

Digital Silence as Professional Agency in Online Spaces: Implications for Teacher Identity and Curriculum Implementation

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Abstract

In the age of digitized professional learning, teacher engagement is frequently quantified through online attendance and participation metrics. This study challenges that assumption by conceptualizing digital silence as a deliberate form of professional agency and identity work. Drawing on narrative inquiry with 22 teachers from different regions, the research examines how educators navigate emotional, ethical, and institutional dimensions of digital spaces. Through thematic analysis of semi-structured interviews and digital diaries, the study reveals that teachers use silence intentionally to establish emotional boundaries, enable reflection, and preserve authenticity amid performative cultures of visibility. The findings demonstrate that silence functions as both a reflective and protective practice, signifying agency in response to algorithmic demands and institutional expectations. This paper advances an integrative model positioning digital silence as a boundary practice within individual, institutional, and cultural contexts. It advocates policy frameworks that value reflective disengagement and emotional sustainability in teacher learning.

Keywords: digital silence; professional agency; teacher identity; online professional learning; emotional sustainability

1 Introduction

The growing integration of digital technologies into education has changed how teachers engage with their professional practices, implement the curriculum, and construct their identities in online environments. While many studies focus on active participation, visibility, and digital engagement as indicators of effective teaching, there has been less focus on teachers' intentional non-participation or digital silence. In online professional settings including learning management systems, social media platforms, and virtual professional community's teachers may strategically choose to remain silent as a form of skilled judgment rather than as a sign of disengagement. Understanding digital silence as a form of professional agency challenges the common belief that teacher effectiveness is solely tied to constant online presence. Instead, silence can serve as a reflective, ethical, or resistant practice that allows teachers to navigate power dynamics, institutional expectations, and curricular mandates (Perumal, 2008). This study reexamines teacher identity by exploring how digital silence functions as an agentic response in online spaces, influencing teachers' approaches to curriculum implementation.

In recent years, digital professional learning environments such as online forums, social media groups, and virtual professional learning communities have become normative in teacher education and professional development. Teachers are often encouraged, or even expected, to actively post, share, comment, and co-construct knowledge online. This type of engagement is recurrently framed as evidence of reflective practice, collegiality and professional development (Chen et al., 2023). However, this master narrative of connectivity as virtue occludes the reality that some teachers still lurk without posting, while others selectively provoke negativity by withdrawing into digital space. What might such silence mean?

Silence is often construed as absence, disengagement, or deficiency. In professional development settings, teachers' reticence whether verbal in workshops or digital silence can be interpreted as a lack of confidence, knowledge, or as passive learning (Wang & Jacobs, 2024). Within educational settings, silence has been studied in classroom talk and in organizational power dynamics. However, the notion of digital silence that is, the conscious or tacit choice to not post, to remain invisible, or to limit one's online visibility remains under examined in teacher education research. Moreover, some teachers are now advocating a more deliberate focus on silence. Lausch (2018)

recommended “mindful silence” as an approach to pedagogy, understanding silence not as emptiness but as a site of reflection, listening and inter-being. Within this study the context of teacher education, silence has also been associated with voice, identity, and agency. However, most studies continue to assume that more speaking, posting and connectedness are better.

Similarly, the teacher professional agency is expanding, particularly in digital environments. Teacher agency is the professional (1) teachers' ability to act purposefully, (2) make choices and negotiate constraints, and (3) influence their own professional development paths (Eteläpelto et al., 2013; Skantz-Åberg et al., 2022). Digital learning environments consider agency in relation to the digital or transformative-agency being (Engeness & Gamlem 2025.), including how teachers appropriate and shape technology, how they constructively reject technology, etc. (Lin & Gao, 2023). Agency is not only about what men or women do but also about what people choose not to do, how they distinguish themselves, and how they police each other.

