

# Continuous Professional Competency Development of Teachers for Excellent Learning Services: Literature Review on Learning Culture, Psychological Well-Being, Growth Mindset, and Digital Skills

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## Abstract

Excellent learning services require teachers to continuously update their professional competencies (continuous professional development/CPD) through a supportive school ecosystem, healthy psychological conditions, adaptive mindsets, and digital skills. This article aims to examine and synthesize research findings related to the contribution of learning culture, psychological well-being, growth mindset, and digital skills to the development of teachers' ongoing professional competencies as a prerequisite for improving the quality of learning services. The method used is a literature review by searching for scientific articles in relevant reputable publications within the last 10 years, selected based on the appropriateness of the theme, educational context, and the strength of the evidence. The results of the synthesis indicate that school learning culture serves as an organizational foundation that facilitates professional collaboration, reflection, learning communities, and learning leadership, thereby increasing participation and sustainability of CPD. Teacher psychological well-being is correlated with work engagement, resilience, and the quality of pedagogical interactions, which strengthen the consistency of excellent services. Growth mindset strengthens the orientation of lifelong learning, willingness to accept feedback, and learning innovation, thereby accelerating the renewal of professional competencies. Digital capabilities function as an enabler that expands access to learning resources, learning analytics, and technology-based learning design; However, its impact is optimal when supported by an adequate culture of learning and well-being. This article produces an integrative conceptual framework that explains the interrelationships of the four constructs in promoting CPD and excellent learning services, and proposes practical implications for schools and policymakers in developing CPD interventions that are culturally, psychologically, mindset-wise, and digitally literate.

**Keywords:** Continuing professional competence, Teacher CPD, Learning culture, Psychological well-being, Growth mindset, Digital skills, Excellent learning services

## Introduction

Rapid changes in policy, technology, and public expectations require teachers to develop sustainable professional competencies to ensure superior learning services. Excellent learning services not only impact academic achievement but also the quality of the learning experience experienced by students and parents. Global reports on the teaching profession emphasize the urgency of professional transformation and the strengthening of systemic support for teacher career development (UNESCO & International Task Force on Teachers for Education 2030, 2024). At the same time, international surveys on teaching show that learning quality is correlated with relevant and ongoing professional development opportunities (OECD, 2025).

However, teacher competency development is often understood solely as technical training, neglecting the psychological prerequisites and work culture that underpin changes in practice. Yet, research on teacher well-

being confirms that psychological well-being influences the sustainability of professional practice and the quality of pedagogical interactions. In the digital era, professional competencies also encompass the ability to design technology-assisted learning, manage digital classrooms, and maintain ethical data use. In this context, the literature calls for an integrative framework that connects learning culture, psychological well-being, growth mindset, and digital skills. This integrative framework is crucial to ensuring that "excellent service" is not merely a slogan but operationalized within a measurable competency development strategy. Therefore, this introduction positions teachers' ongoing professional competency development as a strategic issue for the quality of learning services.

Continuous professional development (CPD) is seen as a long-term process that requires consistency, relevance, and organizational support. In many education systems, CPD is shifting from a one-way training model to collaborative, practice-based professional learning. International survey findings indicate that teachers who engage more frequently in meaningful professional learning tend to report greater readiness to teach across diverse classroom contexts (OECD, 2019). However, CPD outcomes do not automatically emerge when training is available, as the quality of the design, the school context, and leadership support are all determining factors.

Relevance is crucial because CPD that is not aligned with classroom needs often ends up as an administrative routine. From a policy perspective, teacher professionalism is also related to recognition, public trust, and working conditions that enable teachers to learn continuously (OECD, 2020). Curriculum changes and digital transformation increasingly demand CPD that is adaptive and responsive to current needs. Therefore, discussions of CPD need to go beyond a list of training programs to an analysis of the drivers that make professional learning truly impactful. One key factor increasingly highlighted is a school learning culture that encourages reflection, collaboration, and pedagogical experimentation. Thus, effective CPD needs to be read as a learning ecosystem that brings everyday professional practice to life.

A learning culture reflects the values, norms, and habits that make a school a learning community for teachers. When a learning culture is strong, teachers are encouraged to ask questions, test strategies, and share practices, rather than simply fulfilling administrative obligations. Evidence from Indonesia suggests that strengthening a learning culture can be supported through consistent policies and support, so that professional learning becomes part of the school routine (Arif et al., 2022). A learning culture is also closely related to the existence of collaborative structures that provide space for pedagogical dialogue and reflection. In many cross-national studies, professional learning communities (PLCs) are seen as a mechanism linking teacher collaboration to various professional outcomes.

A cross-national analysis based on TALIS found a positive relationship between PLCs and teacher job satisfaction across multiple educational contexts (Antonietti, C., Cattaneo, A. A. P., & Amenduni, F. 2022). These findings confirm that a learning culture is not simply an "atmosphere" but has consequences for work experience and professional sustainability. However, PLCs are not automatically effective if they are merely formal meetings, without a focus on learning and instructional improvement. Therefore, developing a learning culture requires emphasizing the quality of professional interactions, a focus on evidence of learning, and the courage to try new practices. At this point, a culture of learning becomes the bridge that connects CPD to real change in the classroom.

Teacher psychological well-being is a crucial foundation for sustainable professional competence and quality learning services. Well-being is understood not only as the absence of stress, but also as the presence

of energy, meaning in work, and the capacity for emotional regulation when facing professional demands. A systematic review confirms that teacher well-being is related to individual factors and the work context, including organizational support and school climate (Hascher & Waber, 2021). A policy perspective also emphasizes the need for a measurement framework capable of comprehensively capturing the dimensions of teacher well-being for system improvement. When well-being is low, the risk of emotional exhaustion and a decline in the quality of pedagogical interactions increases.

This condition can weaken the consistency of quality learning practices, making learning services feel less responsive to students. Within the framework of excellent service, psychological well-being serves as "working capital" that enables teachers to demonstrate empathy, patience, and clarity of instruction (Porter, 2022). Well-being is also related to teachers' readiness to learn new things, as professional learning requires cognitive and emotional energy. This means that CPD that demands changes in practice without considering well-being can generate resistance or merely symbolic compliance (Zhang, 2023). Therefore, the literature positions psychological well-being as a variable that strengthens or weakens the effectiveness of CPD. Thus, discussing CPD without psychological well-being risks ignoring the determinants of the quality of learning services.

The issue of teacher well-being has become increasingly important due to the increased workload and demands of digital adaptation in various education systems. Reports on teacher well-being describe increasing work pressure, the need for mental health support, and the importance of school-based. Globally, professional organizations emphasize that teacher well-being is intertwined with professional sustainability, retention, and the quality of education received by students (Education International, 2024). When well-being is managed, teachers tend to have more stable work engagement and are able to maintain the quality of teaching. From an educational policy perspective, well-being support is also seen as a strategy to curb the teacher shortage in various countries (UNESCO, 2023).

Therefore, excellent learning services need to view teacher well-being as part of the quality of education services, not merely a personal issue. Well-being also influences how teachers respond to the individual needs of students, especially in diverse classrooms. Furthermore, well-being can strengthen teachers' courage to innovate, as innovation often requires a tolerance for risk and uncertainty. Therefore, linking psychological well-being to CPD makes sense, as changing practices demand psychological resilience. Therefore, a literature review that combines well-being with a learning culture, growth mindset, and digital skills is relevant for formulating a more humane and effective CPD strategy. This framework helps define excellent service as the result of mutually supporting competency, culture, and psychological well-being.

A growth mindset provides a psychological foundation for teachers to view challenges as opportunities for learning and improvement. In a professional context, a growth mindset encourages teachers to view teaching competency as something that can be developed through effort, strategies, and feedback. Empirical evidence suggests that a growth mindset can predict teachers' life satisfaction when they are challenged to innovate in their teaching, including in the context of changing practices (Dweck, 2016). This relationship indicates that a growth mindset can be a protective factor when teachers face the demands of adaptation.

