority in AI-rich contexts and provides the conceptual lens through which these accounts are interpreted as manifestations of entangled agency rather than simple attitudes toward technology.

Method

Research design

This study employed a multi-country qualitative interview study situated within the interpretive paradigm, with the aim of understanding how teacher leaders enact leadership within AI-integrated educational contexts. Although

participants worked across different national systems rather than within a single bounded institution, the study is analytically bounded by a shared sociotechnical condition (AI-integrated classroom practice) and a common professional formation (teacher leaders recruited through a single regional online teacher community under uniform inclusion criteria). Beyond examining leadership practices, the study also sought to explore how human – AI interactions give rise to new forms of agency, identity, and authority in the everyday work of teaching.

To access participants' perspectives and experiences, semi-structured interviews were conducted, offering a flexible yet focused framework to elicit rich, contextually grounded narratives. This method enabled participants to reflect on their leadership practices, articulate how AI shaped their decision-making, and share the tensions and reconfigurations they experienced in their professional roles. Semi-structured interviews were particularly suited to this study's aims, as they allowed for an in-depth exploration of participants' lived experiences and provided the flexibility to probe emergent themes as they arose. Given the study's interpretive orientation and focus on reconfigurations of leadership amid AI-mediated ecologies, this method supported the co-construction of meaning between researcher and participant (Kallio et al. 2016). It also facilitated openness, reflexivity, and narrative depth, making it an effective approach for investigating complex and evolving sociotechnical phenomena in education (Adams 2015).

Participants

Participants in this study were enrolled in an online community of teachers that spans multiple Arab States. The community was originally established under the patronage of UNESCO during the COVID-19 pandemic to support teachers and sustain quality education aligned with SDG 4. In the post-pandemic period, the UNESCO-recruited consultants who led this community opted to sustain the initiative rather than discontinue it, particularly as teacher enrolment was growing rapidly. They therefore volunteered to keep the community active and to continue providing free-of-charge, Arabic-medium professional learning and growth opportunities for teachers on a voluntary basis. The community functions as a digitally mediated professional learning space in which teachers engage in webinars and virtual workshops, participate in teacher-moderated discussion boards to collectively deliberate pressing classroom and school challenges, and join sub-communities of interest that connect teachers across countries and specialisms. It also enables members to upload and download pedagogical resources, exchange practice-based materials, and sustain peer support through ongoing asynchronous interaction.

Rather than issuing an open call, the researchers employed a targeted approach, relying on the community platform's built-in analytics to identify

highly active members who had consistently volunteered their time and expertise. These teachers were recognised for regularly facilitating online workshops, leading thematic discussions, co-developing pedagogical resources, and participating in collaborative research dialogues. Their sustained engagement, initiative, and peer influence within the online community stood as clear manifestations of their enactment of teacher leadership in a digitally mediated professional space.

Following institutional ethical clearance and approval from the online community board, the administrator contacted all active contributors, inviting them to consider participation. There total number was 21. The invitation included a consent form and outlined four inclusion criteria: (1) the participant's school had been implementing AI in teaching and learning for over two years; (2) the teacher had a minimum of one year of hands-on experience using AI tools in classroom practice; (3) the teacher had at least five years of overall teaching experience; and (4) the teacher self-identified as a teacher leader.

Of the 16 teachers who responded affirmatively, 13 met the criteria, and one of these was selected to participate in a pilot interview. The final study sample thus comprised 12 teacher leaders from five Arab countries, all of whom represented a unique intersection of technological fluency, pedagogical leadership, and regional collaboration in digitally mediated professional networks. The characteristics of participants are presented in [Table 1](#).

AI tools and implementation context

Participants reported using a limited set of AI tool types in their schools: (1) generative AI assistants (chatbots) to support lesson drafting and formative feedback prompts; (2) adaptive learning platforms to enable personalised practice and differentiation; (3) learning-analytics dashboards (often embedded in a learning management system) to monitor engagement and progress and to flag learning needs; and (4) automated assessment and feedback features (e.g. quiz marking and reporting). Implementation was described as mixed:

Table 1. Characteristics of participants.