A handful of recent studies touch on related themes. Thus, taking professional educators' positions in digital society as a case, one study explored how teacher educators perceive their professional agency in HE and observed that tensions emerge between institutional expectations, identity, and autonomy (Roumbanis Viberg et al., 2021). A study of online teacher PD also found that many teachers engage in superficial participation (e.g., sharing resources) rather than deep discussion, which questions the validity of treating participatory frequency as a proxy for quality (Chen et al., 2023). Furthermore, the transience of algorithmic and automated systems in education creates uncertain contested terrains of teacher agency (Röhl, 2025). These occurrences call for a rethinking of what constitutes agency in digital teacher spaces. Can silence stand as a form of agency that is valent, strategic, and infused with identity? This article argues for conceptualizing digital silence as professional agency, specifically regarding its intersection with teacher identity in online spaces. The goal is to reframe silence not as a lack, but as something in need of interpretation and theorization.

This study is guided by the following research questions:

1. How do teachers describe and make sense of their silence or limited participation in online professional spaces?

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2. In what ways might silence act as an expression of agency in digital professional contexts?
 3. How do institutional, cultural, or interpersonal norms and pressures shape decisions about digital engagement and silence?
 4. What implications might be conceptualizing digital silence have for understanding teacher identity, professional learning, and designing digital professional spaces?

In the research question, these issues are explored through narrative and thematic inquiry across different settings. This paper aims to foster empirical learning and theoretical input. It reframes teacher norms of digital participation and challenges teacher educators, policy makers, and online community designers to consider the quiet practices that can be part of sustainable professional practice.

2 Theoretical Framework

Teacher identity and professional agency are central constructs in understanding how educators navigate and shape their professional worlds, especially in digital environments. This study integrates three theoretical strands: (1) teacher professional agency, (2) teacher identity construction, and (3) the emerging concept of *digital silence* as boundary practice. Together, these perspectives provide a lens for examining how teachers make sense of their participation—and deliberate non-participation—in online spaces.

2.1 Teacher Professional Agency

Teacher professional agency refers to teachers' ability to act purposefully and make meaningful choices regarding their work and professional learning within current social and structural arrangements (Eteläpelto et al., 2013). Agency is not a characteristic of the individual, but rather an achievement that occurs relationally and contextually through the interaction between personal abilities, professional communities, and institutional opportunities/restrictions (Biesta et al., 2015). From a sociocultural perspective, teacher agency refers to teachers' capacity to critically negotiate among competing discourses of professionalism, accountability, and innovation. In this digital world, agency extends to deciding when and how to enter online professional spaces. Brevik et al. (2019) explore that digital agency itself comprises teachers' purposeful use of technology to fulfill pedagogical objectives and the negotiation of autonomy with institutional requirements. Similarly,

Mohammad Nezhad & Stoltz (2024) characterized agency in online teacher learning as enacted through "negotiated participation" woven into algorithms, peer visibility, and affective boundaries. This study frames silence as an agentic action as a form of boundary-drawing, self-care, or reflection rather than a failure of professional practice.

2.3 Teacher Identity in Digital Spaces

The identity of the teacher is a narrative and performative structure constantly mediated through interaction, reflection, and participation (Beauchamp & Thomas, 2009; Akkerman & Meijer, 2011). Online spaces introduce a new dimension to the identity work and particularly demand that teachers must juggle multiple selves—personal, professional, and institutional—across digital platforms (Zhang et al., 2024). Teachers' online presence all too often involves a degree of performativity, including the construction of a digital self, capitulation to institutional discourses around innovation, and participation in peer networks for visibility (Marín et al., 2022). However, these virtual worlds can also create friction between the poles of authenticity and acceptance. Visibility can include monitoring, judgment, or evoking emotional exposure, and some educators deliberately constrain their digital presence. From this perspective, digital silence is seen as a principle of protecting professional ethics and personal safety (Wang & Jacobs, 2024). It reflects a trade-off between the pressures of hyper-connectivity and a teacher's desire to remain or appear coherent and professional in public space.