A growth mindset is also relevant for CPD because professional learning involves a process of trial, error, revision, and relearning. Without a growth mindset, CPD easily devolves into a "certificate-collecting" activity without transforming beliefs and practices. In the paradigm of excellent service, a growth mindset reinforces a continuous improvement orientation, so teachers do not stop at minimum standards. Furthermore, a growth mindset can increase openness to collaboration and peer feedback. The process of reflection the core of a

learning culture is often more productive when teachers believe that abilities can be improved. Thus, a growth mindset functions as an internal driver that strengthens the impact of a learning culture and CPD. Therefore, integrating a growth mindset into CPD studies helps explain why the same program can have different impacts on different teachers. This framework positions a growth mindset as a crucial psychological prerequisite for innovation in learning services.

The development of a growth mindset also needs to be seen as a process influenced by the work environment and organizational support. International surveys show that meaningful learning opportunities often arise when schools provide space for collaboration and reflection (OECD, 2019). When a learning culture is strong, teachers are more frequently exposed to new practices, pedagogical discussions, and opportunities to interpret challenges as part of the learning process. In such situations, a growth mindset can be nurtured through real-life experiences, not just motivational slogans. Studies on teaching innovation confirm that innovation challenges are more manageable when teachers have adequate self-confidence and social support (Dweck, 2016).

Therefore, a growth mindset needs to be positioned as a variable that interacts with a learning culture and psychological well-being. Teachers with well-being tend to be better able to regulate their emotions when receiving criticism or experiencing failure when trying new strategies. Conversely, teachers experiencing prolonged stress may interpret challenges as threats, thus inhibiting a growth mindset. Within the framework of CPD, this implies the need for professional development designs that are psychologically safe and encourage gradual experimentation. This approach aligns with the idea of "continuous improvement," which requires small but consistent learning cycles. Furthermore, strengthening a growth mindset can also help teachers navigate digital change and the demands of technological literacy. Thus, a growth mindset is not an additional variable, but rather a crucial link between the psychological dimension and professional competence. This integration enriches the explanation of how excellent learning services can be built sustainably.

In the context of Indonesian education, strengthening teacher professional competence is also related to the school's ability to implement thematic programs and curricula that require consistent classroom learning services. In Adiwiyata schools, the implementation of the environmental curriculum and participation in environmental activity programs are important indicators of a school culture that supports meaningful learning. A study of Adiwiyata high schools in Pati showed that schools supported the implementation of environmental education in the curriculum, participation in environmental activity programs, and the use of facilities such as greenhouses as part of school practices (Wibowo et al., 2023). These findings confirm that the quality of learning services is determined not only by teaching materials but also by a learning ecosystem that integrates experiences, activities, and supporting facilities.

However, the level of environmental awareness among students in the study was moderate, indicating room for improvement in the depth of internalization of values and learning practices (Wibowo et al., 2023). The reported differences in attitudes based on gender also demonstrate the need for pedagogical strategies that adapt to the diversity of student characteristics (Wibowo et al., 2023). Thus, excellent learning services need to be understood as services that are responsive to student needs while consistently building competencies and values through structured learning experiences. Within the CPD framework, this condition strengthens the argument that teachers require continuous professional learning that goes beyond knowledge transfer, but also strengthens the capacity for contextual learning design. The implication is that a school's learning culture must facilitate teachers in designing activities, assessments, and reflections that link academic achievement to

attitude formation. Therefore, evidence from the Adiwiyata context provides the basis for the recognition that targeted CPD is key to maintaining the quality of learning services across disciplines.

Digital skills are becoming an increasingly central component of teacher professional competence, especially as technology-based learning rapidly evolves. These skills encompass basic digital literacy, digital pedagogical competence, and the ability to design safe and meaningful learning experiences. A systematic review of digital teaching competence indicates that the concept of teacher digital competence has evolved into a multidimensional construct that goes beyond technical skills (Revuelta-Domínguez et al., 2022). Frequently emerging dimensions include digital lesson planning, learning resource management, technology-assisted assessment, and supporting student participation. Another study confirmed that the characterization of teachers' digital competence also changed before and during the pandemic, reflecting the dynamic needs of teaching practice (Smestad et al., 2023).

Therefore, relevant CPD needs to focus on contextualized digital pedagogical competence, rather than application training disconnected from learning objectives. This need is further amplified when learning utilizes collaborative platforms, learning analytics, and open sources. Within a service excellence framework, digital skills enable teachers to respond to student needs more quickly, more personally, and more transparently. However, digital skills also carry the risk of additional workload if not accompanied by support systems and emotional regulation. Therefore, digital skills must be understood as a professional competency closely linked to psychological well-being. This link is crucial because excellent learning services in the digital space depend on the quality of instructional design and the psychological well-being of instructors. Therefore, the literature calls for the integration of digital skills with learning culture and psychological factors for CPD to produce sustainable change.

The digital competency framework provides a common language for designing indicators, training, and evaluation. DigComp 2.2 enriches examples of relevant knowledge, skills, and attitudes, including aspects of emerging technologies such as artificial intelligence, in citizens' digital competencies (Vuorikari et al., 2022). While DigComp is aimed at citizens, the framework helps map the fundamental digital skills that teachers also need to operate safely, critically, and ethically. At the educator level, competency framework studies emphasize the importance of aligning teacher competency frameworks with 21st-century challenges, including the demands of digital transformation in learning (Caena & Redecker, 2019).

This alignment is relevant because teachers are not simply users of technology but also designers of technology-based learning experiences. With a clear framework, CPD can focus on competencies that directly impact the quality of learning services. The framework also makes it easier for schools to identify competency gaps and design gradual professional learning pathways. However, a competency framework is insufficient if a school's learning culture does not support reflective and collaborative practice (Nuutinen & Bordi, 2025). This is where the learning culture plays a role as an "implementation engine" that brings the framework to life. Furthermore, a competency framework needs to be balanced with attention to well-being, as digital transformation can create new pressures. Thus, the digital competency framework must be read in conjunction with psychological variables and organizational culture. This integration will help define excellent service as adaptive, ethical, and student-centered learning services.

Digital transformation can improve the quality of learning, but it also has the potential to lead to digital burnout in teachers. Research shows that online teaching competency, self-efficacy, and emotional regulation are associated with teachers' levels of digital burnout in online learning contexts. These findings confirm that

digital skills do not stand alone but are intertwined with psychological factors that determine teacher resilience. If CPD only emphasizes "platform skills," the risk of burnout may increase as teachers continue to struggle to manage emotions and the demands of digital work. Conversely, CPD that strengthens self-efficacy and emotional regulation strategies can help teachers engage in healthier digital practices.

Psychological well-being mediates why digital transformation sometimes improves quality but sometimes triggers burnout. Within the framework of service excellence, digital fatigue can reduce the quality of teacher responses, clarity of instruction, and empathy for learners' needs. Therefore, integrating well-being and digital skills is a prerequisite for maintaining the quality of learning services in the long term. Furthermore, a growth mindset can function as a psychological mechanism that helps teachers interpret technological difficulties as a learning process, not as evidence of incompetence. A learning culture that supports collaboration can also reduce individual burden as teachers share learning strategies and resources. Thus, the literature shows that effective digital CPD requires a combination of competency, psychological, and work culture dimensions. Consequently, literature-based research needs to refocus digital CPD from "tools" to "pedagogical capacity and psychological resilience."

The development of generative artificial intelligence (AI) broadens the spectrum of digital skills that teachers need to master. Teachers now face new needs, such as AI literacy, ethical use of AI, academic integrity, and student data protection. International guidelines emphasize that the use of AI in education needs to be oriented towards ethics, security, and the role of humans in pedagogical decision-making (UNESCO, 2023). This means that CPD (Creative Development Programme) needs to address new challenges that are not only technical, but also normative and pedagogical. In the practice of excellent service, the wise use of AI can enhance the personalization of learning, enrich feedback, and streamline administrative work. However, without critical literacy, AI can pose risks of bias, dependency, and privacy violations.