Gender	Male	4
	Female	8
Age	20–30 years	4
	31–40 years	5
	41 –50 years	3
Overall Teaching Experience	5–7 years	4
	8–10 years	5
	11 years or more	3
Teaching experience using AI	1–2 years	7
	3–5 years	5
	6–10 years	0
Countries	UAE	3
	Qatar	2
	Saudi Arabia	2
	Jordan	2
	Lebanon	3

dashboards and adaptive systems were commonly mandated at the school or system level, whereas generative AI assistants were more often teacher-selected, with varying degrees of informal school guidance. Use was reported primarily in core subjects (languages, mathematics, science, and social studies) across upper primary, middle, and secondary grades. Across contexts, the main functions supported were planning and resource generation, assessment feedback, differentiation, and monitoring learning needs, with teachers retaining final instructional judgment while increasingly working through system-generated outputs.

Data collection

Data was collected via a semi-structured interview schedule that spanned approximately 45 min per participant. The interviews aimed to elicit both retrospective accounts and forward-looking imaginaries, enabling participants to narrate their leadership practices. The schedule was carefully designed to capture teacher leadership in AI-integrated classrooms and was structured into five thematic sections.

Section (1) focused on background and contextualisation collected foundational data regarding the participants' teaching history, their self-perception as teacher leaders, and the duration and depth of their engagement with AI technologies. This section situated the participants' narratives within their broader professional trajectories and technological contexts, inviting participants to reflect, for example, on how they defined themselves as teacher leaders and what experiences had shaped that identity. Section (2) focused on leadership practices in AI-integrated contexts explored the participants' enactment of leadership in environments shaped by AI tools. Data gathered in this section focused on peer mentoring, instructional support, data-informed decision-making, and the evolution of leadership roles in technologically mediated pedagogical spaces, prompting participants to recount concrete episodes in which they supported colleagues' teaching or decision-making in relation to an AI tool or platform used in their school.

Section (3) focused on human – AI entanglements and shifting professional selves gathered interpretive data about how participants' sense of agency, authority, and professional identity were reconfigured in relation to AI systems. This section surfaced embodied experiences of working alongside algorithms, including tensions, role negotiations, and redefinitions of expertise, asking participants to describe how they responded when AI outputs (e.g. dashboards, recommendations, or automated feedback) suggested directions they questioned, and how such moments shaped their felt authority and professional judgment. Section (4) focused on reflections and future imaginaries captured speculative insights into how teacher leadership is evolving in light of increasing AI integration. Participants were invited to articulate ethical dilemmas,

emotional complexities, and their envisioned futures as leaders within posthuman educational ecologies, encouraging them to consider how AI might reshape teacher leadership going forward, particularly in relation to responsibility, ethics, and the boundaries of professional discretion. The final section focused on closing reflections, offering participants the opportunity to elaborate on any remaining thoughts, clarifying earlier responses, or highlighting critical incidents not yet discussed; participants were also invited to share any additional incident, concern, or insight about AI and leadership that they considered important but had not yet surfaced in the interview.

Data analysis

The data analysis followed Braun and Clarke's (2006) six-phase thematic analysis and was supported (not determined) by NVivo 15 as a data-management and retrieval platform (QSR International 2024). Phase 1 (familiarisation) involved repeated reading of transcripts, alongside the production of initial analytic notes and reflexive memos. In Phase 2 (coding), two members of the research team coded the full dataset independently in NVivo, using a hybrid approach that combined deductive sensitising concepts aligned with the research questions and theoretical framing (e.g. agency, authority, human – AI relations) with inductive codes grounded in participants' accounts. The two coders then met for iterative analytic debriefings to compare coding interpretations, resolve discrepancies through discussion, and refine shared code meanings and boundaries, generating a consolidated coding architecture and memo trail.

In Phase 3 (theme development), coded segments were collated into candidate themes by identifying patterned meaning across interviews and mapping relationships among codes. To make the theme-building process transparent, coding moved from (a) descriptive labels close to participants' language (e.g. references to 'checking the dashboard first,' 'being pushed by the system,' or 'trusting the flag') to (b) interpretive codes (e.g. algorithmic cues shaping instructional urgency), which were then integrated into higher-order theme constructions (e.g. 'algorithmic sense-making' within 'recalibrated leadership practices'). Phase 4 (reviewing) involved checking candidate themes against both the coded extracts and the full dataset to ensure coherence, distinctiveness, and explanatory reach, with explicit attention to contradictions, silences, and emotional undertones. Phase 5 (defining and naming) refined the analytic story by specifying what each theme captured, how it related to the research questions, and how sub-themes differed conceptually while remaining internally coherent. Phase 6 produced the final account, integrating illustrative excerpts and interpreting patterns through posthumanist and sociomaterial concepts.

