



Teachers' Lifelong Learning in Digital Professional Development: Narrative Inquiry into Positive Emotions and Technology-Enhanced Teaching Practices

Qin Wang^{*a} & Narina A. Samah^a

* Corresponding author:

Email: narina@utm.my

a. Faculty of Educational Sciences and Technology, Universiti Teknologi Malaysia, 81310 Skudai, Johor Bahru, Johor, Malaysia

Article Info

Received: June 11, 2026

Accepted: October 04, 2026

Published: October 23, 2026



10.46303/jcve.2026.62

How to cite

Wang, Q., & Samah, N. A. (2026). Teachers' Lifelong Learning in Digital Professional Development: Narrative Inquiry into Positive Emotions and Technology-Enhanced Teaching Practices. *Journal of Culture and Values in Education*, 9(3), 609-639. <https://doi.org/10.46303/jcve.2026.62>

Copyright license

This is an Open Access article distributed under the terms of the Creative Commons Attribution 4.0 International license.

ABSTRACT

Digital professional development has become central to teachers' lifelong learning, yet research has paid limited attention to how teachers emotionally experience digital learning and translate it into technology-enhanced teaching practices. Using narrative inquiry, this study explores how teachers construct meaning from digital professional development, how positive emotions emerge within their learning journeys, and how these emotions shape pedagogical transformation. Data were collected from 18 primary and secondary school teachers through semi-structured narrative interviews, reflective learning journals, and digital teaching artefacts. Thematic narrative analysis revealed four interconnected findings. First, meaningful digital professional development renewed teachers' professional hope and strengthened their lifelong learning orientation. Second, positive emotions, including hope, enjoyment, satisfaction, pride, curiosity, and belonging, supported teachers' willingness to experiment with digital tools. Third, these emotions enhanced digital teaching self-efficacy and helped teachers move from technical adoption to more reflective technology-enhanced pedagogy. Fourth, professional identity reconstruction strengthened the sustainability of digital teaching practices, particularly when teachers began to view themselves as adaptive learners, peer contributors, and digitally capable educators. The study contributes to the teacher professional development literature by positioning positive emotions as affective mechanisms linking digital professional learning with classroom innovation. It also offers practical insights for designing emotionally supportive, collaborative, and pedagogically meaningful digital professional development.

KEYWORDS

Teacher development; educational technology; emotions; self-efficacy; professional competence; narrative inquiry.

INTRODUCTION

The rapid digital transformation of education has reshaped teachers' professional work across curriculum delivery, assessment, communication, professional collaboration, and school improvement. Digital platforms, data-informed tools, artificial intelligence applications, and interactive learning environments have expanded instructional possibilities while increasing the need for teachers to update their knowledge and practices continuously (Timotheou et al., 2023; Fernández-Batanero et al., 2022). In this context, teachers' lifelong learning has become essential to maintaining pedagogical responsiveness and instructional relevance in technology-rich environments. Recent scholarship therefore treats teachers' digital competence as a developing professional capacity rather than a narrow ability to operate tools. It involves interpreting, adapting, and applying digital technologies in pedagogically meaningful ways and is strengthened through continuing professional learning (Fernández-Batanero et al., 2022; Garzón-Artacho et al., 2021). This perspective frames digital development as an ongoing process that requires reflection, adaptation, and professional judgment.

Teacher professional development has accordingly expanded beyond one-off workshops to include online courses, webinars, digital mentoring, professional learning networks, blended training, social media-based teacher communities, and self-directed technology exploration (Dille & Røkenes, 2021; Amemasor et al., 2025). Yet access to these opportunities does not automatically produce pedagogical change. Digital professional development is most meaningful when it is sustained, collaborative, reflective, and connected to classroom practice (Darling-Hammond et al., 2017; Philipsen et al., 2019). Within this context, technology-enhanced teaching concerns the purposeful pedagogical use of digital resources to support interaction, feedback, collaboration, creativity, accessibility, and student engagement. Its educational value depends on how teachers align technologies with learning aims and local conditions, not on technology's presence alone (Timotheou et al., 2023; Caena & Redecker, 2019). Emerging generative technologies further extend this professional responsibility by requiring teachers to evaluate digital outputs, authorship, accuracy, learner agency, and ethical use (Mishra et al., 2023).

Despite the growing body of research on digital competence and technology integration, the emotional dimension of teachers' digital professional development remains relatively underexplored. Much of the existing literature has focused on teachers' skills, attitudes, readiness, barriers, or acceptance of technology, while paying less attention to how teachers feel, narrate, and emotionally make sense of their digital learning experiences (Orakova et al., 2025). Yet teaching is an emotional profession, and teacher learning is also emotionally situated. Multiple interacting factors shape teacher emotions, including personal beliefs, professional goals, student relationships, institutional conditions, and broader socio-cultural contexts (Chen, 2021). Jiang et al. (2021) further showed that teachers' emotions are closely linked to professional identity construction during educational reform. These insights are important for digital professional development because teachers may experience uncertainty, anxiety,

frustration, hope, curiosity, confidence, joy, and pride as they learn to teach with unfamiliar technologies. Such emotions may influence whether teachers persist, withdraw, experiment, or transform their practice (Frenzel et al., 2021).

Among these emotional experiences, positive emotions deserve particular attention because they may support teachers' willingness to engage with digital change rather than comply. Positive emotions such as enjoyment, hope, satisfaction, confidence, curiosity, and professional pride can help teachers reinterpret digital challenges as opportunities for growth. From a positive psychology perspective, such emotions are not merely private psychological states; they can also function as professional resources that support resilience, engagement, creativity, and future-oriented learning (MacIntyre et al., 2019). In digital professional development, for example, teachers may become more willing to experiment with unfamiliar tools when they feel encouraged by peers, satisfied with students' responses, or proud of their own pedagogical progress. However, these emotions should not be reduced to simple enthusiasm. Teachers may feel excited about technology while still worrying about technical failure, workload, or their own readiness. Therefore, positive emotions need to be examined as situated, gradual, and professionally meaningful experiences that unfold through collegial support, repeated practice, student engagement, and identity reconstruction.

Narrative inquiry offers a valuable approach for addressing this limitation. Narrative inquiry views experience as storied, temporal, social, and situated. It allows researchers to examine how teachers understand their professional lives through stories of challenge, transition, agency, and transformation. It is especially useful for educational research because it enables the researcher to examine lived experience while preserving the complexity of voice, context, and meaning (Kim, 2016). Narrative inquiry attends to the continuity of experience, the social conditions of storytelling, and the places in which professional lives unfold (Clandinin, 2022). For this study, narrative inquiry is suitable because teachers' digital professional development is not a single event but a continuing journey shaped by past experiences, present emotions, and imagined professional futures.

Although recent research has examined teachers' digital competence, online professional development, and technology-enhanced learning, a clear gap remains in understanding how teachers narrate positive emotions in digital professional development and how these emotions shape technology-enhanced teaching practices (Dolezal et al., 2025; Falloon, 2020). Existing studies have provided valuable evidence on what teachers need to know and what professional development should include, but less is known about how teachers emotionally experience digital learning as part of lifelong professional growth. This gap is significant because digital transformation in education is not only about infrastructure, policy, or training provision. It is also a human and emotional process in which teachers negotiate uncertainty, confidence, professional identity, and pedagogical purpose (Deng et al., 2022). To address this gap, the present study explores teachers' lifelong learning in digital professional

development through a narrative inquiry into positive emotions and technology-enhanced teaching practices. Four research questions were developed:

RQ1: How do teachers narrate lifelong learning in digital professional development?

RQ2: What positive emotions emerge in teachers' digital professional learning narratives?

RQ3: How do positive emotions and digital teaching self-efficacy shape the pathway from digital professional development to technology-enhanced teaching practices?

RQ4: How does professional identity reconstruction shape the translation of positive emotions into sustained technology-enhanced teaching practices?

By foregrounding teachers' stories, this study moves beyond a purely technical understanding of digital professional development. It offers a more human-centred account of teacher learning in digitally mediated educational contexts.

This study makes three main contributions. First, it contributes to the teacher professional development literature by showing how digital professional development is experienced as an emotional and identity-related process rather than solely as a competence-building activity. Second, it extends research on technology-enhanced teaching by examining how positive emotions may support teachers' confidence, experimentation, and pedagogical redesign. Third, it contributes methodologically by applying narrative inquiry to reveal the temporal and contextual nature of teachers' digital lifelong learning. In doing so, this research provides a more nuanced understanding of how teachers continue to learn, feel, adapt, and transform their practice amid the pressures and possibilities of digital education.

LITERATURE REVIEW

Teachers' Lifelong Learning in the Context of Digital Professional Development

Lifelong learning has become increasingly central to teachers' professional work because the knowledge required for effective teaching is no longer stable or confined to initial teacher preparation. In digitally mediated education systems, teachers are expected to continuously renew their pedagogical knowledge, technological understanding, assessment literacy, and capacity to respond to learners' changing needs. Lifelong learning, in this sense, refers not only to teachers' participation in formal training but also to their ongoing engagement in reflective practice, collegial learning, self-directed inquiry, and professional adaptation throughout their careers. Recent studies have shown that teacher learning is most meaningful when it is sustained, practice-based, collaborative, and connected to teachers' classroom realities rather than delivered as isolated technical instruction (Cabezas-González et al., 2024; Darling-Hammond et al., 2017; Kalymova et al., 2026; Philipsen et al., 2019).