Therefore, digital skills for excellent service must incorporate dimensions of critical literacy and professional responsibility. Strengthening AI literacy also needs to be supported by a learning culture that encourages ethical discussions and reflection on the impact of technology. Psychological well-being remains relevant because rapid technological change can increase professional anxiety and the burden of adaptation. A growth mindset helps teachers navigate technological uncertainty with a learning orientation, rather than a defensive one. Thus, AI reinforces the need for an integrative CPD framework that connects a learning culture, well-being, a growth mindset, and digital skills. A literature review is essential for mapping empirical findings and developing evidence-based recommendations. Therefore, a literature review on this topic should consider AI literacy as part of the evolution of teachers' digital competencies.

The concept of "service excellence" in education is often associated with the quality of service perceived by service recipients, including students. The literature on educational services shows that service quality is debated in terms of approaches, indicators, and implications for the institution-student relationship. Bibliometric studies on SERVQUAL in higher education indicate that the study of service quality continues to evolve and is used to understand satisfaction and service perceptions. However, there is also criticism that a customer-centered approach in education can shift academic orientation if applied. Therefore, service excellence in learning needs to be defined contextually as the quality of the learning experience, the quality of pedagogical interactions, and the quality of learning support, not simply from a "consumer" perspective.

Furthermore, a literature review on SERVQUAL in education and training shows that the dimensions of reliability, responsiveness, assurance, empathy, and tangibles are often used to explain student experiences.

These dimensions can be pedagogically translated, for example, from reliability to consistency of feedback, and from empathy to support differentiated learning. Thus, excellent service can be positioned as a quality pedagogical service oriented towards the learning needs and development of students. Within this framework, teacher professional competence is a key factor because teachers play a direct role in the learning service experience. Therefore, examining CPD as a pathway to excellent service is relevant and has practical value. Integration with psychological variables and learning culture is crucial so that excellent service does not stop at procedures but is manifested in the quality of relationships and learning processes. Therefore, excellent learning service can be understood as the output of a comprehensive ecosystem of competencies and support.

The relationship between excellent service and teacher professionalism is also evident in studies on trust and satisfaction with educational services. Case studies on excellent service emphasize that good service practices can increase public trust in educational institutions (Page et al, 2021). In higher education, research shows that dimensions of educational service quality are related to student trust and satisfaction (Page et al., 2021). Although the contexts differ, these findings confirm that educational service quality extends beyond administrative aspects to academic interactions and learning support. In the school context, excellent learning service means teachers are able to provide clear instructions, respond quickly, provide meaningful feedback, and provide a safe learning environment.

These qualities are difficult to achieve if teachers lack adequate pedagogical and digital competencies. These qualities are also vulnerable to decline if teachers experience emotional or digital burnout. Therefore, psychological well-being and emotional regulation need to be integrated into a quality learning service strategy. A growth mindset also plays a role because excellent service demands continuous improvement and a willingness to accept evaluation. A learning culture provides a context that allows excellent service practices to be learned, practiced, and standardized in a healthy manner. Thus, the relationship between excellent service and CPD is systemic, not merely individual. A literature review on this topic needs to examine how these variables mutually reinforce each other to generate implementable recommendations in schools. Therefore, this introduction emphasizes the importance of an integrative approach to developing teacher professional competencies for excellent learning services.

An integrative framework linking learning culture, psychological well-being, growth mindset, and digital skills is empirically grounded in numerous cross-national studies. TALIS places professional learning, collaboration, and working conditions as crucial components of teachers' work experiences (OECD, 2019; OECD, 2020). Recent analysis also suggests that education systems seeking to improve quality need to address factors that contribute to teachers' thriving, not simply survival (OECD, 2025). At the school level, PLCs can strengthen learning cultures and are associated with teacher job satisfaction, potentially improving the quality of learning services (Antonietti, C., Cattaneo, A. A. P., & Amenduni, F. 2022).

In the digital realm, teachers' digital competence is a key determinant of the quality of technology-based learning, but is also associated with the risk of digital burnout if psychological support and emotion regulation are low. Psychologically, teacher well-being has been shown to be influenced by the work context and linked to the quality of professional practice (Hascher & Waber, 2021). In the realm of beliefs, growth mindset is related to teachers' self-efficacy and life satisfaction when facing innovation challenges (Dweck, 2016). Thus, the literature provides complementary pieces of evidence for formulating a more comprehensive CPD model. However, these pieces of evidence are scattered across different disciplines and contexts, requiring systematic synthesis.

Therefore, a literature review approach is relevant to synthesize findings, identify gaps, and formulate practical implications. This introduction positions the literature review as a scientific strategy for testing the consistency of findings and discovering patterns of relationships between variables. With an integrative framework, schools can design CPD that not only enhances competency but also maintains well-being and strengthens a learning culture. This is the argumentative basis for why this study places these four variables as the primary lens for developing teacher professional competency toward excellent learning services.

A robust literature review requires transparent methods to ensure a credible synthesis of findings. The 2020 PRISMA Guidelines emphasize the importance of clear reporting procedures, from search strategy and study selection to synthesis (Rethlefsen et al., 2021). Through these standards, a literature review is no longer simply a narrative summary but a replicable scientific process. Furthermore, a systematic review of the impact of professional development on learning outcomes emphasized the importance of understanding program features, implementation contexts, and impact pathways (Ventista & Brown, 2023). This is crucial because CPD can operate through several mechanisms, such as changing beliefs, changing practices, or changing the quality of collaboration. In this topic, impact pathways may also include improvements in well-being, increased self-efficacy, and strengthening a culture of learning.

Therefore, a literature review needs to map not only "what works," but also "why and under what conditions" that effectiveness occurs. This approach aligns with the needs of schools, which often face limited resources and require targeted strategies. Furthermore, technological developments such as AI add new variables that require rapid but careful synthesis (UNESCO, 2023). Thus, a literature review serves as a strategic tool to guide evidence-based professional development decisions, not a passing fad. This introduction emphasizes that the purpose of the synthesis is not simply to compile a list of programs, but rather to build a coherent theoretical-empirical understanding. Therefore, this study positions the literature review as a foundation for formulating integrative CPD recommendations for excellent learning services. It also contributes to the literature by linking the domains of learning culture, teacher work psychology, mindset, and digital competency into one conceptual model. In this way, the research is expected to provide a more systematic roadmap for schools in developing teachers sustainably.

Learning culture and PLCs need to be examined as the social infrastructure of service-oriented CPD. Within PLCs, teachers can build a shared language about learning quality, indicators of service excellence, and differentiation strategies. Cross-national analysis shows that PLCs are positively related to teacher job satisfaction, potentially strengthening the stability of learning services across multiple contexts (Antonietti, C., Cattaneo, A. A. P., & Amenduni, F. 2022). Job satisfaction is important because it can influence teachers' persistence in implementing quality learning practices, particularly in situations that require adaptation. However, the relationship between PLCs and self-efficacy and instructional aspects can vary across contexts, so PLC design needs to consider organizational culture and leadership support.

Therefore, a literature review should identify the characteristics of PLCs most relevant to strengthening learning services. These characteristics could include a focus on evidence of learning, structured reflection, and problem-solving-oriented collaboration. Within a service framework, PLCs can also be used to establish standards for responsiveness, clarity of communication, and consistency of feedback. This aligns with the notion that service excellence is not simply a friendly attitude but a consistent and measurable work system. Therefore, the development of sustainable professional competence should consider PLCs as both an implementation vehicle and a mechanism for psychological support. With strong social support, teachers are more likely to maintain well-being and maintain a growth mindset when facing challenges. Therefore, the

literature review in this study needs to position PLCs and learning culture as key contexts that bridge individual competency with the quality of learning services.