Frequencies reported in Table 2 (forthcoming) were calculated after themes were finalised: a sub-theme frequency represents the number of interviews (n/

Table 2. Thematic analysis of semi-structured interviews.

Theme	Sub-Themes	Frequencies ^a /12
Recalibrated leadership practices	Algorithmic sense-making;	10
	Delegation to AI systems;	9
	Routinisation of decisions;	11
	AI as colleague	10
Reconfigured professional identity	From expert to mediator;	10
	Role fluidity;	12
	De-skilling anxiety;	8
	Eroded professional anchors	9
Distributed agency and decision-making	Shared intentionality;	9
	Machine-human coordination;	11
	Responsive vs. reactive leadership;	7
	Devolved authority	9
Ambivalent ethical stances toward AI	Data privacy concerns;	8
	Algorithmic opacity;	7
	Bias in predictive analytics;	9
	Ethical distancing	7
Imagining posthuman pedagogies	Human-machine co-creation;	7
	Pedagogical hybridity;	6
	Refusal of techno solutionism;	6
	Relational reconstruction	8

^aFrequency indicates the number of interviews (n/12) in which a sub-theme was meaningfully present (at least once). It does not imply comparative importance, causal weight, or generalisability beyond this sample.

12) in which the sub-theme was meaningfully present at least once, based on NVivo-coded coverage and cross-checking of extracts (QSR International 2024). These counts were used to indicate prevalence across the dataset rather than comparative importance, causal weight, or generalisability. Themes in Table 2 were ordered to mirror the study’s analytic logic and research questions (from practices to identity, agency, ethics, and imaginaries), while sub-themes were presented in a consistent within-theme sequence to aid readability and interpretive flow.

To strengthen trustworthiness, the team maintained a detailed audit trail (coding notes, theme maps, and decision memos) and conducted regular analytic debriefings to surface assumptions and justify interpretive moves – strategies aligned with established guidance for rigour in qualitative thematic analysis (Nowell et al. 2017).

Finally, given the cross-national nature of the sample and the study’s focus on AI-integrated practice, the research team approached the interviews and analysis with explicit reflexivity regarding their positions relative to participants and the sociotechnical context. The researchers were familiar with educational leadership and digitally mediated professional learning in the region, which supported contextual sensitivity in interpreting participants’ accounts; at the same time, they remained attentive to the risk of reading AI integration through normative ‘innovation’ assumptions. To mitigate this, the team documented positional reflections through reflexive memos, used analytic debriefings to surface and challenge interpretations, and compared independently developed coding decisions to check for overreach and to preserve participants’ meanings across diverse national and school settings.

Findings

Thematic analysis yielded five key themes capturing how teacher leadership is being reshaped in AI-integrated classrooms. These reflect shifts in practice, identity, agency, and ethics. Table 2 outlines the themes, sub-themes, and their frequencies across participants. Themes 1 and 5 address RQ1 by detailing how teacher leaders enact leadership in AI-integrated contexts through recalibrated practices and evolving pedagogical leadership, while Themes 2–4 address RQ2 by showing how human – AI entanglements reconstitute professional identity, distribute agency in decision-making, and reshape authority and ethical accountability.

Recalibrated leadership practices

Participants described noticeable shifts in their leadership practices as a result of working alongside AI systems. One sub-theme was *algorithmic sense-making*, where teachers reported relying on AI-generated data to guide their instructional choices. As one participant explained, ‘Before, I would use my own observations to adjust the lesson, but now I start by checking what the AI dashboard shows about student engagement and progress’ (P4). The second sub-theme, *delegation to AI systems*, highlighted how teachers increasingly entrusted routine pedagogical and managerial tasks to AI. For instance, one teacher remarked, ‘Grading short answers, flagging who is struggling – those are things I let the system handle now’ (P2).