2.4 Digital Silence as Boundary Practice

Gathered from critical digital pedagogy and affect theory (Al-Freih & Bali, 2023; Lather, 2016), digital silence then might be thought of as a border practice – as one through which teachers negotiate the boundaries between presence and absence, exposure and withdrawal, participation and reflection. The silence is not an empty speech space but rather a communicative space; it conveys autonomy, ethics, and care (Lausch, 2018). In online professional spaces, educators might use silence to regain cognitive space, push back against performativity, and privately reflect on their changing identity(s). In concept, digital silence relates to what Mertala (2021) calls reflective disconnection—purposeful breaks in connectivity that support emotional health and facilitate deeper professional learning. This paper thus provides a theoretical understanding of digital silence

as a site for professional agency through boundary work, wherein teachers create and control their visibility, affective labor, and professionalism online.

2.5 Implications for Curriculum Implementation

Curriculum implementation is increasingly perceived as an interpretive process that involves identity rather than just a technical act of compliance (Biesta et al., 2019). Teachers' digital choices, including their moments of silence, reflect how they navigate curricular expectations, uphold professional values, and respond to institutional authority. Recognizing digital silence as a form of professional agency expands our understanding of how teachers engage with the curriculum and shape their identities in online environments.

2.6 Integrative Model

From these perspectives, we develop an integrative model in which digital silence, as a form of media use, can be conceptualized at the nexus of agency and identity. Not only do teachers use visible participation to exert agency, but they also employ strategic non-participation. Contextual and personal factors mediate this agency. Comprehending silence in this way extends dominant understandings of teacher professionalism away from activity counts toward more complex, sustainable, and ethical forms of digital participation.

3 Methodology

This study adopted a qualitative interpretive design to explore how teachers conceptualize and experience digital silence as a form of professional agency within online professional spaces. A qualitative approach was selected to capture the depth, nuance, and contextual richness of teachers' lived experiences and meaning-making (Tisdell et al., 2025). Guided by constructivist and sociocultural assumptions, the research sought to understand participants' perspectives within their specific professional, institutional, and cultural contexts (Creswell & Poth, 2016).

3.1 Research Design

The study employed a narrative inquiry approach, which views experience as storied and knowledge as constructed through participants' narratives (Thorne, 2025). Narrative inquiry is particularly suitable for examining professional identity and agency, as it emphasizes how

individuals make sense of their experiences over time and across contexts (Connelly & Clandinin, 2012). This design enabled the exploration of how teachers articulate, justify, and reflect on their decisions to remain silent or partially visible in online spaces.

The following questions guided the research:

1. How do teachers describe and make sense of their silence or limited participation in online professional spaces?
2. In what ways might digital silence serve as a form of professional agency?
3. How do cultural, institutional, and emotional contexts influence teachers' decisions regarding digital visibility and silence?

3.2 Participants and Sampling

A purposive sampling strategy was used to select participants who could provide rich, relevant insights into the phenomenon of digital silence (Patton, 2015). Twenty-two teachers (12 in-services and 10 pre-service) were recruited from three countries like *B*, *F*, and *A* to provide cultural variation in digital practices and professional expectations. Participants were recruited through professional learning networks, institutional mailing lists, and snowball sampling.

The participants represented diverse subject areas (English, Science, ICT, Social Studies) and had between 1 and 20 years of teaching experience. Pseudonyms were assigned to protect anonymity. The diversity of participants allowed for a comparative exploration of how digital silence manifests across professional stages and cultural contexts.

3.3 Data Collection

Data were collected over six months (January-June, 2025) through semi-structured interviews, digital diaries, and limited document analysis of online professional forums.

1. Semi-structured interviews: Conducted via Zoom, lasting 45–60 minutes each. Interviews focused on teachers' digital engagement habits, moments of silence, emotional and professional reasoning behind silence, and perceptions of visibility and identity.

2. Digital diaries: Participants kept reflective logs for three weeks, documenting instances where they chose not to engage digitally and their reflections on those choices.
3. Document analysis: Publicly available online spaces (e.g., teacher forums, social media groups) were reviewed to contextualize participants' narratives, without identifying individuals.

All interviews were recorded, transcribed verbatim, and anonymized. Field notes and reflexive memos were maintained throughout data collection.