Digital skills also need to be linked to pedagogical-technological knowledge models to prevent CPD from becoming application-based training. TPACK has become a popular framework for understanding the integration of technology, pedagogy, and content in teaching. A systematic review of reviews on TPACK demonstrates the diversity of approaches, necessitating conceptual and methodological clarity in TPACK-based research and training (Schmid et al., 2024). On the intervention side, a systematic synthesis of TPACK-based interventions highlights the need to understand the targeted knowledge components and how competency growth is measured (Schmid et al., 2024).

These findings are crucial for CPD because excellent digital-based learning services require a balance between content objectives, pedagogical strategies, and technology selection (Zhou, 2024). If CPD does not facilitate such integration, teachers may become proficient in using tools, but this may not necessarily improve the quality of the learning experience. Therefore, a literature review needs to map how effective digital training transforms instructional practices, not just technical skills. Furthermore, the development of AI demands an extension of TPACK to the dimensions of AI ethics and literacy, as emphasized in international guidelines (UNESCO, 2023).

At the same time, the risk of digital burnout demands training that also addresses emotional regulation and self-efficacy. Therefore, integrating TPACK with aspects of psychological well-being is relevant to ensure the sustainability of digital learning services. A growth mindset can strengthen the technology learning process because teachers are more resilient to obstacles and more open to feedback (Dweck, 2016). Therefore, a robust digital framework must be read alongside psychological frameworks and a learning culture to achieve excellent technology-based learning services sustainably.

Evidence on strategies for strengthening teachers' digital competencies through CPD is growing, but the approaches and quality remain diverse. A systematic review of teachers' digital competency development and strengthening illustrates the variety of training programs, intervention structures, and reported outcomes (Miranda, 2025). In higher education, a systematic review also suggests that microcourses can be a flexible approach to strengthening specific areas of digital competency, particularly when tailored to the needs of participants (Trujillo-Juárez et al., 2025). On the evaluation side, a recent review highlights the importance of clear instruments and frameworks for more consistent assessment of educators' digital competencies (López-Nuñez et al., 2024).

This diversity underscores the need for digital CPD to be needs-driven design, implementation support, and evaluation of its impact on learning practices. Otherwise, programs can easily stall on improving self-perceptions without evidence of instructional change. Within the framework of service excellence, what is needed is a change in teaching behavior that improves the quality of interactions, learning accessibility, and learning equity. Therefore, digital competency needs to be understood as a professional competency linked to the quality of pedagogical services. This connection can be sharpened through a more general digital competency framework such as DigComp 2.2, which maps basic digital literacy, including aspects of AI (Vuorikari et al., 2022).

However, this framework needs to be translated into the educational context by aligning the teacher competency framework with 21st-century demands (Caena & Redecker, 2019). Furthermore, the pressures of digital adaptation need to be balanced with well-being support programs, as digital competency without

psychological resilience risks triggering burnout. Therefore, a literature review on this topic needs to assess the evidence on digital training while mapping the psychological conditions and learning cultures that make training impactful. This synthesis will help develop digital CPD recommendations that are realistic, humane, and oriented towards excellent learning services.

Based on this literature landscape, there is a need to systematically synthesize evidence to provide schools with comprehensive competency development guidelines. International studies confirm that the quality of continuous learning is linked to relevant professional learning opportunities, a supportive work environment, and teacher well-being (OECD, 2025; UNESCO & International Task Force on Teachers for Education 2030, 2024). However, evidence on the simultaneous relationship between learning culture, psychological well-being, growth mindset, and digital skills remains scattered and has not always been linked to the concept of excellent learning service. Furthermore, the literature on educational services indicates that service quality has dimensions that can be translated pedagogically, but its implementation requires caution to avoid shifting the essence of education.

Therefore, this study positions excellent service as a pedagogical service quality oriented toward learning needs, not merely consumer logic. A literature review that adheres to the principle of transparent reporting can provide a strong basis for mapping themes, identifying research gaps, and developing a conceptual model (Rethlefsen et al., 2021). The synthesis can also highlight the CPD practices that most consistently impact professional change and learning outcomes (Ventista & Brown, 2023). With this approach, the resulting recommendations can guide schools toward CPD strategies that simultaneously strengthen a learning culture, maintain well-being, foster a growth mindset, and enhance digital skills. This is crucial because excellent learning services depend on the quality of teachers' competencies and long-term working conditions.

Therefore, this introduction emphasizes the urgency of a literature review as an empirical foundation for formulating a more integrative approach to teacher continuous professional development. Thus, this research is expected to contribute to school practice through evidence-based models and recommendations that can be adapted across contexts. Ultimately, excellent learning services are more likely to be achieved when teacher development is understood as an ecosystem that integrates competency, culture, and well-being. This integrative framework serves as a foundation for this research to develop a systematic and relevant literature synthesis for the needs of today's schools.

## Methodology

To maintain process traceability, this review was structured with a review protocol that established from the outset the focus of the questions, database, search strategy, and inclusion-exclusion criteria. The protocol helped prevent opportunistic changes in selection decisions when researchers encountered "interesting" but irrelevant findings. This principle aligns with recommendations for review reporting, which emphasize transparency and replicability (Rethlefsen et al., 2021).

The protocol also included operational definitions for each construct to ensure consistency in selection across all stages. Operational definitions are necessary because terms like "learning culture" and "digital competence" are often used across disciplines with varying meanings. The protocol aligned keywords and indicators with the chosen theoretical framework. The protocol also defined the synthesis output, namely an integrative conceptual model for determining excellent learning service. Clarity of the output facilitated the selection of appropriate synthesis techniques, especially when the studies being reviewed were heterogeneous.

Conceptually, the protocol served as a "roadmap" to prevent the review from deviating from its initial objectives. Thus, the review's methodological integrity was maintained from the outset.

Four key constructs were established as the analytical lenses: learning culture, psychological well-being, growth mindset, and digital capabilities. Learning culture is defined as norms, practices, and collaborative structures that foster professional learning, reflection, and the sharing of practices. Psychological well-being is understood as a state of positive psychological functioning encompassing meaningful work, adequate positive affect, and the capacity for emotional regulation when facing professional demands. Growth mindset is defined as the belief that professional capabilities can be enhanced through effort, strategies, and feedback. Digital capabilities are understood as pedagogical-technological competencies that encompass the effective, safe, critical, creative, and responsible use of technology in learning.

The primary outcome variable is CPD/continuous professional competency, while the systemic outcome is excellent learning service as the quality of pedagogical services that are consistent, responsive, and oriented toward learning needs. Operational definitions were used to screen studies that actually measured the constructs, rather than simply mentioning their terms. This step follows the principles of structured review, which emphasize conceptual consistency to ensure a terminologically unbiased synthesis (Snyder, 2019). Thus, the selection process relied not only on keywords but also examined the suitability of the constructs within the study content.

In addition to direct database searches, this study applied backward and forward snowballing techniques to key articles. Backward snowballing involved searching the bibliography of the most relevant articles, while forward snowballing involved searching publications that cited the articles. This technique is crucial for capturing relevant studies that are overlooked by differences in terms in titles and abstracts. Snowballing also helps identify cross-disciplinary studies, such as those on teacher work psychology or educator digital competencies, that do not always use the CPD label. To ensure objective selection, articles resulting from snowballing must still meet the same inclusion criteria. The application of snowballing aligns with modern review practices that advocate comprehensive and accountable search strategies (Rethlefsen et al., 2021). All additional records from snowballing are recorded as separate source identifiers in the selection process. This ensures that the source of the articles remains transparent and unmixed with the initial search results.