Digital professional development has expanded the spaces in which teachers can learn. Teachers now participate in online workshops, webinars, digital mentoring, blended training, professional learning networks, and informal social media communities. These spaces can make professional learning more flexible and accessible, especially when teachers face geographical, institutional, or time-related constraints. Trust et al. (2016) argued that professional learning

networks allow teachers to access resources, exchange ideas, and construct professional knowledge through socially connected digital participation. More recent scholarship has similarly indicated that digital professional learning is no longer only about technology training, but also about developing teachers' professional digital competence, which includes pedagogical, ethical, collaborative, and reflective dimensions (Fernández-Batanero et al., 2022; Garzón-Artacho et al., 2021; Sharipova et al., 2025).

However, digital professional development is not automatically transformative. Teachers may attend online professional development sessions without substantially changing their classroom practices, especially when the training is too generic, tool-centred, short-term, or disconnected from pedagogical problems. Philipsen et al. (2019) highlighted that professional development for online and blended learning should include active learning, modelling, collaboration, reflection, and implementation support. This is important because teachers' lifelong learning orientation depends partly on whether professional development helps them see themselves as capable, developing, and agentic professionals. When teachers experience digital professional development as meaningful and relevant, it may strengthen their willingness to continue learning beyond compulsory training.

Therefore, digital professional development can be understood as a condition that shapes teachers' lifelong learning orientation. Teachers who experience digital professional learning as useful, collaborative, and pedagogically grounded are more likely to view continuous learning as part of their professional identity. In contrast, poorly designed training may reinforce resistance, fatigue, or superficial compliance. Based on this logic, the following proposition is proposed:

P1: Digital professional development positively influences teachers' lifelong learning orientation.

Lifelong Learning Orientation and Positive Emotions in Teacher Development

Teachers' lifelong learning orientation reflects their willingness to remain open to new knowledge, to reflect on practice, and to adapt their teaching in response to changing educational demands. In digital contexts, such an orientation is especially important because technologies, platforms, and pedagogical possibilities change rapidly. Teachers who possess a stronger lifelong learning orientation are more likely to approach digital change with curiosity, persistence, and a sense of professional possibility. Conversely, teachers who see digital learning as an external burden may resist more or experience emotional exhaustion.

Teacher learning is deeply emotional. Studies on teacher emotion have shown that teachers' feelings are shaped by professional identity, classroom interactions, institutional expectations, reform pressures, and personal beliefs about teaching (Chen, 2021; Jiang et al., 2021). In digital professional development, teachers may experience both positive and negative emotions. They may feel anxiety when facing unfamiliar tools, frustration when technology fails, or uncertainty when institutional expectations exceed their readiness. Yet, they may also

experience interest, enjoyment, hope, satisfaction, and professional pride when they successfully learn and apply new digital practices.

Positive emotions matter because they can support teachers' motivation to keep learning. MacIntyre et al. (2019) noted that positive psychology in education highlights the role of strengths, engagement, well-being, and meaningful growth. Applied to teacher professional development, this perspective suggests that positive emotions can encourage teachers to interpret digital challenges as opportunities rather than threats. A teacher who feels hopeful about digital teaching may persist even when facing technical difficulties. A teacher who feels satisfaction after a successful digital lesson may be more willing to refine and reuse technology-enhanced strategies. Thus, positive emotions may operate as an affective foundation for sustainable lifelong learning.

The relationship between lifelong learning orientation and positive emotions is reciprocal, but this study conceptualizes lifelong learning orientation as a key antecedent. Teachers who already value continuous learning may be more likely to experience curiosity, hope, and enjoyment during digital professional development because they interpret novelty as part of professional growth. Such teachers may also be less threatened by temporary failure because they understand learning as gradual and developmental (Buric & Macuka, 2018). Therefore, the following proposition is proposed:

P2: Teachers' lifelong learning orientation positively influences their positive emotions in digital professional development.

Positive Emotions and Digital Teaching Self-Efficacy

Digital teaching self-efficacy refers to teachers' belief in their capability to use digital technologies effectively for instructional purposes. It is different from general digital skills because it involves teachers' confidence in applying technology to support teaching, learning, assessment, communication, and classroom engagement. A teacher may know how to use a digital tool technically, but still feel unsure about whether it can be used effectively with students. Therefore, digital teaching self-efficacy links technological competence with pedagogical confidence.

Recent studies have increasingly emphasized the role of self-efficacy in digitally mediated teaching (Stavermann et al., 2025). Teachers with higher digital self-efficacy are more likely to experiment with technology, persist through challenges, and integrate digital tools in more pedagogically meaningful ways. The digital competence literature has also suggested that teachers' professional development should not only build operational skills but also support teachers' confidence and critical judgment in technology integration (Fernández-Batanero et al., 2022; Garzón-Artacho et al., 2021). This is especially relevant in the post-pandemic, AI-mediated education landscape, where teachers are expected to navigate online platforms, digital assessment, student data, and generative tools more independently.

Positive emotions may strengthen digital teaching self-efficacy because emotions shape how teachers interpret their own capability. Enjoyment can reduce the fear of experimentation.

Hope can sustain effort during uncertain learning processes. Pride can reinforce teachers' belief in their capacity for digital innovation. Satisfaction can confirm that technology use is worthwhile when students respond positively. In this way, positive emotions are not merely outcomes of successful learning; they may become psychological resources that help teachers develop stronger beliefs in their own digital teaching capacity. This aligns with research showing that teacher emotions and self-efficacy are closely connected to professional engagement and instructional change (Chen, 2021; Jiang et al., 2021).

In digital professional development, the emotional experience of small success may be particularly powerful. For example, when a teacher successfully uses an interactive quiz, a collaborative online board, or a digital formative assessment tool, the experience can lead to satisfaction and confidence. These emotions can encourage the teacher to try more complex forms of technology-enhanced teaching. Therefore, the following proposition is proposed:

P3: Positive emotions in digital professional development positively influence teachers' digital teaching self-efficacy.

Digital Teaching Self-Efficacy and Technology-Enhanced Teaching Practices

In this study, technology-enhanced teaching practices include digital formative assessment, interactive multimedia explanation, online collaboration, differentiated digital materials, student-centred inquiry activities, digital storytelling, learning analytics-supported feedback, and AI-assisted instructional design (Dogan & Adams, 2018; Nagel & Amdam, 2025). Their effectiveness depends on pedagogical intention rather than the mere presence of digital tools. The literature on technology integration has repeatedly shown that teachers are central to the educational value of digital technologies. Timotheou et al. (2023) argued that the impact of digital technologies on education depends on factors such as school digital capacity, leadership, infrastructure, teacher competence, and implementation conditions. This implies that technology does not transform teaching on its own. Instead, teachers must interpret technology's affordances, align tools with learning objectives, and make context-sensitive decisions about classroom use. Similarly, Mishra et al. (2023) emphasized that the emergence of generative AI requires renewed attention to teachers' technological, pedagogical, and content knowledge, because teachers must now evaluate digital outputs and guide students' responsible use of intelligent tools.

Digital teaching self-efficacy likely influences whether teachers move from passive technology adoption to active pedagogical redesign. Teachers with stronger self-efficacy may feel more capable of experimenting with interactive activities, modifying digital resources, solving technical problems, and reflecting on student engagement. They may also be more willing to use technology for higher-order teaching purposes, such as collaboration, creativity, critical thinking, and personalized learning. By contrast, teachers with lower digital teaching self-efficacy may limit their use of technology to basic presentation, communication, or administrative functions. Therefore, digital teaching self-efficacy functions as a practical and psychological condition for technology-enhanced teaching (Hu et al., 2025). It allows teachers

to translate digital professional learning into classroom action. Based on this reasoning, the following proposition is proposed:

P4: Digital teaching self-efficacy positively influences teachers' technology-enhanced teaching practices.

The Mediating Role of Positive Emotions

Although digital professional development can provide teachers with knowledge and skills, the pathway from professional learning to technology-enhanced practice is not always direct. Teachers may participate in digital training, but whether they transfer their learning to classroom practice may depend on how they emotionally interpret the learning experience. Positive emotions may mediate this process by converting professional development experiences into confidence, motivation, and willingness to experiment (Cepa-Rodriguez, 2025).

A positive emotional response to professional development may emerge when teachers perceive training as useful, supportive, and connected to their classroom realities. Such emotions can make teachers more open to risk-taking and less fearful of failure. For instance, a teacher who enjoys and feels encouraged during a digital mentoring session may be more willing to test a new digital assessment method. A teacher who feels professional pride after receiving peer recognition may become more motivated to develop further technology-enhanced lessons. In this way, positive emotions may explain why some teachers transform digital professional development into practice while others remain at the level of passive participation (Arstorp, 2024).