3.4 Data Analysis

Data were analyzed using reflexive thematic analysis (Braun & Clarke, 2019), supported by N-Vivo 14. Analysis followed six iterative stages: (1) familiarization with data; (2) initial coding; (3) theme generation; (4) reviewing and refining themes; (5) defining and naming themes; and (6) producing the report. The analysis emphasized both semantic and latent meanings, focusing on how participants construct professional agency through silence. Themes were developed inductively from the data while being informed by theoretical sensitizing concepts such as agency, identity, and boundary practices (Eteläpelto et al., 2013; Biesta et al., 2015). Thematic patterns were validated through member checking and peer debriefing to enhance trustworthiness (Lincoln & Guba, 1985).

3.5 Researcher Reflexivity

As the researcher had prior experience facilitating online teacher education programs, reflexivity was integral throughout the study. A reflexive journal was maintained to record positionality, assumptions, and interpretive decisions. Following Lather (2016), reflexivity was treated not merely as procedural but as epistemological—acknowledging that meaning emerges through relational engagement with participants and data.

4 Findings and result discussion

The analysis of the 22 participants' interviews, digital diaries, and supporting online observations yielded four interrelated themes that capture how teachers experience and enact digital silence as a form of professional agency:

- Silence as Emotional Boundary Work,
- Silence as Reflective and Cognitive Space,
- Selective Visibility as Identity Management, and
- Cultural and Institutional Mediation of Silence.

Each theme is described below, illustrated with anonymized quotations from participants (pseudonyms used).

4.1 Silence as Emotional Boundary Work

Participants consistently described digital silence as an act of emotional preservation and self-care rather than disengagement. Many teachers expressed that the constant visibility expected in online professional spaces led to fatigue and vulnerability.

“I don’t post in our Facebook teacher group anymore,” said Shera (B). “Everyone competes to show who is more innovative, and it drains me. Staying quiet helps me protect my peace.”

This theme aligns with research on emotional labor and professional well-being (Hargreaves, 1998; Nias, 1996), suggesting that silence can serve as an emotional boundary strategy. Participants consciously withheld engagement to prevent emotional exhaustion or judgment from peers. Teachers also used silence as a coping mechanism when dealing with performative cultures of sharing—where professional worth was equated with online activity. Rashed (P) reflected:

“If you don’t post your students’ achievements, people think you’re not doing anything. But I’d rather do the work than prove it online.”

These experiences highlight digital silence as a protective form of agency, allowing teachers to navigate the emotional demands of visibility (Bali & Zamora, 2022).

4.2 Silence as Reflective and Cognitive Space

A second theme revealed silence as a deliberate space for reflection and meaning-making. Several participants described refraining from immediate responses in online discussions as a way to think critically and integrate new ideas.

“I read everything but rarely comment,” noted Minna (F). “I use that quiet time to process how I might apply something in my classroom.”

This aligns with the notion of reflective disconnection (Tao et al., 2022), where temporary withdrawal supports deeper engagement. Participants described how moments of digital silence allowed them to avoid reactive posting and engage in more intentional learning.

Interestingly, many teachers felt guilty about not participating but later reframed silence as productive. John (A) explained:

“At first, I thought I was lazy for not joining discussions. Then I realized I was thinking more deeply during those silences. It’s part of my learning style.”

Thus, silence functioned as a cognitive and affective pause, reflecting a more sustainable rhythm of professional engagement.

4.3 Selective Visibility as Identity Management

Participants practiced selective visibility—deciding when, where, and to whom to be visible online as a way of managing their professional identities. Teachers balanced multiple selves (personal, institutional, cultural), using silence strategically to control their representation.

“I have accounts on multiple platforms, but I only post professional things on LinkedIn. On Facebook, I’m silent—it’s not worth the risk of being misinterpreted,” said Lina (Australia).

Selective silence allowed teachers to preserve authenticity while navigating surveillance and professional scrutiny (Hohaus & Heeren 2023). Teachers used privacy settings, pseudonyms, and restricted audiences as boundary tools.