All search results are exported to a reference management tool to facilitate deduplication and metadata tracking (author, year, journal, DOI). Deduplication is performed before the screening stage to ensure accurate selection flow calculations and avoid inflating the number of studies. Deduplication uses a combination of DOI, title, author name, and publication year criteria, as some databases format metadata differently. After deduplication, records are labeled according to their source databases to facilitate auditing. Labeling is also useful when reporting the composition of the most productive databases for capturing studies. Next, bibliographic data is standardized to minimize citation errors in proceedings manuscripts. This procedure is crucial because citation quality affects the credibility of scientific papers and facilitates reader verification. Well-organized reference management also facilitates the compilation of bibliographies in APA 7<sup>th</sup> edition. Thus, this technical process supports both accuracy and efficiency in writing.

Screening is conducted in two stages: title-abstract screening and full-text review. To increase reliability, two reviewers can independently screen a portion of the initial sample, then discuss any discrepancies until a consistent selection rule is reached. When disagreements arise at the full-text stage, decisions are made through discussion based on inclusion criteria, not on findings' preferences. This practice minimizes selection bias and

strengthens the consistency of operational definitions. Where possible, the initial level of agreement can be calculated using a simple coefficient, such as a percentage agreement, and then accompanied by a narrative of how the selection rule was refined after testing. This approach is common in structured reviews to strengthen the quality of the decision-making process (Booth et al., 2021). All reasons for exclusion at the full-text stage are recorded, such as inappropriate populations, lack of relevance to CPD, or unclearly measured constructs. Recording the reasons for exclusion is a crucial element of PRISMA reporting (Rethlefsen et al., 2021). This allows readers to assess the reasonableness of study selection decisions.

Each selected study was assessed for quality using the Mixed Methods Appraisal Tool (MMAT) 2018, as this review encompasses qualitative, quantitative, and mixed methods studies within a single framework. The MMAT helps assess aspects such as design rigor, measurement quality, sample representativeness, analytical feasibility, and data integration coherence in mixed methods studies (Hong et al., 2018). The quality score is not used to automatically "eliminate" studies, but rather to weigh the interpretation of findings in the synthesis. For example, strong findings from studies with rigorous design and analysis are given higher priority than findings from studies with clear limitations. In addition to the quality assessment, the review also noted potential risks of bias that often arise in survey studies, such as self-report bias, social bias, and non-response bias. In qualitative studies, the risk of bias is assessed through procedural transparency, triangulation, and a clear audit trail. The principle of assessing risk of bias is important because an integrative literature review risks generalizing the strength of evidence from different designs. By considering quality, the synthesis results are more cautious and avoid overclaiming.

Data extraction was conducted using a matrix that captured the core information from each study. The matrix included study identity, context, population, sample size, instruments, construct definitions, and key findings. In quantitative studies, the extraction included the direction of relationships, effect sizes, if available, and reported mediator/moderator variables. In qualitative studies, the extraction included key themes, concise thematic quotes, and context explaining why the findings emerged. In mixed methods studies, the extraction emphasized how the two types of data were integrated and whether the results were mutually reinforcing. The matrix also noted the authors' suggested practice implications for CPD, well-being, and strengthening digital competencies. The matrix structure facilitated the coding process because findings across studies could be compared in the same column. The matrix allowed researchers to track where themes originated and how consistently they emerged across contexts. This procedure supported an audit trail, strengthening the trustworthiness of the review.

The synthesis was conducted using thematic synthesis to combine findings across research designs, particularly when data are heterogeneous, making meta-analysis inappropriate. The initial stage involved open coding of findings related to the four constructs, followed by axial coding to connect themes and mechanisms between variables. Themes were then grouped into relevant pathways of influence, for example, learning culture, CPD intensity, learning service quality, or well-being, work engagement, service consistency. To maintain the rigor of the synthesis, each theme had to be supported by at least two studies or one high-quality key study with a strong theoretical argument. Thematic synthesis enabled researchers to distinguish between themes that are "consistent across contexts" and themes that are "contingent depending on school conditions." This approach aligns with review practices that emphasize mapping themes, mechanisms, and implementation contexts (Snyder, 2019). The final results of the synthesis were expressed in an integrative conceptual model that demonstrates direct and indirect relationships to excellent learning service. The conceptual model also

includes theoretical assumptions that explain why these relationships make psychological and organizational sense. Thus, the review contributed to a framework ready for empirical testing in follow-up studies.

To increase the robustness of the conclusions, additional checks were conducted based on study quality and context. First, key findings were compared between high-quality and medium-quality studies to determine whether the direction of the findings was consistent. Second, findings were grouped by context (e.g., primary vs. secondary schools, or post-pandemic vs. pre-pandemic contexts) to assess variation. Third, a check for "contradictory findings" was conducted to ensure the synthesis did not only highlight results that supported the hypothesis. Fourth, potential publication bias was examined narratively, as studies with significant results tend to be published more frequently. This robustness check is important because the topic of digital competence and well-being is evolving rapidly, allowing the literature to be "skewed" toward certain trends. This step ensures more balanced recommendations and reduces overgeneralization. Robustness also strengthens policy implications, which typically require consistent evidence.

## Finding and Discussion

A literature synthesis indicates that teachers' continuing professional competence (CPD) for excellent learning services is formed through the interaction between school learning culture, psychological well-being, growth mindset, and digital skills (OECD, 2025). Cross-study findings demonstrate that effective CPD is not simply episodic training, but rather a recurring and measurable work-learning ecosystem. The literature also emphasizes that a quality work environment and collaboration are prerequisites for professional learning to transform into consistent classroom practice (OECD, 2019). In the digital dimension, competency needs are shifting from simply using devices to integrating pedagogical and critical literacy skills based on competency frameworks (Vuorikari et al., 2022).

At the same time, increasing technological demands are correlated with the risk of digital burnout, so well-being needs to be positioned as a foundation for sustainable performance. International studies also link teacher thriving with self-confidence, collaboration, and the belief that abilities can develop through effort (OECD, 2025). Therefore, "excellent service" in learning is more accurately defined as the quality of reliable, responsive, and empathetic pedagogical services based on continuously updated competencies. The findings point to the need for a deterministic model that integrates individual, collective, and system levels to explain the pathways of influence (Gómez-Genovart et al., 2025). This framework positions learning culture as a key lever that activates psychological and digital mechanisms leading to quality learning services (Antonietti, C., Cattaneo, A. A. P., & Amenduni, F. 2022). Thus, the synthesis suggests that service-oriented CPD should be designed as a continuous process that is sensitive to well-being and digital dynamics (UNESCO, 2023).

Methodologically, the synthesized literature shows a predominance of quantitative survey and correlational studies, accompanied by a post-pandemic increase in systematic reviews examining digital CPD and teacher wellbeing (Hascher & Waber, 2021). Studies of teacher wellbeing emphasize the multifactorial nature of the concept and the variability of indicators used across studies, making operationalization consistency a key issue (Gómez-Genovart et al., 2025). In the realm of CPD, systematic reviews identify that evidence of impact on student learning outcomes remains more limited than that on teaching practices (Ventista & Brown, 2023). A meta-analysis on coaching confirms stronger causal evidence than one-off training, particularly on changes in instruction and student outcomes (Kraft et al., 2018).

In the realm of digital integration, systematic reviews indicate a shift in focus from “ICT skills” to the broader “digital teaching competence” (Revuelta-Domínguez et al., 2022). Reviews of reviews on TPACK also highlight the diversity of focus and the need to clarify the relationships between TPACK components and teaching decision-making (Schmid et al., 2024). Global policy documents emphasize that digital competencies now need to encompass AI literacy, data security, and critical appraisal of content (Vuorikari et al., 2022). Global guidance on GenAI adds dimensions of ethics, accountability, and strengthening teacher capacity to ensure technology is human-centered (UNESCO, 2023). Furthermore, a global teacher report highlights the strong link between working conditions, professional support, and professional retention. This pattern reinforces the need for determinant models to incorporate organizational context and policy factors as moderators of the relationships between variables (OECD, 2019).