This mediating logic also responds to a gap in the existing literature. Much research on digital professional development focuses on training design, digital competence, or technology acceptance, but fewer studies examine the affective processes through which teachers internalize and enact digital learning. By positioning positive emotions as a mediator, the present study emphasizes the human and emotional processes through which professional development becomes pedagogical change. Therefore, the following proposition is proposed:

P5: Positive emotions mediate the relationship between digital professional development and teachers' technology-enhanced teaching practices.

Professional Identity Reconstruction as a Moderating Mechanism

Digital transformation can challenge teachers' professional identity (Bond et al., 2018). Teachers who previously viewed themselves as experienced, competent, and pedagogically confident may feel unsettled when new technologies disrupt familiar teaching routines. At the same time, digital professional development may also create opportunities for teachers to reconstruct their identity as adaptive, innovative, collaborative, and future-oriented educators. Professional identity reconstruction is the process by which teachers reinterpret who they are as professionals in response to changing pedagogical, technological, and institutional conditions.

Teacher identity is not fixed; it is continuously formed through experience, emotion, reflection, and social interaction. Jiang et al. (2021) showed that teacher emotions and professional identity are closely intertwined during reform processes. In digital professional

development, positive emotions may support identity reconstruction by helping teachers see themselves as capable digital learners rather than as teachers forced to comply with technological change. For example, a teacher who experiences pride after successfully designing a digital lesson may begin to see digital innovation as part of their professional identity. Another teacher who feels joy in helping colleagues use digital tools may reconstruct their identity from an isolated practitioner to a digital mentor.

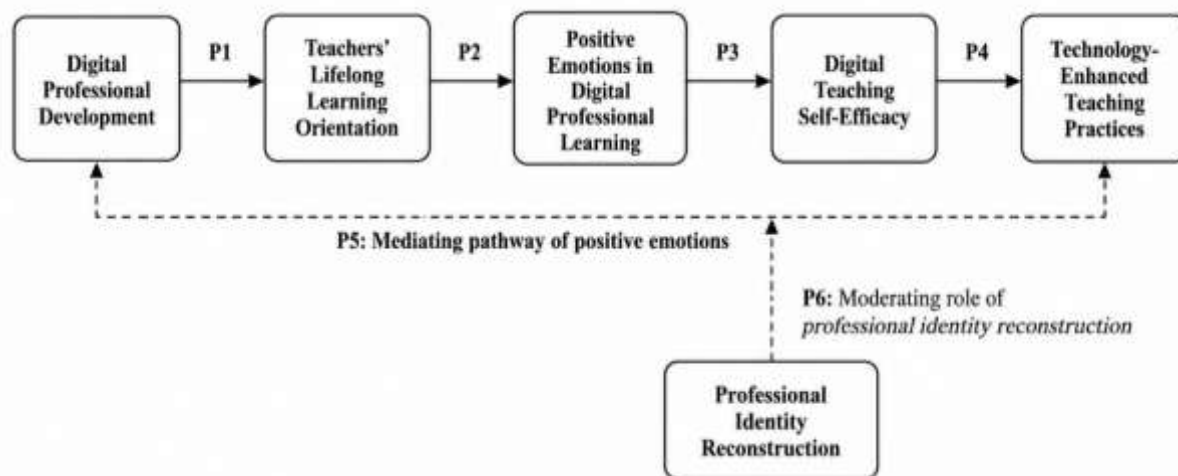
Professional identity reconstruction may strengthen the relationship between positive emotions and technology-enhanced teaching practices. When teachers internalize positive digital learning experiences into their professional identity, they may be more likely to sustain technology-enhanced teaching beyond temporary training effects (Hirsch & Rubach, 2024). In contrast, teachers who experience positive emotions but do not connect these experiences to their professional identity may engage in short-term experimentation without long-term pedagogical change. Therefore, professional identity reconstruction can be viewed as a boundary condition that determines whether positive emotions are translated into sustained technology-enhanced practices. Based on this reasoning, the following proposition is proposed: **P6:** Professional identity reconstruction strengthens the positive relationship between positive emotions and technology-enhanced teaching practices.

Conceptual Framework of the Study

Drawing on the literature above, this study proposes a conceptual framework linking digital professional development, lifelong learning orientation, positive emotions, digital teaching self-efficacy, professional identity reconstruction, and technology-enhanced teaching practices. The framework assumes that digital professional development supports teachers' lifelong learning orientation by providing opportunities for continuous, collaborative, and practice-based learning. Lifelong learning orientation, in turn, encourages positive emotions because teachers who value continuous growth are more likely to experience digital learning as meaningful and professionally enriching. Positive emotions strengthen digital teaching self-efficacy, which subsequently supports technology-enhanced teaching practices. In addition, positive emotions are proposed to mediate the relationship between digital professional development and technology-enhanced teaching practices. In contrast, professional identity reconstruction is expected to strengthen the influence of positive emotions on teaching practices. Although the present study adopts a narrative inquiry design, the propositions provide a conceptual structure for interpreting teachers' stories. In qualitative terms, these propositions guide narrative exploration rather than statistical testing. This approach allows the study to retain theoretical clarity while remaining sensitive to the lived, emotional, and contextual nature of teachers' digital professional learning. Figure 1 summarizes the proposed relationships among these constructs.

Figure 1.

Conceptual framework of teachers' lifelong learning in digital professional development



METHODOLOGY

Research Design

This study adopted a qualitative narrative inquiry design to explore how teachers construct meaning from their lifelong learning experiences in digital professional development and how positive emotions shape their technology-enhanced teaching practices. Narrative inquiry was considered appropriate because the study does not merely seek to identify teachers' digital skills or measure their level of technology acceptance. Instead, it aimed to understand how teachers narrate their professional learning journeys, emotional transitions, identity reconstruction, and pedagogical changes over time. In this sense, teachers' stories are treated as meaningful accounts of lived experience rather than as simple descriptions of participation in professional development.

Narrative inquiry is particularly suitable for research on teacher learning because teachers' professional lives are shaped by temporality, social relationships, institutional contexts, and personal interpretations of change. Clandinin (2022) emphasized that narrative inquiry allows researchers to examine experience through the dimensions of time, place, and sociality. Kim (2016) similarly argued that narrative inquiry enables researchers to craft and analyze stories in ways that preserve the complexity of participants' voices and lived meanings. In the present study, this methodological orientation allows the researcher to examine how teachers move from digital uncertainty to confidence, from individual learning to collegial participation, and from technical adoption to technology-enhanced teaching practices.

Although the study is qualitative, it is guided by the conceptual framework. The framework provides theoretical sensitivity for understanding the relationships among digital professional development, lifelong learning orientation, positive emotions, digital teaching self-efficacy, professional identity reconstruction, and technology-enhanced teaching practices. However, the study did not test these propositions statistically. Instead, the propositions serve as narrative guides for interpreting teachers' stories. This approach allows the study to retain

theoretical coherence while remaining open to unexpected meanings emerging from the participants' narratives.

Research Context

The study was situated within the context of school-based digital professional development, in which teachers were increasingly required to participate in online or blended learning activities focused on technology integration. These activities included online workshops, webinar-based training, professional learning communities, digital peer mentoring, self-directed learning through educational platforms, and school-supported technology integration initiatives. The context was appropriate because digital professional development had become an important pathway for teachers to update their pedagogical knowledge and build confidence in technology-enhanced teaching.

The participating teachers worked in primary and secondary school settings where digital teaching tools were gradually integrated into daily instructional practice. These tools included learning management systems, interactive presentation platforms, digital assessment applications, video-based resources, online collaborative spaces, and AI-supported teaching resources. The study did not focus on one specific technology. Instead, it examined teachers' broader professional learning experiences across multiple digital tools and platforms. This wider focus was necessary because teachers' digital professional learning is usually fragmented and cumulative, shaped by both formal and informal learning opportunities.

Participants and Sampling

Participants were selected through purposive sampling because the study required teachers with direct experience of digital professional development and the ability to provide rich narrative accounts of emotional and pedagogical change. Qualifying digital professional development included the forms represented in the study context: online workshops, webinar-based training, professional learning communities, digital peer mentoring, self-directed learning through educational platforms, and school-supported technology-integration initiatives. Given the variation in the structure, duration, and frequency of these professional-learning formats, eligibility emphasized recent, relevant engagement and evidence of classroom application. Specifically, participants were required to have engaged in at least one relevant form of digital professional development within the previous two years and to have attempted to apply digital technologies in classroom teaching. They also needed to be willing to share reflective accounts of their professional learning experiences and to provide interview data, reflective notes, or teaching artefacts for research purposes.

A total of 24 teachers were invited to participate, and 18 teachers agreed and completed all stages of data collection. The participants represented different teaching backgrounds, school levels, subject areas, and levels of teaching experience. Their teaching experience ranged from early-career teachers to senior teachers with more than 20 years of professional practice. This variation was important because teachers' emotional responses to digital professional

development may differ by career stage, prior digital confidence, subject demands, and institutional expectations.

The sample size was appropriate for narrative inquiry because the aim was not statistical representativeness, but depth of experience and richness of narrative meaning. Narrative inquiry typically prioritizes deep engagement with participants' stories over broad sample coverage. Therefore, the sample was considered sufficient when the data provided recurring narrative patterns, emotional turning points, and diverse examples of technology-enhanced teaching practices.