For some, silence served as reputation management. Tariq (I) expressed:

“Our supervisors monitor what we share. I prefer silence to avoid misunderstandings. It’s safer.”

This echoes Goffman’s (1959) dramaturgical perspective, where individuals manage their front-stage and back-stage identities. Digital silence, in this sense, becomes a performative choice rather than a passive absence.

4.4 Cultural and Institutional Mediation of Silence

The meanings and acceptability of digital silence varied across cultural and institutional contexts.

In F, silence was perceived as a normative and respected professional stance—a marker of reflection and humility.

“In our culture, silence means thinking deeply,” explained Anna (S). “It’s not avoidance; it’s respect.”

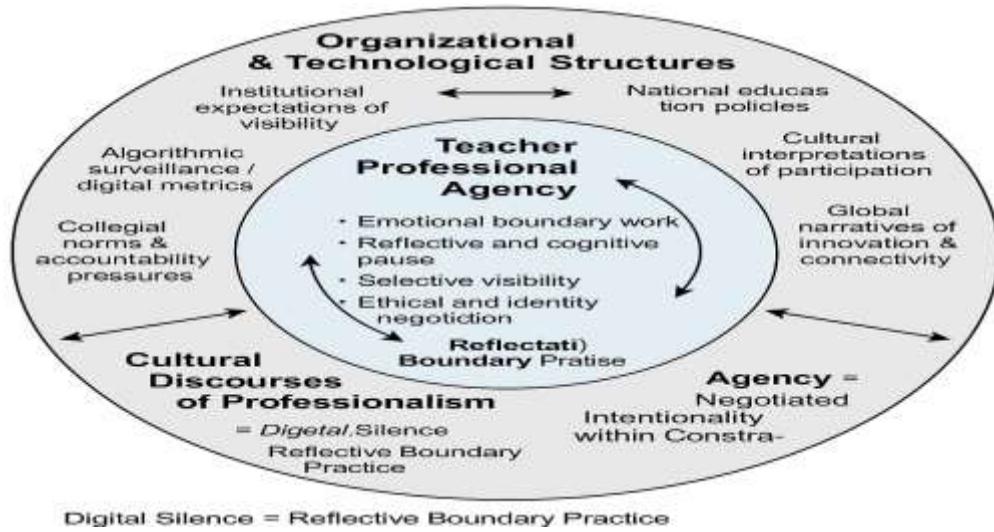
In contrast, teachers in Bangladesh and Australia faced stronger expectations of constant digital visibility, tied to institutional accountability and peer validation. Hasan (M) noted:

“Our principal checks who shares class updates online. Being silent can seem like non-compliance.”

This tension illustrates how digital silence is socially constructed—valued in some contexts, penalized in others. Institutional surveillance and algorithmic visibility pressures (Selwyn, 2011) shaped teachers’ agency differently across settings.

4.5 Summarizing the thematic model

The four themes reveal that digital silence is not a uniform behavior but a complex, contextually situated form of agency. Silence serves emotional, cognitive, identity, and cultural functions, reflecting teachers’ negotiations between self-care, professionalism, and institutional demands. Figure 1 indicates that visually represents the integrative model of digital silence as professional agency, showing its interplay across personal, institutional, and cultural levels.

Figure 1. An Integrative Model of Digital Silence as Professional Agency

Source: Lainidi et al.,2023

The model illustrates how teachers enact digital silence at the intersection of individual, institutional, and cultural systems. At the core, digital silence represents an agentic boundary practice through which teachers manage emotional labor, reflect on practice, and negotiate professional identity. Institutional and technological structures mediate this agency, while cultural discourses shape how silence is valued or penalized across contexts. Bidirectional arrows indicate the recursive relationship between teacher agency and the social structures that both constrain and are reshaped by it.