Synthesis indicates that school learning cultures most often manifest in the form of structured collaboration, professional learning communities (PLCs), and norms of reflective practice (Antonietti, C., Cattaneo, A. A. P., & Amenduni, F. 2022). Cross-national studies show that involvement in PLCs correlates with job satisfaction, self-efficacy, and clarity of instruction, components of excellent learning outcomes (Antonietti, C., Cattaneo, A. A. P., & Amenduni, F. 2022). The literature also confirms that PLCs are effective when they incorporate inquiry cycles, shared evidence of student learning, and psychologically safe feedback (OECD, 2019). Within the framework of a school as a learning organization, learning cultures encompass instructional leadership, collaboration, and a systemically nurtured capacity for innovation (OECD, 2025).

However, findings also indicate that collaboration without a learning focus and without the support of work time tends to become an administrative routine (Ventista & Brown, 2023). Therefore, the quality of PLC design and governance is more crucial than the mere existence of a PLC (Antonietti, C., Cattaneo, A. A. P., & Amenduni, F. 2022). A strong learning culture also facilitates the exchange of digital practices, thus accelerating the adoption of relevant digital competencies in the classroom (Revuelta-Domínguez et al., 2022). Psychologically, a supportive learning culture acts as a social resource that reduces stress and promotes well-being (Hascher & Waber, 2021). TALIS findings emphasize that thriving teachers are related to a work environment that encourages innovation and collaboration, not simply demands for change (OECD, 2025). Thus, a learning culture is an upstream determinant that conditions the pathway to excellent service through CPD, well-being, mindset, and digital capability.

Synthesized results identified that the most consistently impactful CPD is iterative, contextual, and directly linked to classroom practice. Systematic reviews indicate that training remains the most common form of CPD, but ongoing coaching is more frequently associated with sustained practice changes (Ventista & Brown, 2023). A meta-analysis of coaching confirms that individualized support with feedback can improve instructional quality and impact student outcomes, although challenges arise as programs scale (Kraft et al., 2018). The theory of effective PD emphasizes a combination of components to build insight, motivate change, develop techniques, and instill practice habits. Results also indicate that impactful PD typically includes practice models, guided practice, and data-driven follow-up (Ventista & Brown, 2023).

In a digital context, effective PD demands a balance between “tool training” and “pedagogical integration” to ensure teachers do not stagnate in operational skills (Schmid et al., 2024). The digital competency framework for citizens and educators emphasizes dimensions of security, information evaluation, content creation, and problem-solving that are transferable to learning (Vuorikari et al., 2022). The synthesis also emphasized that digital PD needs to incorporate aspects of AI ethics and literacy to maintain the quality of learning services and academic integrity (UNESCO, 2023). The recent TALIS document highlights that while teachers' use of AI is

emerging, the need for support and readiness remains a competency issue (OECD, 2025). Therefore, CPD design for service excellence is strongest when it combines coaching, collaboration, and framework-based digital competency strengthening (Kraft et al., 2018).

The psychological well-being dimension, synthesized in the results, emerged as a bridging variable between "teacher learning capacity" and "quality of instructional services" (Hascher & Waber, 2021). Systematic reviews of teacher well-being confirmed the central role of social relations in schools as a recurring predictor (Hascher & Waber, 2021). Recent reviews also revealed conceptual and measurement fragmentation, leading to recommendations for a more integrated framework and consistent indicators (Gámez-Genovart et al., 2025). In the intervention literature, psychological programs for teachers have been shown to improve mental health and reduce burnout across numerous studies, although program and context heterogeneity remains high (Beames et al., 2023). These results emphasize that excellent service delivery is difficult to maintain if well-being is low, as the quality of pedagogical interactions declines as burnout increases (Beames et al., 2023).

In the digital dimension, a mediation model suggests that online teaching competence, self-efficacy, and emotion regulation are associated with digital burnout. This means that enhancing digital skills without the support of emotional regulation and work design risks creating psychological costs. A global teacher report links working conditions, administrative burden, and professional support to retention and professional resilience (UNESCO, 2023). TALIS findings position teacher thriving as a professional outcome influenced by school characteristics and teachers' beliefs about their ability to thrive (OECD, 2025). Therefore, well-being is not an additional variable, but rather a core determinant of the sustainability of CPD and the quality of learning services (Hascher & Waber, 2021).

Growth mindset has emerged as a psychological mechanism that strengthens teacher persistence in CPD and innovation adaptation (OECD, 2025). The TALIS report links growth mindset beliefs to a variety of professional outcomes, including satisfaction and efficacy, which have implications for the quality of learning services (OECD, 2025). A recent meta-analysis of mindsets in teachers and students demonstrated a link between mindset and self-efficacy, providing the basis for the belief that changes in these beliefs can strengthen competence. In the synthesis, growth mindset acts as a "learning orientation" that leads teachers to view feedback as data for service improvement, rather than as a threat to evaluation. This pattern is consistent with findings that effective PD requires motivation for change and internalization of goals, not simply the transfer of content. A growth mindset also fosters the courage to experiment with new technologies as digital competency frameworks continue to evolve, including AI (Vuorikari et al., 2022).

UNESCO's GenAI guidelines emphasize the importance of strengthening human capacity to ensure that technological innovation does not displace teachers' pedagogical roles (UNESCO, 2023). Within the context of a learning culture, a growth mindset is more likely to develop if schools provide a safe environment for collaborative experimentation, failure, and improvement (OECD, 2020). This relationship explains why learning culture is often an upstream predictor, simultaneously influencing mindset, well-being, and digital skills (Antonietti, C., Cattaneo, A. A. P., & Amenduni, F. 2022). Thus, a growth mindset, within the determination model, serves as a strengthening pathway from CPD to service excellence by increasing learning efficacy and resilience (OECD, 2025).

Digital competence, as synthesized, is not understood as a single competency, but rather as a cluster of capabilities encompassing information literacy, security, content production, and pedagogical integration

(Vuorikari et al., 2022). Systematic studies of digital teaching competence demonstrate a diversity of dimensions and development models, including evaluation instruments that map teacher competency areas (Revuelta-Domínguez et al., 2022). A review of reviews of TPACK emphasized that the primary challenge is linking technological knowledge to contextual instructional decisions, rather than simply measuring separate components (Schmid et al., 2024). A DigComp-based training study demonstrated that strengthening digital competence can be linked to improving the integration of technology and TPACK, particularly when training is directed toward learning needs (Cabero, 2025).

The synthesis also found that strong digital competence also supports excellent service delivery by improving communication quality, differentiation, and responsiveness to learning needs (OECD, 2025). However, increasing technology intensity without a sound work design can trigger digital burnout, thereby reducing service quality. Therefore, the literature emphasizes “digital well-being” as part of teachers' professional competencies, not a separate issue. The GenAI Guidelines add competencies for evaluating AI output, transparency of use, and managing risks of bias and privacy (UNESCO, 2023). This broadens the definition of digital capability from “skill” to “capacity,” encompassing ethics and responsibility (UNESCO, 2023). Thus, digital capability is a direct determinant of excellent service delivery, as well as an indirect determinant through efficacy and reduced work friction when supported by a culture of learning and well-being (OECD, 2020).

The "excellent learning service" dimension in the synthesis results emerged as visible outputs in learning reliability, teacher responsiveness, instructional clarity, and empathetic relationships (Bardach et al., 2024). A SERVQUAL-based study of academic service quality showed that reliability and responsiveness are related to user satisfaction, making them relevant for capturing learning services (Bardach et al., 2024). Other findings confirmed the relationship between service quality and satisfaction and loyalty in the educational context, although the indicators needed to be adapted for the classroom level. The synthesis positioned instructional quality and clarity as core aspects of excellent service, most closely aligned with teacher professional competence (Antonietti, C., Cattaneo, A. A. P., & Amenduni, F. 2022). Therefore, indicators of excellent service at the classroom level were drawn from evidence of CPD that impacts changes in teaching practice (Kraft et al., 2018).