Data Collection

Data were collected through three main sources: semi-structured narrative interviews, reflective learning journals, and digital teaching artefacts. Using multiple data sources allowed the researcher to understand teachers' experiences from different angles and strengthen the credibility of the findings. Interviews captured spoken narratives, reflective journals provided more personal and time-sensitive accounts of emotion, and teaching artefacts offered concrete evidence of how teachers translated digital professional learning into classroom practice.

The first data source was semi-structured narrative interviews. Each participant took part in one interview lasting approximately 45 to 70 minutes. The interview protocol was designed to encourage participants to tell stories rather than provide short factual answers. Questions focused on teachers' experiences of digital professional development, memorable learning moments, positive and difficult emotions, sources of confidence, collegial support, identity change, and examples of technology-enhanced teaching. Follow-up questions clarified meaning, explored emotional turning points, and encouraged participants to connect professional development experiences with classroom practice.

The second data source was reflective learning journals. After the interview, participants wrote two short reflective entries. The first entry asked them to describe a memorable positive emotional experience during digital professional development. The second entry asked them to reflect on how that experience influenced their technology-enhanced teaching. These journals were useful because some teachers could express their feelings more openly in writing than in interviews. They also helped capture the emotional texture of professional learning, including confidence, enjoyment, pride, hope, and satisfaction.

The third data source was digital teaching artefacts. Participants were invited to share examples of teaching materials or classroom practices developed after they participated in digital professional development. These artefacts included digital lesson plans, interactive slides, online quiz designs, screenshots of learning management system activities, digital feedback templates, collaborative student tasks, and reflective notes on AI-assisted teaching preparation. The artefacts were not evaluated as indicators of teaching quality. Instead, they provided contextual evidence of how teachers' learning narratives connected to actual teaching practices.

Interview Protocol

The interview protocol was developed based on the research questions and conceptual framework. It focused on teachers' experiences of digital professional development, emotional turning points, digital teaching confidence, changes in professional identity, and examples of technology-enhanced teaching. The full interview protocol is provided in the Supplementary File.

Data Analysis

Data analysis followed a thematic narrative approach informed by Braun and Clarke's (2021) reflexive thematic analysis. Interview transcripts, reflective journals, and teaching artefacts were first read repeatedly to develop familiarity with each teacher's professional learning story. For each participant, an individual narrative profile was prepared before cross-case analysis to preserve the temporal sequence of experience.

Each narrative profile summarized five analytical elements: the participant's initial orientation toward digital teaching, the form of digital professional development experienced, salient emotional turning points, reported classroom enactment, and subsequent changes in digital teaching self-efficacy, professional identity, or willingness to continue learning. The profiles functioned as within-case analytical summaries rather than as separate participant biographies and provided the basis for the cross-case trajectory presented in Figure 2.

Coding proceeded iteratively from initial descriptive coding to focused analytical categorization and final theme development. Initial codes were generated from meaningful segments of the interviews and journals, including expressions of encouragement, new possibilities, reduced fear, peer support, growing confidence, professional recognition, learning from mistakes, and reflective selection of digital tools. Related codes were compared and consolidated into focused categories such as professional hope and renewed learning purpose, confidence through supported experimentation, collegial joy and professional belonging, and emotional translation into technology-enhanced practice. Cross-case comparison was then used to examine recurring and contrasting patterns across the 18 narrative profiles. Because coding was reflexive and iterative, codes were refined, merged, and reorganized during analysis rather than treated as a fixed numerical inventory; Table 3 therefore presents the representative coding hierarchy that underpinned the final interpretation.

The coding and theme-development process was conducted by the researcher, with the conceptual framework providing theoretical sensitivity rather than a predetermined coding template. Teaching artefacts contextualized narrated practices and connected emotional experiences with pedagogical evidence. The developing themes were repeatedly compared with interview accounts, reflective journals, narrative profiles, and teaching artefacts before being refined into the four final narrative themes. In keeping with reflexive thematic analysis, analytical credibility was supported through repeated engagement with the data and the trustworthiness procedures described below rather than inter-rater agreement statistics.

Validation of the Study

Trustworthiness was strengthened through data triangulation, participant checking, reflexive memoing, audit trail documentation, and thick description (Morse, 2015). Interview narratives, reflective journals, and teaching artefacts were compared to ensure that the themes were supported by multiple forms of evidence. Brief narrative summaries were shared with participants for confirmation, and reflexive memos documented analytic assumptions and decisions. During analysis, particular attention was focused on moments when participants hesitated, corrected themselves, or compared earlier and later teaching experiences, because these moments often revealed emotional shifts not immediately visible in the first reading of the transcripts. These strategies helped keep the findings grounded in participants' lived experiences.

RESULTS

The analysis generated four major narrative themes that explain how teachers experienced lifelong learning in digital professional development, how positive emotions emerged across their learning journeys, and how these emotions supported technology-enhanced teaching practices. The findings are presented through both narrative interpretation and visual evidence matrices to strengthen analytical clarity. Although the study is qualitative, the tables and figures are used to organize the narrative evidence, not to reduce teachers' experiences into numerical outcomes.

Table 1 (see Appendix) shows that the participants represented different teaching levels, subject areas, career stages, and digital professional development experiences. This variation enabled the study to capture diverse emotional and pedagogical narratives rather than focusing on a single digital training model or subject-specific technology practice.

To make the narrative-profile stage explicit in the findings, each participant was first examined as a within-case trajectory before cross-case comparison. Across the 18 profiles, the recurring analytical sequence considered the teacher's initial stance toward digital teaching, engagement in professional learning, salient emotional turning points, classroom experimentation, and subsequent shifts in self-efficacy, professional identity, or willingness to continue learning. The profiles were not treated as separate biographical findings, but their cross-case synthesis informed the four narrative themes and is visualized in Figure 2.

The use of multiple data sources helped the researcher understand teachers' experiences as both emotional and practical. Interviews provided extended narratives, journals deepened the emotional descriptions, and artefacts showed how teachers enacted their professional learning in classroom practice.

The coding process showed that teachers' positive emotions were not isolated feelings. Instead, they were embedded in learning conditions, peer relationships, professional identity, and classroom experimentation. The final themes were therefore written as narrative themes to preserve the developmental movement of teachers' experiences.

Figure 2.

Narrative trajectory of teachers' digital professional learning

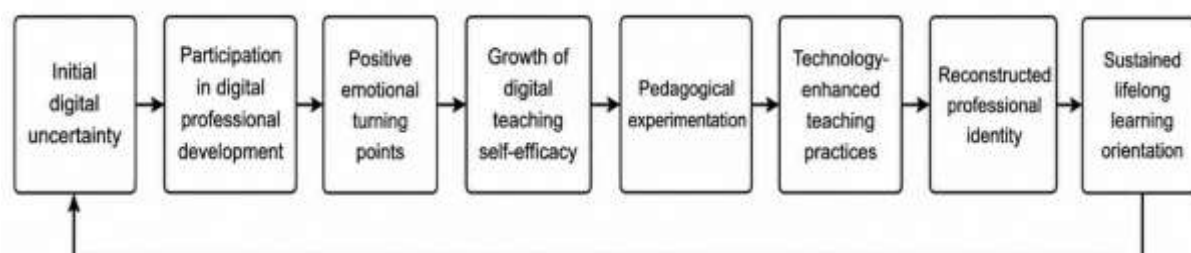


Figure 2 illustrates the common narrative trajectory identified across the participants' stories. Many teachers did not begin their digital professional development journey with full confidence. Instead, they moved through uncertainty, gradual participation, emotional turning points, and classroom experimentation before reconstructing themselves as more adaptive and digitally capable teachers.

Theme 1: Digital Professional Development as Renewed Professional Hope

The first theme shows that digital professional development generated renewed professional hope among many teachers. At the beginning of their narratives, several participants described digital teaching as something they had previously associated with pressure, additional workload, or technical difficulty. Some teachers reported that they joined online professional development because their school required it, while others participated because they felt they were falling behind their colleagues or students. However, their stories also revealed that meaningful digital professional development gradually changed how they understood their own capacity to learn.

For numerous participants, hope emerged when they saw a clear connection between digital tools and student learning. Teachers were not motivated simply because a tool was new or fashionable. They became hopeful when they realized that digital technologies could help them solve long-standing classroom problems, such as low participation, delayed feedback, difficulty explaining abstract concepts, or lack of student confidence. For example, one mathematics teacher explained that the use of online quizzes allowed her to identify students' misconceptions immediately, which led her to conclude, "Digital tools were not only for decoration, but really can help teaching." This moment shifted her view of digital professional development from a compulsory training activity to a personally meaningful learning opportunity.

Several senior teachers also narrated professional hope as a form of self-renewal. They had initially viewed digital teaching as something more suitable for younger teachers. However, after participating in peer-supported digital learning, they began to see themselves as still capable of professional growth. One teacher with more than 20 years of experience reflected, "I felt I was not outdated yet because I could still learn new ways to engage students." This kind of statement suggests that positive emotions were closely connected to professional identity.

Hope was not only about learning technology; it was about restoring teachers' belief that they could continue growing in a changing educational environment.