Participants also noted the *routinisation of decisions*, where leadership actions became more procedural and guided by algorithmic prompts. ‘Every morning I log in and the system tells me who needs help and what to focus on’, said one teacher (P9). Lastly, several teachers personified the system, referring to AI as a *colleague*. ‘I feel like I have a teaching partner now’ said P3. Similarly, P10 shared, ‘I call it my co-teacher – it helps me stay on track, and sometimes I feel like we co-lead the learning process’.

Reconfigured professional identity

Participants reflected on how the integration of AI technologies had reshaped their professional identities as teacher leaders. A prominent sub-theme was the shift *from expert to mediator*, where teachers described themselves as facilitators navigating between students, content, and algorithmic systems. As P6 noted, ‘I’m no longer the main source of knowledge – AI gives suggestions, and I guide students through it. My job feels more like mediation now’. This shift was accompanied by a strong sense of *role fluidity*. P8 shared, ‘Some days I’m a data analyst, other days I’m mentoring colleagues, and sometimes I feel like I’m just monitoring systems. It’s always shifting’.

Another sub-theme was *de-skilling anxiety*. Several participants voiced concern that their pedagogical instincts were becoming dulled. P1 reflected,

'I used to plan lessons from scratch. Now I wait to see what the system recommends, and it makes me sometimes question my own expertise'. Similarly, P7 remarked, 'It scares me that I don't rely on my own judgment as much as I used to'. The final sub-theme, *eroded professional anchors*, captured a broader uncertainty about the core identity of teaching. As P12 put it, 'I used to define myself by my subject knowledge and teaching style. But now, I'm not sure what makes me a special teacher or teacher leader anymore'.

Distributed agency and decision-making

Participants articulated a growing sense that agency and decision-making were increasingly shared between themselves and AI systems. The sub-theme of *shared intentionality* emerged as teachers described a collaborative dynamic in which pedagogical direction was co-constructed with machines. 'The AI doesn't just give me data – it shapes how I think about what's urgent or important', explained P5. Similarly, P11 remarked, 'It's like we plan together – me and the system'.

The second sub-theme, *machine – human coordination*, highlighted how leadership actions were now intertwined with system-driven outputs. P2 explained, 'I lead, but my leadership is shaped by what the platform tells me. I adjust and respond in real time to its cues'. Several teachers also distinguished between *responsive* and *reactive leadership*, noting that AI sometimes dictated a pace or sequence of action. As P4 stated, 'I feel more reactive now. I don't always set the agenda – the system pushes me toward certain decisions'.

The final sub-theme, *devolved authority*, captured the sense that some traditional leadership powers had been transferred – or at least blurred – between teacher and technology. P9 reflected, 'I used to make all the calls. Now it's like the AI has some of that power. It decides what matters first'. Likewise, P6 noted, 'I lead, but not alone anymore. The authority is kind of shared, and that's new type of sharing for me'.

Ambivalent ethical stances toward AI

Participants expressed mixed and often uneasy feelings about the ethical implications of AI integration in their professional contexts. The sub-theme of *data privacy concerns* surfaced frequently, with participants raising apprehensions about how student data was collected and used. As P1 noted, 'I don't always know where the data goes or who can see it – it feels like a black box'. *Algorithmic opacity* was another common concern, as teachers felt unable to fully understand or challenge the logic behind AI-generated recommendations. P12 commented, 'Sometimes the system flags a student as struggling, but I don't know why – and there's no explanation'. Similarly, P3 said, 'It's hard to trust something you can't question'.

Moreover, the theme of *bias in predictive analytics* emerged in reflections on how certain students were consistently identified by the system as at-risk or low-performing. P7 observed, 'I worry that some students are being labelled unfairly because the system works from patterns, not people'. The final theme, *ethical distancing* described how some participants felt that moral responsibility was subtly displaced onto the system. As P6 explained, 'It's easier to say, 'The AI recommended it,' instead of owning the decision.' P11 reflected, 'Sometimes I wonder if we're hiding behind the system to avoid tough calls. It's convenient, but is it right?' P3 similarly noted, '*When the recommendation comes from the system, it feels safer to follow it – almost like the accountability shifts away from me.*' Echoing this, P9 admitted, '*I catch myself justifying decisions by pointing to the dashboard, even when I'm not fully convinced. It's like the system becomes my shield.*'