The literature also confirms that the quality of learning services is unlikely to be stable when teacher well-being declines because burnout disrupts the quality of interactions and teaching consistency (Beames et al., 2023). In the digital dimension, excellent service also encompasses the ability to manage online/hybrid learning safely, equitably, and support participation. The GenAI Guidelines emphasize that “service quality” must encompass aspects of integrity, accountability, and student protection in the use of AI (UNESCO, 2023). The global teacher report highlights that professional support and working conditions determine teachers' capacity to deliver quality education services (UNESCO, 2024). Therefore, the synthesis defines excellent service as a multidimensional outcome influenced simultaneously by psychological, cultural, and digital determinants (OECD, 2025).

The determinant model emerging from the synthesis positions learning culture as an upstream determinant shaping the intensity and quality of CPD (OECD, 2020). A collaborative learning culture strengthens PLC and coaching mechanisms, facilitating the transfer of knowledge to classroom practice (Antonietti, C., Cattaneo, A. A. P., & Amenduni, F. 2022). Further pathways indicate that high-quality CPD improves efficacy, clarity of instruction, and the quality of learning services as proximal outcomes (Kraft et al., 2018). At the same time, well-being plays a mediator in determining whether CPD produces sustainable or temporary changes (Hascher

& Waber, 2021). A growth mindset strengthens the effects of CPD by increasing learning orientation, persistence, and acceptance of feedback for service improvement (OECD, 2025). Digital capabilities play a dual role as a direct predictor (expanding learning design capacity) and as a moderator (making CPD more applicable in digital contexts) (Schmid et al., 2024).

However, digital pathways also pose risks, such as increased technological burden, which can trigger digital burnout if emotional regulation and organizational support are weak. Therefore, the model adds policy support and working conditions as contextual factors that moderate all key relationships (UNESCO, 2024). The TALIS report indicates that teacher thriving is related to school characteristics and professional support, so context cannot be excluded from the model (OECD, 2025). With this structure, the deterministic model views excellent learning service as a system outcome that requires the orchestration of individual and organizational factors.

The synthesis also found that the strongest quality of evidence was for coaching and PD interventions that adhere to the principles of repeated practice and feedback (Kraft et al., 2018). Systematic reviews of teacher professional learning show that studies with causal designs on student learning outcomes are still fewer than studies on changes in teaching practice (Ventista & Brown, 2023). This makes it safer to position indicators of service excellence primarily as indicators of process and instructional quality (Ventista & Brown, 2023). Meanwhile, the wellbeing literature shows that while correlational evidence is abundant, evidence for interventions is also beginning to strengthen through reviews and meta-analyses of psychological programs (Beames et al., 2023). Wellbeing findings demand that CPD and digital innovation not be designed as an additional burden, but rather be integrated with healthy work designs (Hascher & Waber, 2021).

On the mindset dimension, cross-study evidence demonstrates a relationship between mindset and efficacy, but mindset interventions need to be tailored to the professional context and school culture. In the realm of digital competencies, the literature emphasizes the need for common standards and frameworks to consistently measure and improve competency development (Vuorikari et al., 2022). The DTC review indicates that various countries are developing competency models, but consistency of dimensions and measurement tools remains a research agenda (Revuelta-Domínguez et al., 2022). UNESCO's GenAI guidance emphasizes the urgency of AI literacy as part of digital competency and professionalism (UNESCO, 2023). Thus, the overall findings emphasize that CPD programs for service excellence must combine causal evidence (coaching), systemic evidence (learning culture), and risk evidence (digital burnout) in an integrated design.

On the theme of learning culture, the synthesis reveals three dominant elements: data-driven collaboration, leadership that facilitates learning, and reflection routines (OECD, 2020). Strong PLCs are characterized by clear learning objectives and structured practice-sharing mechanisms (Antonietti, C., Cattaneo, A. A. P., & Amenduni, F. 2022). Cross-country findings confirm that PLC engagement is related to job satisfaction, which in turn supports stable and consistent learning services (Antonietti, C., Cattaneo, A. A. P., & Amenduni, F. 2022). A learning culture also lowers psychological barriers to change because teachers feel safe trying new strategies (Hascher & Waber, 2021).

The framework for effective PD emphasizes that embedding practice changes requires organizational support and collective norms, not just training. In a digital context, a learning culture facilitates the exchange of technological literacy and collaborative problem-solving, thus accelerating competency improvement (Revuelta-Domínguez et al., 2022). However, results also suggest that a learning culture can be “false” if collaboration is not followed by evidence-based improvement actions (Ventista & Brown, 2023). Therefore,

the success of a learning culture is assessed by its cycle of action and its impact on instructional practice (Ventista & Brown, 2023). TALIS emphasizes the role of an environment that fosters innovation and collaboration in improving professional outcomes (OECD, 2023). Therefore, the learning culture in the determination model is positioned as a driving force for organizational learning, making CPD a habit (OECD, 2023).

On the topic of psychological well-being, the synthesis indicates that teacher well-being is linked to individual factors and work context, with social relationships being a highly consistent predictor (Hascher & Waber, 2021). A recent review emphasized that well-being research tends to be fragmented, necessitating conceptual and methodological integration (Gámez-Genovart et al., 2025). Psychological intervention programs have shown potential for improving mental health and reducing burnout, but program quality and intensity vary (Beames et al., 2023). The literature also positions burnout as a threat to learning services because it reduces emotional energy and the quality of teacher-student interactions (Beames et al., 2023). In the digital context, burnout arises not only from workload but also from technological complexity, demands for rapid response, and competency uncertainty.

Mediation models suggest that self-efficacy and emotion regulation influence digital burnout, so CPD needs to include strengthening these aspects. The global teacher report emphasizes that working conditions, professional support, and professional status influence retention and well-being (UNESCO, 2023). TALIS findings link thriving to professional aspects such as efficacy and growth mindset beliefs, which are also related to well-being (OECD, 2025). Therefore, the well-being pathway in the determinants model is positioned as a mediator that strengthens or weakens the impact of CPD on service excellence (Hascher & Waber, 2021). Practically, the results demand a “whole-school well-being” approach integrated with policies and work culture, rather than solely individual training (UNESCO, 2023).

On the theme of growth mindset, the synthesis confirms that mindset influences how teachers interpret challenges and feedback in the professional learning process (OECD, 2025). The relationship between mindset and self-efficacy is supported by a meta-analysis showing a consistent correlation between mindset and self-efficacy across a broad sample. This means that improving mindset has the potential to strengthen teachers' confidence to try new strategies and sustain improvement efforts. Within the framework of effective PD, motivation for change is a causal component that needs to be present for training to transform into classroom action. A growth mindset acts as a motivational catalyst because it emphasizes that teaching quality can be improved through practice and reflection (OECD, 2025).

A supportive learning culture makes the mindset more likely to develop because failure is seen as part of organizational learning (OECD, 2020). In the digital context, mindset helps teachers tolerate technological uncertainty and continuously improve AI literacy and digital security (Vuorikari et al., 2022). UNESCO's GenAI guidelines emphasize that technology adaptation must be accompanied by the ability to think critically about AI output, which requires an open learning orientation (UNESCO, 2023). Thus, a growth mindset is not simply an attitude, but a psychological mechanism that magnifies the effects of CPD and strengthens the quality of learning services (OECD, 2025). The synthesis positioned mindset as a moderator that strengthens the CPD → efficacy → service excellence pathway, particularly in the context of rapid curriculum and technological change.

On the topic of digital competencies, the synthesis found that the DigComp framework helps operationally map digital competencies and provides examples of knowledge, skills, and attitudes for citizens and educators

(Vuorikari et al., 2022). The DTC study showed that teacher digital competency has evolved into a multidimensional concept encompassing instructional design, evaluation, content creation, and ethics (Revuelta-Domínguez et al., 2022). The TPACK review-of-reviews emphasized that technology enhancement must be tied to pedagogy and content for integration to be meaningful to learning (Schmid et al., 2024). Training studies linking DigComp to technology integration suggest that competency enhancement needs to be designed around authentic tasks and reflection on practice (Cabero, 2025).