This theme supports P1 by showing that digital professional development can strengthen teachers' lifelong learning orientation when it is relevant, supportive, and connected to classroom improvement. Teachers' narratives indicated that professional development became meaningful when it helped them imagine better teaching possibilities. In this sense, hope functioned as an emotional entry point into lifelong learning.

Table 4.

Cross-case evidence for Theme 1

Narrative evidence	Emotional meaning	Link to conceptual framework
Teachers described digital professional development as helping them "see new teaching possibilities."	Hope and future-oriented learning	Supports the link between digital professional development and lifelong learning orientation
Senior teachers reported feeling that they were "still able to learn."	Professional renewal	Connects digital learning with identity and lifelong growth
Teachers valued training when it solved real classroom problems.	Meaningfulness and relevance	Shows that professional development must be pedagogically grounded
Teachers became more willing to join future training after early success.	Sustained learning motivation	Indicates strengthened lifelong learning orientation

Theme 2: Positive Emotions as a Bridge to Digital Teaching Self-Efficacy

The second theme concerns how positive emotions supported teachers' digital teaching self-efficacy. Many participants described a turning point when they successfully used a digital tool in the classroom for the first time. These successes were often modest, such as creating an online quiz, using an interactive slide, organizing a student discussion in a digital platform, or sharing a video-based explanation. However, these experiences had a substantial emotional impact. Teachers repeatedly described relief, satisfaction, pride, and confidence after seeing students respond positively.

One primary school teacher explained that she had been afraid of using digital formative assessment because she worried that students might not know how to log in or that the internet connection might fail. After receiving guidance from a colleague, she tried a simple quiz at the end of a lesson. When students became excited and asked to see their scores, she felt "a bit surprised and happy" because the technology energized the classroom. This small success made her more confident to use similar tools in later lessons. Her story shows how positive emotion transformed perceived difficulty into perceived capability.

Another teacher described confidence as something built through repeated attempts rather than immediate mastery. He explained that his first online collaborative activity was not smooth because several students submitted answers in the wrong section. However, instead of

abandoning the tool, he revised the instructions and tried again. When the second attempt worked better, he felt proud because he had "solved the problem by learning." This narrative suggests that digital teaching self-efficacy was not simply based on technical competence. It was also shaped by emotional resilience and the belief that mistakes could be part of the learning process.

Across the data, confidence was closely related to supportive professional development environments. Teachers were more willing to experiment when trainers, colleagues, or online community members normalized mistakes and offered practical solutions. In contrast, participants were less positive when training moved too fast, became too technical, or focused too much on performance outcomes. Therefore, positive emotions emerged most strongly when teachers experienced digital learning as safe, gradual, and professionally respectful.

This theme supports **P2** and **P3** by showing that teachers with stronger lifelong learning orientation were more likely to interpret digital challenges positively. At the same time, positive emotions helped them develop stronger digital teaching self-efficacy. In teachers' stories, confidence was not only a psychological belief; it was a narrative achievement constructed through practice, support, and emotional validation.

Table 5.

Positive emotions and digital teaching self-efficacy

Positive emotion	How it appeared in teachers' narratives	Influence on digital teaching self-efficacy
Hope	Teachers believed digital tools could improve student engagement	Increased willingness to continue professional learning
Enjoyment	Teachers enjoyed interactive student responses during digital activities	Reduced fear of experimenting with new tools
Satisfaction	Teachers felt successful when digital lessons worked smoothly	Reinforced belief in their ability to teach with technology
Pride	Teachers felt proud when colleagues or students appreciated their digital teaching	Strengthened professional confidence
Curiosity	Teachers became interested in exploring new platforms or AI-supported resources	Encouraged self-directed digital learning
Belonging	Teachers felt supported in online professional communities	Reduced isolation and increased persistence

Theme 3: Online Professional Communities as Emotional Learning Spaces

The third theme reveals that online professional communities functioned as emotional learning spaces. Participants frequently referred to peer support as one of the most meaningful aspects of their digital professional development. Although formal workshops introduced tools and strategies, teachers often sustained their learning through informal digital communities, including messaging groups, subject-based online networks, school learning teams, and social media teacher communities.

Teachers valued these spaces because they provided quick access to practical advice, shared teaching materials, encouragement, and emotional reassurance. One teacher noted that when she faced a problem with an online discussion platform, another teacher in the same professional learning group helped her within minutes. This immediate support helped her feel less anxious and more willing to continue. Another participant explained that seeing other teachers share imperfect but useful digital activities made her feel more comfortable because she realized that "everyone is still learning."

Collegial joy was a recurring emotional pattern in this theme. Teachers felt happy not only when they received help, but also when they contributed to others' learning. Some participants described how they began as passive observers in online groups but gradually became resource sharers or informal mentors. This shift was emotionally significant because it allowed teachers to see themselves as contributors to professional knowledge. One teacher explained that when another colleague used her digital lesson template, she felt "very encouraged" because her own learning had become useful to others.

Professional recognition also played an important role. Teachers felt more motivated when colleagues, students, or school leaders acknowledged their digital teaching efforts. This recognition did not need to be formal. Simple comments such as "your activity worked well" or "can you share this with us?" were enough to generate pride and belonging. These findings suggest that digital professional development should not be understood solely as an individual learning process. It is also a relational and emotional process shaped by professional communities.

This theme supports the role of professional identity reconstruction in the conceptual framework. As teachers participated in online professional communities, some began to reconstruct their identities from hesitant technology users to active learners, collaborators, and digital resource contributors. Therefore, professional identity reconstruction appears to strengthen the emotional pathway from positive emotions to technology-enhanced teaching practices.

Figure 3.

Emotional-pedagogical transformation model

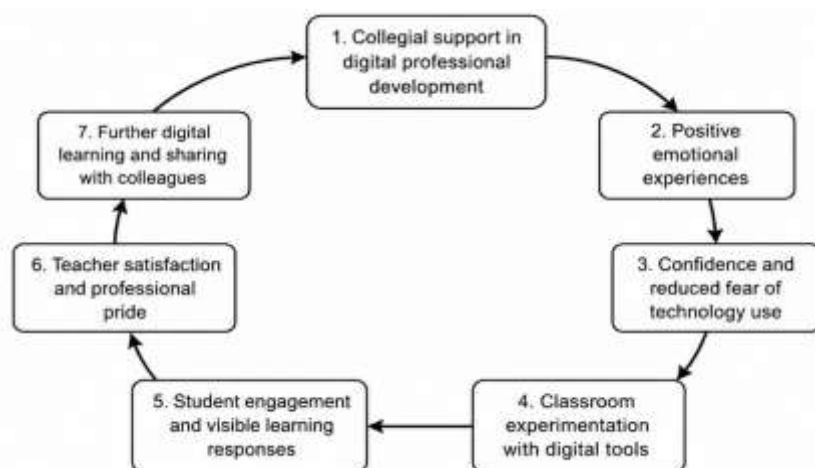


Figure 3 shows the emotional-pedagogical cycle emerging from the narratives. Positive emotions did not appear only at the end of successful digital teaching. Rather, they circulated throughout the learning process and encouraged teachers to continue experimenting, reflecting, and sharing.

Table 6.

Online professional communities and emotional learning

Community experience	Emotional response	Professional learning outcome
Receiving quick technical help from peers	Relief and reduced anxiety	Continued use of digital tools
Observing other teachers' digital practices	Curiosity and reassurance	Increased willingness to experiment
Sharing resources with colleagues	Pride and recognition	Strengthened identity as contributor
Discussing classroom problems online	Belonging and trust	More reflective digital teaching decisions
Receiving positive feedback from peers	Encouragement and satisfaction	Greater motivation for future professional learning
Helping less confident colleagues	Professional pride	Identity reconstruction as digital mentor

Theme 4: From Positive Emotions to Technology-Enhanced Teaching Practices

The fourth theme explains how teachers translated positive emotions into technology-enhanced teaching practices. The narratives showed that teachers' use of technology became more pedagogically purposeful over time. Early on, some teachers used digital tools mainly because they were introduced during training or required by school policy. However, as they gained confidence and experienced positive emotional outcomes, they began to select tools more intentionally based on students' learning needs.

Several teachers used technology to increase student participation. Teachers used interactive quizzes, polling tools, collaborative documents, and online discussion boards to make students more active during lessons. Teachers reported that these tools helped quieter students participate more comfortably and allowed teachers to see student responses more quickly. A language teacher explained that digital discussion boards helped shy students express their ideas in writing. This made the teacher feel that technology could create "another space for students to speak."

Other participants used digital tools to improve explanation and visualization. Science and mathematics teachers described using simulations, videos, digital diagrams, and step-by-step visual materials to explain abstract concepts. These practices were associated with satisfaction because teachers could see students understanding concepts more clearly. One

physics teacher explained that simulations helped students "see the movement" rather than only imagine it. This changed his teaching practice because he began to design lessons around visual exploration before formal explanation.

Digital formative assessment was another important practice. Teachers used online quizzes, exit tickets, digital rubrics, and instant feedback tools to monitor student understanding. These practices helped teachers adjust instruction more quickly. Participants described feeling more confident because they could identify learning difficulties during the lesson rather than after marking homework. This shows that technology-enhanced teaching was connected to teachers' sense of instructional control and pedagogical responsiveness.