Imagining posthuman pedagogies

Participants reflected on how their teaching philosophies and leadership visions were evolving in response to sustained engagement with AI systems. One sub-theme was *human – machine co-creation*, where teachers described instructional planning and delivery as shared between themselves and AI agents. As P5 explained, 'It's no longer me designing everything. The AI suggests resources or questions, and I adapt or build on that – it feels collaborative'. Moreover, the idea of *pedagogical hybridity* also emerged, as teachers articulated blended roles that merged human judgment with algorithmic scaffolding. 'Teaching now feels like a layered process', remarked P2. 'It's part intuition, part data-driven, and sometimes I'm switching between both in the same lesson', P1 reflected, 'I've started thinking of my pedagogy as hybrid – human values, machine input, and student agency all woven together'.

Some participants voiced a *refusal of techno-solutionism*, resisting the notion that AI alone could solve complex educational problems. P4 stated, 'There's pressure to adopt AI as if it will fix everything, but real learning doesn't work that way'. P7 added, 'Technology helps, but it's not a substitute for relationships, context, or critical thinking'. Finally, the sub-theme of *relational reconstruction* captured how teachers reimaged relationships in the AI-integrated classroom. P3 noted, 'The presence of AI shifts how I connect with students – there's a third presence in the room now'. P11 elaborated, 'I'm learning to build trust not just with students, but around the system – helping them see it as a tool, not a judge'.

Discussion

This study set out to explore how teacher leaders enact leadership within AI-integrated educational contexts, and to investigate how human – AI interactions give rise to new forms of agency, identity, and authority in the everyday work of teaching. The findings suggest that teacher leadership in AI-rich classrooms: is

best understood as leadership-in-relation, emerging through routine interactions among teacher leaders, AI systems, data traces, and institutional expectations, rather than as influence exercised by an autonomous individual. This interpretation converges with teacher leadership scholarship that frames leadership as practice-based and context-sensitive (Bond 2022; Harris and Jones 2019; Katzenmeyer and Moller 2009; York-Barr and Duke 2004), while extending it by showing that the ‘conditions’ of leadership are not only cultural or structural but also sociotechnical: dashboards, flags, recommendations, and automated feedback become part of what leadership *is*, because they participate in shaping what becomes visible, urgent, and legitimate in professional judgment (Fenwick 2010; Orlikowski & Scott 2015; Williamson and Eynon 2020).

Participants’ accounts align with the broader AIED literature that emphasises AI’s practical promise – automation of routine work, enhanced personalisation, and data-informed intervention (Holmes, Bialik, and Fadel 2019; Hwang et al. 2020). The convergence is apparent in how teachers describe delegating marking, tracking, and reporting, and using analytics to anticipate needs – patterns consistent with evidence that AI can support instructional decision-making and professional work (Chounta et al. 2022; Nazaretsky et al. 2022). Yet the study diverges from much of that literature by showing that these benefits are not ‘add-ons’ to existing leadership routines; they reorganise leadership itself. What appears as efficiency at the tool level becomes, at the leadership level, a re-ordering of attention: teacher leaders increasingly begin from system outputs (what is flagged, predicted, or recommended) and then decide whether to validate, reinterpret, or resist those outputs in context. Leadership thus becomes more explicitly interpretive and justificatory, with credibility increasingly tied to the ability to translate algorithmic claims into pedagogically defensible action (Shum and Luckin 2019; Williamson and Eynon 2020).

These findings also problematise the familiar binary in AI debates – whether AI ‘empowers’ or ‘constrains’ teachers. In participants’ narratives, agency is not simply gained or lost; it is redistributed across human – AI configurations. Teachers describe being enabled through visibility (patterns surfaced), speed (routine work offloaded), and reach (data supporting targeted intervention), while simultaneously encountering pressures tied to mandated platforms, opaque logic, and institutional reliance on system outputs (Holmes, Bialik, and Fadel 2019; Hwang et al. 2020; UNESCO 2021). This refines existing claims about teacher agency in AI contexts by showing that constraints are not only technical limitations, but also the institutionalisation of ‘what the data says’ as a persuasive authority in professional deliberation (Shum and Luckin 2019; Vincent-Lancrin and Van der Vlies 2020).