4.6 Overview Findings

The study reveals that teachers use digital silence as a deliberate and multifaceted form of professional agency rather than a sign of withdrawal. Teachers engaged silence to safeguard emotional well-being, counteracting the pressures of constant online visibility and performative participation. Silence also provided essential cognitive space for reflection, allowing teachers to process information and engage more intentionally with professional content. Additionally, teachers employed selective silence to manage their professional identities, controlling what aspects of their practice became publicly visible in digitally networked environments. Cultural norms and institutional expectations further shaped how silence was interpreted valued in some contexts as reflective professionalism, yet viewed in others as non-compliance. Overall, digital

silence emerged as a strategic boundary practice through which teachers negotiate emotional demands, identity concerns, and contextual constraints in digital professional spaces.

5 Discussion

The purpose of this study was to examine how teachers experience and conceptualize digital silence as a form of professional agency and identity work in online spaces. The findings extend current understandings of teacher agency by reframing non-participation as a potentially meaningful, intentional, and contextually situated act. This section interprets the findings in light of existing scholarship, discusses their implications for teacher identity and professional learning, and highlights theoretical and practical contributions to the field of teacher education.

5.1 Reframing Silence as Agency

A central contribution of this study lies in its reconceptualization of silence from a deficit model as absence, disengagement, or failure—to a productive model of agency. Teachers' accounts revealed silence as an act of emotional regulation, identity preservation, and strategic positioning within digital environments. This challenges the traditional equation of professional learning with visible participation and aligns with Eteläpelto et al.'s (2013) view of agency as situated negotiation among individual intentions, cultural norms, and institutional structures. In this study, silence functioned as a negotiated expression of agency, allowing teachers to exert control over their digital identities amid pressures of hypervisibility and algorithmic surveillance (Selwyn, 2011). Rather than absence of voice, digital silence emerges as voice differently articulated—through restraint, reflection, or selective engagement. This echoes Lausch's (2018) argument that silence can foster critical awareness and deeper professional reflection. Hence, digital silence should not be interpreted as professional passivity but as a mode of critical agency that resists performative norms of constant sharing.

5.2 Emotional Boundary Work and Professional Sustainability

The findings also underscore the emotional dimensions of teacher professionalism. Participants described digital silence as a form of boundary work—a means to maintain emotional equilibrium in online spaces saturated with performance pressures and comparison cultures. This resonates

with Hargreaves' (1998) notion of the emotional practice of teaching and recent scholarship emphasizing teacher well-being and emotional sustainability (Day & Gu, 2010; Chen & Jia 2022).

By choosing silence, teachers resisted what (Chiner et al., 2025) calls the pedagogy of exposure, where teachers feel compelled to constantly display evidence of productivity. Such practices of selective silence represent acts of care for the self, fostering resilience and autonomy in the digital age. The recognition of silence as self-care adds an important affective dimension to professional agency theory expanding beyond cognition and decision-making to include emotional and ethical intentionality. This insight may inform the design of professional learning programs that respect teachers' emotional rhythms and foster reflective spaces rather than demanding incessant online participation.

5.3 Identity Negotiation and Selective Visibility

Teacher identity in digital spaces is inherently performative and negotiated (Beauchamp & Thomas, 2009). This study shows how teachers employ silence as a mechanism of selective visibility controlling when and how their professional selves are seen. Through silence, teachers manage conflicting demands of authenticity, surveillance, and institutional expectations. This aligns with Goffman's (1959) dramaturgical metaphor of identity management and with Lund and also these findings that teachers curate multiple digital selves to maintain professional credibility. However, unlike performative participation, silence here becomes a performative withholding—a deliberate act of professionalism that balances presence and privacy. Such identity negotiation underscores that teacher professionalism in digital spaces is relational, situated in the interplay between self, community, and platform architecture (Mertala, 2021). Teacher educators must therefore move beyond binary notions of active/inactive participation and recognize how agency is enacted through controlled visibility.

5.4 Cultural Contexts and Power Relations

The cross-cultural comparison revealed that meanings of silence are socially and institutionally mediated. In Finland, silence was culturally aligned with reflection and respect, while in Bangladesh and Australia it was often interpreted as non-compliance or disengagement. This finding reinforces Biesta et al.'s (2015) argument that agency is always exercised within and

against power structures. Institutional surveillance and algorithmic accountability systems (Selwyn, 2011) amplify this power dynamic, making digital silence both a risky and resistant practice in some contexts. The study thus invites teacher educators and policy makers to consider cultural literacy around silence, recognizing that professional norms of digital visibility may reproduce inequities across global contexts.