Some teachers also used technology to support differentiated learning. They prepared video explanations, extra digital exercises, online reading materials, or flexible tasks for students with different learning needs. This was especially meaningful for teachers who wanted to support slower learners without making them feel embarrassed in class. Teachers reported positive emotions when they saw students become more independent or more willing to try.

However, the findings also show that teachers became more selective with technology over time. At the beginning, some teachers tried many tools because they were excited after professional development. Later, they realized that not every tool improved learning. This reflective shift matters because it shows a move from technology adoption to pedagogical maturity. Teachers began to ask whether a digital tool improved engagement, understanding, feedback, collaboration, or inclusion. This suggests that positive emotions did not lead to blind technology use. Instead, when combined with reflection and professional identity reconstruction, positive emotions supported more thoughtful technology-enhanced teaching.

This theme provides narrative support for P4, P5, and P6. Teachers' accounts indicated that stronger digital teaching self-efficacy was associated with more sustained technology-enhanced teaching practices. The narratives also suggested a mediating pathway in which positive emotions helped translate digital professional development into classroom experimentation and persistence. Professional identity reconstruction appeared to strengthen this pathway, particularly when teachers began to view themselves as adaptive digital educators.

DISCUSSION

This study explored teachers' lifelong learning in digital professional development through a narrative inquiry into positive emotions and technology-enhanced teaching practices. The findings show that teachers' digital professional learning is an emotional, social, and identity-related process through which they reinterpret professional capability, confidence, and pedagogical purpose. Across the narratives, teachers moved from uncertainty to renewed hope, from hesitant participation to supported experimentation, and from tool-based adoption to more purposeful technology-enhanced teaching.

Digital Professional Development as Emotional Lifelong Learning

The findings suggest that digital professional development can strengthen teachers' lifelong learning orientation when they experience it as pedagogically meaningful and emotionally supportive. Teachers did not value digital professional development merely because it introduced new tools. Instead, they described it as meaningful when it helped them solve practical classroom problems, such as increasing student participation, improving feedback, supporting visual explanation, and designing more flexible learning activities. This supports **P1**, which proposed that digital professional development supports teachers' lifelong learning orientation.

This finding is consistent with the view that effective teacher professional development should be sustained, collaborative, practice-based, and connected to teachers' classroom realities (Darling-Hammond et al., 2017; Philipsen et al., 2019). However, the present study extends this argument by showing that meaningful digital professional development also has an emotional function. It can renew teachers' sense of professional possibility and help them view continuous digital learning as part of their professional growth rather than as an external demand (Licen & Prosen, 2024).

The narratives also show that professional hope was particularly important for teachers who initially felt uncertain or less confident with technology. Some participants had viewed digital teaching as more suitable for younger or more technically skilled teachers. Yet, after experiencing gradual support and small classroom successes, they began to see themselves as still capable of learning and adapting. This suggests that lifelong learning in digital professional development is sustained not by access to training alone, but by emotionally meaningful experiences that restore teachers' belief in their own professional development (Ivanov, 2025; Liu et al., 2025).

Positive Emotions, Self-Efficacy, and Pedagogical Experimentation

The study's second major contribution concerns the role of positive emotions in teachers' movement from digital professional learning to pedagogical experimentation. Hope, enjoyment, satisfaction, pride, curiosity, and belonging emerged as important affective resources in teachers' narratives. These emotions appeared when teachers experienced small successes, received peer support, observed student engagement, or felt recognized by colleagues. This supports **P2** and **P3**, which proposed that lifelong learning orientation encourages positive emotions, and that positive emotions strengthen teachers' digital teaching self-efficacy.

This finding contributes to the teacher emotion literature by showing that emotions are not secondary to professional learning. Rather, emotions influence how teachers interpret digital change and whether they continue experimenting with technology. Chen (2021) argued that professional goals, institutional conditions, classroom interactions, and socio-cultural contexts shape teacher emotions. This study supports this view by showing that teachers' positive emotions resulted from the interaction of professional development design, collegial support, student response, and personal learning orientation (Juric et al., 2026).

The findings also extend research on teacher digital competence. Previous studies have emphasized that teachers' digital competence is multidimensional and requires continuous professional development (Fernández-Batanero et al., 2022; Garzón-Artacho et al., 2021). This study adds that digital competence development is emotionally mediated. Teachers became more confident not only because they learned to use digital tools, but because positive emotional experiences confirmed they could use technology meaningfully in their classrooms (Cid-Martinez et al., 2025).

The concept of "small success" was especially important. Many participants described modest but meaningful moments, such as conducting an online quiz, using a simulation to explain an abstract concept, or receiving active student responses through a digital platform. These moments reduced fear, strengthened confidence, and encouraged further experimentation. Thus, positive emotions functioned as a bridge between digital professional development and technology-enhanced teaching practice. This finding supports **P4** and **P5** by showing that digital teaching self-efficacy promotes technology-enhanced teaching, while positive emotions help mediate the pathway from professional development to classroom innovation.

Professional Identity Reconstruction and Sustainability of Practice

The findings further suggest that professional identity reconstruction plays an important role in sustaining technology-enhanced teaching practices. Teachers who began to see themselves as adaptive digital learners, reflective practitioners, resource contributors, or informal peer mentors were more likely to continue using technology purposefully. This supports **P6**, which proposed that professional identity reconstruction strengthens the relationship between positive emotions and technology-enhanced teaching practices.

This finding is consistent with Jiang et al. (2021), who showed that teacher emotions and professional identity are closely connected during educational change. In this study, positive emotions helped teachers reinterpret themselves as capable participants in digital transformation. For instance, teachers who felt proud after helping colleagues with digital tools began to see themselves not only as learners, but also as contributors to professional knowledge. Similarly, teachers who felt satisfied after improving student engagement began to view digital pedagogy as compatible with their existing teaching values.

Professional identity reconstruction therefore appears to strengthen the sustainability of digital teaching practices. Positive emotions may encourage experimentation, but identity reconstruction helps sustain change beyond isolated training experiences. When teachers internalize digital learning as part of their professional identity, technology-enhanced teaching is more likely to become a sustained practice rather than a temporary response to institutional pressure. This finding is especially important in the current educational landscape, where teachers are expected to respond to rapid technological change, including the growing use of generative artificial intelligence. As Mishra et al. (2023) argued, emerging technologies require

teachers to rethink the relationship among technology, pedagogy, and content knowledge. The present study adds that this rethinking is also emotional and identity-related.

Contribution to Narrative Inquiry and Digital Teacher Development

Beyond the specific research propositions, this study demonstrates the value of narrative inquiry for understanding teachers' digital professional learning. Narrative inquiry captured the temporal movement of teachers' experiences, including initial uncertainty, participation in digital professional development, positive emotional turning points, growth of self-efficacy, classroom experimentation, professional identity reconstruction, and sustained lifelong learning. These processes may be difficult to understand through survey-based measures alone. This methodological contribution is important because teachers' digital development is often more complex than simple categories such as "ready" or "not ready," "competent" or "not competent," and "adopter" or "non-adopter." The narratives showed that teachers may be confident in one digital practice but uncertain in another, enthusiastic about one tool but cautious about another, and emotionally encouraged by students while still pressured by institutional expectations. Narrative inquiry therefore provides a more human-centred way to understand digital professional development as lived experience.

Overall, the study contributes to the literature by positioning positive emotions as affective mechanisms that link digital professional development with technology-enhanced teaching practices. It also shows that digital teaching self-efficacy and professional identity reconstruction are important conditions for sustaining pedagogical change. In doing so, the study moves beyond a narrow skills-based view of teacher digital development and argues that sustainable digital transformation depends on teachers' emotional experiences, collegial support, reflective confidence, and evolving professional identities.

CONCLUSION

This study examined teachers' lifelong learning in digital professional development through a narrative inquiry into positive emotions and technology-enhanced teaching practices. Drawing on narrative interviews, reflective journals, and digital teaching artefacts, the study shows that digital professional development is not merely a technical process of learning new tools. The teachers' accounts show that digital professional development became meaningful when it helped them regain confidence, learn with colleagues, and connect new digital practices with their existing teaching values.

The findings indicate that teachers often began their digital professional learning with uncertainty or limited confidence. However, when digital professional development was relevant to classroom needs, supported by colleagues, and connected to visible student engagement, teachers experienced positive emotions such as hope, enjoyment, satisfaction, pride, curiosity, and belonging. These emotions supported teachers' willingness to continue learning, experiment with digital tools, and develop stronger digital teaching self-efficacy. The findings also show that technology-enhanced teaching practices became more sustainable

when teachers began to view themselves as adaptive learners, reflective practitioners, peer contributors, and digitally capable educators.

Practical and Theoretical Implications

The findings offer several implications for research and practice. Theoretically, this study extends the literature on teacher professional development by showing that digital professional learning is not only a process of competence development, but also an emotional and identity-related experience. Positive emotions such as hope, enjoyment, confidence, pride, and belonging appear to support teachers' lifelong learning orientation and help them translate digital professional development into technology-enhanced teaching practices. The study also contributes to digital competence research by highlighting that teachers' digital teaching self-efficacy is shaped not only by technical training, but also by emotionally meaningful learning experiences and professional identity reconstruction.