A similar convergence – divergence pattern appears in relation to professional identity. Research has long shown that teacher leaders negotiate role ambiguity, collegial tensions, and emotional complexity when influencing peers without formal authority (Cooper 2023; York-Barr and Duke 2004). This study converges

with that literature in capturing uncertainty and boundary-work, yet extends it by showing how AI can function as an ontological disruptor in everyday professional life: participants' shift from 'expert' toward mediator/interpreter is not merely a new task profile; it is a renegotiation of what counts as expertise when systems generate plausible explanations, options, and feedback. Identity work therefore becomes inseparable from the material arrangements of practice – platform logics, dashboards, automated feedback, and policy narratives about being 'future-ready' (Facer and Selwyn 2021; UNESCO 2021).

The study's most distinctive contribution, relative to existing leadership models, is how it illuminates emerging forms of algorithmic authority alongside relational-professional authority. Traditional teacher leadership depends on credibility built through pedagogical knowledge, trust, and peer influence (Harris and Jones 2019; York-Barr and Duke 2004). Here, participants describe an additional authority regime: system outputs can be treated as privileged indicators of risk, need, or progress even when their rationale is unclear. This aligns with concerns in AI governance debates about opacity and datafication (UNESCO 2021; Williamson and Eynon 2020), but the present study adds a leadership-specific account: teacher leaders become brokers between competing epistemic claims – professional judgment, algorithmic signals, and institutional expectations anchored in data traces. Authority is not ceded to machines; it is reconfigured through ongoing negotiations over whose judgment counts and under what conditions (Shum and Luckin 2019; Williamson and Eynon 2020).

Ethical ambivalence in the findings likewise both affirms and extends the literature. Concerns about privacy, bias, and transparency are widely documented (Borenstein and Howard 2021; UNESCO 2021). What this study adds is an account of ethical strain as a leadership problem, not merely a teacher concern: participants' descriptions of 'ethical distancing' suggest that institutional arrangements can make deferral to the system socially and professionally convenient – especially when decisions must be defensible, routinised, or auditable. The result is not ethical indifference; it is a coping response within uneven support and data-driven expectations (UNESCO 2021; Vincent-Lancrin and Van der Vlies 2020).

The K–12 specificity matters here. Working with minors heightens safeguarding, fairness, and data protection expectations, while schooling often involves standardised curricula and platform choices made above the classroom (Ravikumar et al., 2026). Recent K–12 scholarship also underscores recurrent GenAI frictions – privacy risks, student dependence, and uneven guidance – which intensify teachers' role as ethical gatekeepers and sense-makers (Alfarwan 2025; Varlamis et al. 2026). The present study contributes by showing how these K–12 conditions do not merely 'contextualize' leadership; they shape its texture – pushing teacher leaders toward interpretive, ethical, and relational labour that holds together pedagogical purpose, institutional demands, and system outputs in real time (UNESCO 2021).

Taken together, the study advances the literature in three interlocking ways. First, it strengthens teacher leadership scholarship by specifying how leadership practices, identities, and authority are reorganised when data infrastructures and AI outputs become routine participants in instructional decision-making (Fenwick 2010; Orlikowski & Scott 2015; Williamson and Eynon 2020). Second, it pushes AIED research beyond a tool-and-outcomes emphasis by offering a leadership-centered account of how AI becomes embedded in the moral, epistemic, and organisational life of schools (Holmes, Bialik, and Fadel 2019; Hwang et al. 2020; UNESCO 2021). Third, it refines what ‘distributed leadership’ means under AI integration: distribution is not only across people and roles, but across human and technological actors that shape visibility, urgency, and legitimacy – thereby changing what leadership looks like as lived practice (Harris and Jones 2019; Shum and Luckin 2019; Williamson and Eynon 2020).