5.5 Theoretical and Practical Contributions

Theoretical Contributions

This study contributes to theory by advancing the concept of digital silence as professional agency. It integrates theories of teacher agency, identity, and emotional labor to articulate silence as a multi-layered phenomenon:

- **Agentic** — a conscious decision within structural constraints.
- **Affective** — an emotional strategy for well-being.
- **Ethical** — a moral stance on authenticity and self-protection.

It also extends sociocultural theories of teacher learning (Eteläpelto et al., 2013; Priestley et al., 2015) by emphasizing absence and withdrawal as legitimate modes of participation.

5.6 Practical Implications

For teacher education, these findings call for programs that:

- Value reflective disengagement as part of digital professionalism.
- Foster dialogue about emotional sustainability and online identity.
- Train future teachers to exercise agency through selective visibility and to critically evaluate the ethics of online participation.

Institutions should reconsider digital performance metrics and professional expectations that equate visibility with competence, creating more inclusive and humane models of professional learning.

5.7 Limitations and Future Research

This qualitative study is interpretive and context-bound. The sample, though culturally diverse, was limited to three national contexts and relied on self-reported experiences. Future research could employ mixed methods to examine correlations between digital engagement patterns and well-being, or longitudinal studies to explore how digital silence evolves over teachers' careers. Comparative analyses across educational systems with differing digital accountability regimes may further illuminate the socio-political dimensions of silence.

6 Conclusion

This study shows that digital silence is a deliberate and meaningful expression of teacher agency rather than a sign of disengagement. Teachers used silence to protect emotional well-being, create space for reflection, and maintain professional integrity within increasingly performative and monitored digital environments. The findings demonstrate that silence acts as a boundary practice through which teachers manage competing pressures of visibility, authenticity, and accountability. This reframing broadens current understandings of teacher agency by highlighting its affective and ethical dimensions. Practically, the study calls for rethinking professional learning models that equate participation with effectiveness. Institutions and teacher education programs should recognize reflective disengagement as a legitimate aspect of professional growth and design digital spaces that balance engagement with opportunities for restorative silence. Future research should explore how digital silence varies across cultures, policy contexts, and career stages to further clarify its role in sustaining teacher identity and well-being. This study also opens several pathways for future inquiry. Longitudinal and comparative research could examine how digital silence evolves across career stages, cultural contexts, and policy regimes. Methodological extensions, such as quantitative network analyses, could illuminate patterns of visible and invisible participation. In an era characterized by continuous digital demands, the recognition of teachers' strategic silences invites a broader reconsideration of what constitutes professionalism. Acknowledging digital silence as an expression of agency brings needed balance to the discourse on teacher learning—valuing not only the contributions made visible, but also the quiet spaces that sustain reflection, resilience, and authentic professional identity.

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Author Contributions

Akash Mahamud: Conceptualization, data collection, data analysis, writing—original draft preparation, and visualization.

Jesmin Akter: Methodology design, literature review, data validation, and editing.

Muhammad Junaid: Conceptualization, data collection, theoretical framing, critical revision of the manuscript

Prof. Yu Zeyuan: Supervision, theoretical framing, critical revision, and final approval of the manuscript.

All authors read and approved the final version of the manuscript.

Availability of Data and Materials

The datasets generated and analyzed during the current study are available from the corresponding author upon reasonable request. Data have been anonymized to ensure participant confidentiality in accordance with ethical research standards.

Ethics Approval

This study was reviewed and approved by the Institutional Review Board (IRB-20050010) of Southwest University. Participation was voluntary, and informed consent was obtained from all respondents prior to data collection. The research adhered to the ethical guidelines for human subjects in educational research.

Conflicts of Interest

The authors declare no potential conflicts of interest with respect to the research, authorship, or publication of this article.

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