Practically, the findings suggest designing digital professional development around teachers' real classroom needs rather than digital tools alone. Teachers are more likely to sustain digital learning when they can clearly see how technology improves student engagement, feedback, interaction, or conceptual understanding. Professional development programmes should therefore provide emotionally safe spaces where teachers can practise, make mistakes, receive peer support, and gradually build confidence. Schools should also strengthen digital professional learning communities, as collegial support can generate professional belonging and encourage sustained technology-enhanced practice. Overall, digital transformation in education should be treated as a human process that requires time, trust, recognition, and professional autonomy, not merely as the provision of platforms or technical training.

Limitations and Future Research

This study has several limitations. First, the qualitative narrative inquiry design allowed a rich understanding of teachers' experiences, but the findings are not intended to be statistically generalisable. Future studies may use mixed-methods or longitudinal designs to examine how positive emotions, digital teaching self-efficacy, and technology-enhanced teaching practices develop over time. Second, the study relied mainly on teachers' self-reported narratives, reflective journals, and teaching artefacts. Future research could include classroom observations, student feedback, or digital learning analytics to provide additional evidence of how technology-enhanced practices influence teaching and learning outcomes.

This study focused mainly on positive emotions. Although this focus helps explain the supportive role of hope, confidence, and professional belonging, teachers' digital professional development also involves anxiety, frustration, fatigue, and resistance. Future studies could examine how positive and negative emotions interact during teachers' digital learning journeys. Finally, as generative artificial intelligence and other emerging technologies continue to reshape education, future research should explore how teachers emotionally and professionally respond to AI-supported teaching, digital ethics, and new forms of human–technology collaboration.

In conclusion, this study highlights the need to view teachers as whole professionals in digital transformation. Sustainable technology-enhanced teaching depends not only on digital infrastructure or training availability, but also on teachers' emotional experiences, professional identity, collegial support, and orientation toward lifelong learning. When digital professional development is emotionally supportive and pedagogically meaningful, teachers are more likely to transform digital learning into confident, reflective, and sustained classroom practice.

Funding: This research received no funding.

AI statement: During the preparation of this work, the authors used ChatGPT to improve language and readability. The authors reviewed and edited the content as needed and took full responsibility for the article's content.

Declaration of interest: All authors declared no competing interests.

Data Availability Statement: The qualitative data from this study include semi-structured interview transcripts, reflective learning journal excerpts, coding matrices, and anonymized digital teaching artefact summaries. Because teachers' professional experiences are narrative and potentially identifiable, full raw interview transcripts are not publicly available to protect participant confidentiality. De-identified excerpts, coding frameworks, interview protocol, and theme evidence matrices may be made available from the corresponding author upon reasonable request and subject to institutional ethical approval.

REFERENCES

- Amemasor, S. K., Oppong, S. O., Ghansah, B., Benuwa, B.-B., & Agbeko, M. (2025). The influence of digital professional development and professional learning communities in the relationship between school digital preparedness and digital instructional integration. *PLOS ONE*, 20(7), Article e0328883. <https://doi.org/10.1371/journal.pone.0328883>
- Arstorp, A.-T. (2024). Professional digital competence in teacher education. *Journal of Education for Teaching*. <https://doi.org/10.1080/13540602.2024.2379845>
- Bond, M., Marín, V. I., Dolch, C., Bedenlier, S., & Zawacki-Richter, O. (2018). Digital transformation in German higher education: Student and teacher perceptions and usage of digital media. *International Journal of Educational Technology in Higher Education*, 15, Article 48. <https://doi.org/10.1186/s41239-018-0130-1>
- Braun, V., & Clarke, V. (2021). *Thematic analysis: A practical guide*. SAGE.
- Buric, I., & Macuka, I. (2018). Self-efficacy, emotions and work engagement among teachers: A two wave cross-lagged analysis. *Journal of Happiness Studies*, 19(7), 1917–1933. <https://doi.org/10.1007/s10902-017-9903-9>
- Cabezas-González, M., Casillas-Martín, S. & Muñoz-Repiso, A.G.V. (2024). Evaluating DigiCraft for the development of digital competence: A qualitative Approach, *Journal of Social Studies Education Research*, 15(2), 231-250. <https://jsser.org/index.php/jsser/article/view/5646/673>

- Caena, F., & Redecker, C. (2019). Aligning teacher competence frameworks to 21st century challenges: The case for the European Digital Competence Framework for Educators. *European Journal of Education*, 54(3), 356–369. <https://doi.org/10.1111/ejed.12345>
- Cepa-Rodríguez, E. (2025). Digital competence in the master's degree in training for teachers: The influence of academic and emotional factors on its development. *Education Sciences*, 15(12), Article 1586. <https://doi.org/10.3390/educsci15121586>
- Chen, J. (2021). Refining the teacher emotion model: Evidence from a review of literature published between 1985 and 2019. *Cambridge Journal of Education*, 51(3), 327–357. <https://doi.org/10.1080/0305764X.2020.1831440>
- Cid-Martínez, L., Aznar-Díaz, I., Gómez-García, G., & Martínez-Domingo, J. A. (2025). A systematic review on the level of digital competence of in-service Spanish teachers according to the DigCompEdu framework. *Education Sciences*, 15(6), 655. <https://doi.org/10.3390/educsci15060655>
- Clandinin, D. J. (2022). *Engaging in narrative inquiry* (2nd ed.). Routledge. <https://doi.org/10.4324/9781003240143>
- Darling-Hammond, L., Hyler, M. E., & Gardner, M. (2017). *Effective teacher professional development*. Learning Policy Institute. <https://doi.org/10.54300/122.311>
- Deng, J., Heydarnejad, T., Farhangi, F., & Farid Khafaga, A. (2022). Delving into the relationship between teacher emotion regulation, self-efficacy, engagement, and anger: A focus on English as a foreign language teachers. *Frontiers in Psychology*, 13, Article 1019984. <https://doi.org/10.3389/fpsyg.2022.1019984>
- Dille, K. B., & Røkenes, F. M. (2021). Teachers' professional development in formal online communities: A scoping review. *Teaching and Teacher Education*, 105, Article 103431. <https://doi.org/10.1016/j.tate.2021.103431>
- Dogan, S., & Adams, A. (2018). Effect of professional learning communities on teachers and students: Reporting updated results and raising questions about research design. *School Effectiveness and School Improvement*, 29(4), 634–659. <https://doi.org/10.1080/09243453.2018.1500921>
- Dolezal, D., Motschnig, R., & Ambros, R. (2025). Pre-service teachers' digital competence: A call for action. *Education Sciences*, 15(2), 160. <https://doi.org/10.3390/educsci15020160>
- Falloon, G. (2020). From digital literacy to digital competence: The teacher digital competency framework. *Educational Technology Research and Development*, 68(5), 2449–2472. <https://doi.org/10.1007/s11423-020-09767-4>
- Fernández-Batanero, J. M., Montenegro-Rueda, M., Fernández-Cerero, J., & García-Martínez, I. (2022). Digital competences for teacher professional development: Systematic review. *European Journal of Teacher Education*, 45(4), 513–531. <https://doi.org/10.1080/02619768.2020.1827389>

- Frenzel, A. C., Daniels, L., & Burić, I. (2021). Teacher emotions in the classroom and their implications for students. *Educational Psychologist*, 56(4), 250–264.
<https://doi.org/10.1080/00461520.2021.1985501>
- Garzón-Artacho, E., Sola-Martínez, T., Romero-Rodríguez, J. M., & Gómez-García, G. (2021). Teachers' perceptions of digital competence at the lifelong learning stage. *Heliyon*, 7(7), Article e07513. <https://doi.org/10.1016/j.heliyon.2021.e07513>
- Hirsch, A.-K., & Rubach, C. (2024). Exploring the interplay between teaching strategies and digital competencies beliefs among pre-service teachers: A longitudinal study. *Education Sciences*, 14(12), Article 1342. <https://doi.org/10.3390/educsci14121342>
- Hu, X., Xu, W., Wan, Z., Liu, M., & Xu, W. (2025). Bridging self-efficacy and digital competence: A comprehensive scoping review of teachers' readiness for the digital age. *SAGE Open*.
<https://doi.org/10.1177/21582440251363716>
- Ivanov, A. (2025). Teachers' digital competencies before, during, and after the COVID-19 pandemic. *Sustainability*, 17(5), Article 2309. <https://doi.org/10.3390/su17052309>
- Jiang, H., Wang, K., Wang, X., Lei, X., & Huang, Z. (2021). Understanding a STEM teacher's emotions and professional identities: A three-year longitudinal case study. *International Journal of STEM Education*, 8, Article 51. <https://doi.org/10.1186/s40594-021-00309-9>
- Juric, J., Podrug Krstulović, L., & Mišurac, I. (2026). Professional well-being of teachers in the digital age: the role of digital competences and technostress. *Education sciences*, 16(1), 130. <https://doi.org/10.3390/educsci16010130>
- Kalymova, A., Lepeshev, D., Stukalenko, N., Argimbayeva, A., & Mazhitova, S. (2026). Model of Formation of Digital Competences of Future Teachers in the Conditions of Integration of E-Learning and Artificial Intelligence Technologies. *Journal of Curriculum Studies Research*, 8(1), 364–387. <https://doi.org/10.46303/jcsr.2026.19>
- Kim, J. H. (2016). *Understanding narrative inquiry: The crafting and analysis of stories as research*. SAGE. <https://doi.org/10.4135/9781071802861>
- Licen, S., & Prosen, M. (2024). Strengthening sustainable higher education with digital technologies: Development and validation of a Digital Competence Scale for University Teachers (DCS-UT). *Sustainability*, 16(22), Article 9937.
<https://doi.org/10.3390/su16229937>
- Liu, D., Sun, Z., & Cui, Y. (2025). How institutional support enhances teacher engagement in online teaching: Chain mediation effects of digital self-efficacy and negative emotions. *Frontiers in Psychology*, 16, Article 1601764.
<https://doi.org/10.3389/fpsyg.2025.1601764>
- MacIntyre, P. D., Gregersen, T., & Mercer, S. (2019). Setting an agenda for positive psychology in SLA: Theory, practice, and research. *The Modern Language Journal*, 103(1), 262–274.
<https://doi.org/10.1111/modl.12544>