Implications, limitations and future research

Teacher leadership in AI-integrated K–12 schooling appears to involve more than influencing colleagues and improving instruction; it also entails mediating system outputs (dashboards, flags, automated feedback) and deciding what counts as credible evidence for action. A key implication for leadership development is therefore to move beyond generic ‘AI tool training’ toward cultivating critical digital literacies and ethical discernment as everyday leadership competencies. Concretely, leadership programmes can incorporate: (a) structured ‘sense-making’ routines where teacher leaders practice interrogating AI outputs (what the system claims, what it cannot know, what is missing), (b) scenario-based rehearsals of ethical dilemmas (privacy, opacity, predictive bias, student dependence) with explicit decision justifications, and (c) coached co-design cycles in which AI generates options but teachers retain final pedagogical authority and document why they accepted, adapted, or rejected recommendations. These practices help teacher leaders lead responsibly without drifting into default compliance or uncritical delegation.

These implications should be read alongside several limitations. The sample was drawn from a highly active regional online community of teacher leaders, which may reflect a form of digital-elite bias, capturing participants with stronger professional networks, higher technology confidence, or more supportive school conditions than the wider teaching population. The design is also cross-sectional and interview-based; accounts represent retrospective sense-making at one point in time and may be shaped by local innovation narratives or professional self-presentation, especially in AI-positive environments. Finally, the study prioritises interpretive depth over representativeness, so the findings are intended to be analytically informative rather than generalisable across all systems, schools, or teacher populations.

Building from these limitations, future research should extend the work in ways that both deepen transferability and strengthen practical guidance. Longitudinal qualitative studies – using repeated interviews alongside artifacts such as AI-generated feedback, planning outputs, and dashboard traces – could examine how reliance, ethical distancing, and identity shifts evolve as platforms, policies, and professional learning mature. Comparative designs could test how different implementation conditions (mandated versus optional tools, varying levels of governance, safeguarding expectations, and accountability pressures) shape teacher leaders' autonomy and authority. Mixed-methods studies could also examine how affective and workload dynamics intersect with leadership enactment, clarifying when AI-enabled efficiencies translate into more instructional leadership time versus when they generate new forms of strain. Together, such work would help specify which institutional conditions enable teacher leaders to sustain authority and responsibility while working through increasingly datafied, AI-mediated educational arrangements.

Conclusion

This study set out to explore how teacher leaders enact leadership within AI-integrated educational contexts, and to investigate how human – AI interactions give rise to new forms of agency, identity, and authority in the everyday work of teaching. Conceptually, it advances teacher leadership scholarship by showing that leadership in AI-rich classrooms is not simply 'supported' by technology but co-produced through sociotechnical relations in which system outputs reshape what becomes visible, urgent, and legitimate for action. Empirically, drawing on a multi-country qualitative interview study with teacher leaders across Arab States, the findings demonstrate that AI integration recalibrates leadership practice through algorithmic sense-making and routine delegation, repositions professional identity from expert-knower toward mediator and ethical gatekeeper, and distributes decision-making in ways that both extend and constrain discretionary judgment. Practically, the study underscores that preparing teacher leaders for AI-integrated schooling requires more than tool familiarity; it calls for leadership development that strengthens critical digital literacies and ethical discernment, supporting teacher leaders to interpret, contest, and responsibly translate system recommendations while safeguarding professional accountability and sustaining human-centered pedagogy in increasingly datafied learning environments.

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Authors' contributions

All authors contributed equally to all elements and stages of the study, and to the manuscript's writing and revision. All authors read and approved the final manuscript.

Disclosure statement

No potential conflict of interest was reported by the authors.

Ethics approval and consent to participate

This study was reviewed and approved by the Research Ethics Board at the Lebanese University, under approval number 219/2023. All participants provided informed consent prior to data collection. Participation was voluntary, and all data were anonymized to ensure confidentiality.

Ethical

The procedures for this study were performed in line with the principles of the Declaration of Helsinki.

Informed consent

Informed consent was obtained from all individual participants included in this study. Not applicable. The manuscript does not contain any identifiable individual data (including images or videos).

Originality and publication status

This manuscript is an original work and has not been published or submitted for consideration elsewhere.

Data availability statement

The datasets generated and/or analysed during the current study are not publicly available due to the privacy and confidentiality agreements made with participants but are available from the corresponding author on reasonable request.

Notes on contributors

Norma Ghamrawi is a professor of educational leadership and management at the College of Education, Qatar University.

Tarek Shal is a Research Assistant Professor at the Social & Economic Survey Institute at Qatar University.

Najah A.R. Ghamrawi is a professor of Educational Psychology at the Faculty of Education of the Lebanese University.

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