- Mishra, P., Warr, M., & Islam, R. (2023). TPACK in the age of ChatGPT and generative AI. *Journal of Digital Learning in Teacher Education*, 39(4), 235–251.
<https://doi.org/10.1080/21532974.2023.2247480>
- Morse, J. M. (2015). Critical analysis of strategies for determining rigor in qualitative inquiry. *Qualitative Health Research*, 25(9), 1212–1222.
<https://doi.org/10.1177/1049732315588501>
- Nagel, I., & Amdam, S. H. (2025). Teachers' professional digital competence. *Encyclopedia*, 5(3), Article 148. <https://doi.org/10.3390/encyclopedia5030148>
- Orakova, A., Nametkulova, F., Issayeva, G., Mukhambetzhanova, S., Galimzhanova, M., & Rezanova, G. (2024). The Relationships between Pedagogical and Technological Competence and Digital Literacy Level of Teachers. *Journal of Curriculum Studies Research*, 6(1), 1-21. <https://doi.org/10.46303/jcsr.2024.2>
- Philipsen, B., Tondeur, J., Pareja Roblin, N., Vanslambrouck, S., & Zhu, C. (2019). Improving teacher professional development for online and blended learning: A systematic meta-aggregative review. *Educational Technology Research and Development*, 67, 1145–1174. <https://doi.org/10.1007/s11423-019-09645-8>
- Sharipova, A., Janissenova, A., Koshimova, B. & Yegenissova, A. (2025). The Perceptions of New Generation Specialists towards Innovative Pedagogy, Their Professional and Digital Competencies, and Burnout Levels. *Journal of Social Studies Education Research*. 16(3), 301-331. <https://jsser.org/index.php/jsser/article/view/6622/750>
- Stavermann, K., Bedenlier, S., & Bond, M. (2025). Online teacher professional development: A research synthesis. *Technology, Knowledge and Learning*. Advance online publication. <https://doi.org/10.1007/s10758-024-09792-9>
- Timotheou, S., Miliou, O., Dimitriadis, Y., Sobrino, S. V., Giannoutsou, N., Cachia, R., Martínez-Monés, A., & Ioannou, A. (2023). Impacts of digital technologies on education and factors influencing schools' digital capacity and transformation: A literature review. *Education and Information Technologies*, 28, 6695–6726.
<https://doi.org/10.1007/s10639-022-11431-8>
- Trust, T., Krutka, D. G., & Carpenter, J. P. (2016). "Together we are better": Professional learning networks for teachers. *Computers & Education*, 102, 15–34.
<https://doi.org/10.1016/j.compedu.2016.06.007>

APPENDIX

Table 1.*Participant profile*

Participant code	Teaching level	Subject area	Teaching experience	Main form of digital professional development	Main digital teaching application
T1	Primary	Language	6 years	Online workshop	Interactive slides and digital storytelling
T2	Primary	Mathematics	9 years	School-based digital mentoring	Online quizzes and formative assessment
T3	Secondary	Science	12 years	Webinar series	Simulation-based teaching
T4	Secondary	English	15 years	Professional learning network	Collaborative writing platform
T5	Primary	Moral education	5 years	Blended professional development	Video-based reflection tasks
T6	Secondary	History	18 years	Online teacher community	Digital timeline and multimedia resources
T7	Secondary	Mathematics	21 years	Peer coaching	Learning management system activities
T8	Primary	Science	8 years	Self-directed platform learning	Digital experiments and visual explanation
T9	Secondary	Geography	11 years	Webinar and peer sharing	Mapping tools and online discussion
T10	Primary	English	4 years	Online micro-course	Gamified vocabulary activities
T11	Secondary	ICT	13 years	Online certification course	AI-supported lesson planning
T12	Primary	Art	7 years	Social media teacher network	Digital portfolio
T13	Secondary	Chinese language	16 years	Blended workshop	Online reading response platform
T14	Secondary	Biology	10 years	Online professional learning community	Digital formative feedback
T15	Primary	Mathematics	19 years	School-based training	Interactive problem-solving tasks
T16	Secondary	Physics	14 years	Webinar and self-study	Simulations and video explanation
T17	Primary	General studies	6 years	Peer-supported learning	Digital classroom communication
T18	Secondary	Economics	22 years	Professional learning network	Data visualization and online discussion

Table 2.
Data sources and analytical purposes

Data source	Quantity	Purpose in analysis	Contribution to findings
Semi-structured narrative interviews	18 interviews	To capture teachers' spoken accounts of digital learning, emotions, and teaching change	Main source of narrative themes
Reflective learning journals	36 entries	To explore personal emotional meanings and memorable learning experiences	Supported interpretation of positive emotions
Digital teaching artefacts	42 artefacts	To examine how professional learning was translated into teaching practice	Linked emotional narratives with classroom evidence
Researcher reflective memos	28 memos	To document analytic reflections, assumptions, and theme development	Strengthened reflexivity and trustworthiness
Participant narrative summaries	18 summaries	To preserve individual storylines before cross-case interpretation	Supported within-case and cross-case analysis

Table 3. Coding structure and theme development

Initial codes	Focused codes	Final narrative theme
Feeling encouraged, seeing new possibilities, wanting to continue, believing technology can help students.	Professional hope and renewed learning purpose	Theme 1: Digital professional development as renewed professional hope
First successful use, reduced fear, peer support, gaining confidence, learning from mistakes	Confidence through supported experimentation	Theme 2: Positive emotions as a bridge to digital teaching self-efficacy
Enjoying peer exchange, sharing resources, being recognized, helping colleagues, feeling less alone	Collegial joy and professional belonging	Theme 3: Online professional communities as emotional learning spaces
Redesigning lessons, using formative digital tools, improving interaction, adapting to students, reflective selection of tools	Emotional translation into technology-enhanced practice	Theme 4: From positive emotions to technology-enhanced teaching practices

Table 7.
Technology-enhanced teaching practices emerging from teachers' narratives

Technology-enhanced practice	Example from teachers' artefacts	Reported pedagogical purpose	Related positive emotion
Interactive quizzes	Online quiz results and feedback screenshots	Checking understanding and increasing participation	Satisfaction and confidence
Collaborative writing	Shared document activities	Supporting peer learning and idea development	Enjoyment and belonging
Digital simulations	Science and physics simulation activities	Visualizing abstract concepts	Curiosity and hope

Digital storytelling	Student-created multimedia stories	Encouraging creativity and expression	Pride and enjoyment
Online discussion boards	Student responses on a digital platform	Supporting shy students' participation	Hope and satisfaction
Digital exit tickets	End-of-lesson response forms	Identifying misconceptions quickly	Confidence and control
AI-supported lesson preparation	AI-generated activity drafts revised by teacher	Supporting planning and idea generation	Curiosity and professional renewal
Digital portfolios	Student digital work collections	Tracking learning progress over time	Pride and reflection

Table 8.

Evidence matrix linking findings to research questions and propositions

Research question	Related propositions	Main finding	Supporting evidence
RQ1: How do teachers narrate lifelong learning in digital professional development?	P1	Teachers narrated digital professional development as a pathway to renewed professional hope and continued learning	Interview narratives, reflective journals, participant profiles
RQ2: What positive emotions emerge in teachers' digital professional learning narratives?	P2	Hope, enjoyment, satisfaction, pride, curiosity, and belonging emerged as key positive emotions	Emotional coding, reflective journals, cross-case comparison
RQ3: How do positive emotions and digital teaching self-efficacy shape the pathway from digital professional development to technology-enhanced teaching practices?	P3, P4, P5	Positive emotions strengthened digital teaching self-efficacy and encouraged classroom experimentation	Teaching artefacts, interview accounts, digital practice examples
RQ4: How does professional identity reconstruction shape the translation of positive emotions into sustained technology-enhanced teaching practices?	P6	Professional identity reconstruction strengthened the translation of emotions into sustained practice	Narratives of becoming digital learners, collaborators, and mentors