UNESCO's GenAI guidelines expand on digital competencies by emphasizing governance, privacy, bias, and teacher training for responsible use (UNESCO, 2023). These findings are relevant because the use of AI can accelerate work, but also raises the risk of misinformation and dependency without critical literacy (UNESCO, 2023). TALIS marks the emergence of AI use by teachers and the need for support so that technology enhances teaching quality, not increases the burden (OECD, 2025). On the risk side, the digital burnout model shows that online competence, efficacy, and emotion regulation are related to burnout intensity. Therefore, digital empowerment programs need to incorporate the competency of “managing work boundaries” and emotion regulation strategies when facing digital stress. The final synthesis of results positions digital capabilities as a direct determinant of the quality of learning services and an indirect determinant through efficacy and reduced work friction (Schmid et al., 2024).

The synthesis also identified that "excellent service" at the learning level is most easily mapped through the dimensions of instructional quality, clarity of objectives, responsiveness of feedback, and a safe learning experience (Antonietti, C., Cattaneo, A. A. P., & Amenduni, F. 2022). Cross-national PLC studies link PLC engagement with clarity of instruction, a key indicator of learning service quality (Antonietti, C., Cattaneo, A. A. P., & Amenduni, F. 2022). A meta-analysis of coaching demonstrated improved instructional practices, positioning coaching as a core strategy for strengthening learning services (Kraft et al., 2018). From an educational service quality perspective, the dimensions of reliability and responsiveness are related to user satisfaction, although indicators need to be adapted to the classroom context (Bardach et al., 2024).

Findings in education also demonstrate a relationship between service quality and satisfaction, providing a basis for operationalizing learning service quality with measurable indicators. However, the wellbeing literature cautions that excellent service is unstable when burnout increases, as interaction quality and consistency decline (Beames et al., 2023). In a digital context, excellent service also demands security, inclusion, and equity of access, which are related to digital competencies and school policies (Vuorikari et al., 2022). The GenAI Guidelines emphasize the need for transparency in the use of AI to maintain trust and integrity in learning as part of service quality (UNESCO, 2023). The global teacher report emphasizes the need for system support for teachers to provide quality services sustainably (UNESCO, 2023). Therefore, excellent learning service is positioned as a multi-level outcome that requires synergy between CPD, culture, mindset, well-being, and digital capacity (OECD, 2025).

The first dominant determinant pathway is learning culture → CPD quality, as culture provides the norms, time, and collaboration mechanisms that enable repeated PD (OECD, 2020). Cross-country PLC evidence suggests that structured collaboration is related to teacher outcomes, making collaborative culture a powerful lever (Antonietti, C., Cattaneo, A. A. P., & Amenduni, F. 2022). The theory of effective PD emphasizes the embedding of practice changes, which rely heavily on organizational support and school routines. The second determinant pathway is CPD quality → improved instructional practices → service excellence, supported by a meta-analysis of coaching (Kraft et al., 2018). The third determinant pathway is learning culture → wellbeing, as social relationships and peer support reduce stress and strengthen resilience (Hascher & Waber, 2021).

Intervention reviews confirm that wellbeing programs can be helpful, but the most sustained impact is often related to changes in the work environment and systemic support (Beames et al., 2023). The fourth determining pathway is growth mindset → increased CPD efficacy and persistence, supported by evidence of the mindset-efficacy relationship. The fifth determining pathway is digital capabilities → quality of learning design and service responsiveness, guided by the DigComp and DTC frameworks (Vuorikari et al., 2022). However, the risk pathway suggests that increased digital demands without emotional regulation support exacerbate digital burnout. Therefore, the model concludes that maximum service excellence occurs when the reinforcing pathways (culture, mindset, CPD, digital) overcome the risk pathway (burnout) through system support and healthy work design (UNESCO, 2023).

The synthesis of these findings underscores the importance of CPD program “coherence,” namely, alignment between teacher needs, school objectives, and learning service indicators. Coherence increases when schools become learning organizations that facilitate learning across levels, from the individual to the system (OECD, 2020). Studies of professional learning also emphasize that repetition and long duration strengthen the opportunities for transfer to the classroom (Ventista & Brown, 2023). In a digital context, coherence requires a clear competency map so that training is seamless and progress can be monitored (Revuelta-Domínguez et al., 2022). The DigComp framework supports coherence by providing consistent competency domains, including aspects of AI security and literacy (Vuorikari et al., 2022).

The GenAI Guidelines add that coherence should encompass institutional policies, ethical guidelines, and planned teacher capacity development (UNESCO, 2023). From a well-being perspective, coherence also means that competency-building programs do not add to the burden without compensating for time and psychological support (Hascher & Waber, 2021). TALIS emphasizes that school support and environmental characteristics influence thriving, so programs must align with teachers' real-world circumstances (OECD, 2025). The global teacher report emphasizes that recruitment, training, and professional support policies broadly impact the quality of educational services (UNESCO, 2023). Therefore, the determination model positions coherence as a design principle for integrating culture, well-being, mindset, and digital within a single CPD architecture.

The synthesis also found that self-efficacy repeatedly emerged as a bridge between CPD input and the quality of learning services (OECD, 2025). PLC studies demonstrated a relationship between PLC and self-efficacy and clarity, thus clarifying the pathway from learning culture → efficacy → service (Antonietti, C., Cattaneo, A. A. P., & Amenduni, F. 2022). A meta-analysis of coaching confirmed that targeted feedback and individualized support strengthen instructional competencies, which are sources of efficacy (Kraft et al., 2018). In the digital realm, online teaching efficacy is related to pedagogical skills, online content, and emotional regulation, ultimately influencing digital burnout. This means that efficacy has two roles: improving service quality and protecting against burnout when digital demands increase. A growth mindset strengthens efficacy through the belief that abilities can be improved, which is supported by evidence of the relationship between mindset and self-efficacy.

Effective PD theory positions motivation for change and teaching techniques as causal components, allowing efficacy to be viewed as an important intermediate outcome. In a healthy learning culture, efficacy is fostered through peer feedback and small successes accumulated in the inquiry cycle (OECD, 2020). Ultimately, efficacy influences the reliability of learning services because teachers more consistently implement strategies, monitor progress, and adjust responses (Bardach et al., 2024). Therefore, the synthesis positioned efficacy as a key connecting node in the model of determining excellent learning services (OECD, 2025).

In terms of implementation, the synthesis indicates that the most promising strategy is an intervention package combining coaching, PLCs, and framework-based digital competency strengthening (Kraft et al., 2018). This package is considered effective because it bridges the gap between knowledge, practice, and sustainability through embedded change. In a digital context, this package should map teacher competencies across domains such as information, communication, content creation, security, and problem-solving (Vuorikari et al., 2022). The DTC study emphasized that competency development needs to be accompanied by measurement tools for diagnosing needs and monitoring progress (Revuelta-Domínguez et al., 2022). The TPACK review-of-reviews indicates that strengthening technology integration must be linked to content and pedagogy, so coaching needs to focus on instructional decisions (Schmid et al., 2024).

Regarding well-being, the intervention package should include psychological support strategies and workload management to prevent innovation from triggering burnout (Beames et al., 2023). The digital burnout model confirms that emotion regulation can be a target for strengthening to reduce burnout. The global teacher report emphasizes the need for systemic support and policies that improve working conditions for sustainable service quality (UNESCO, 2023). TALIS also emphasizes the importance of an environment that fosters innovation and collaboration, so intervention packages need to be supported by instructional leadership (OECD, 2025). Thus, the synthesis results lead to system-based implementation recommendations, rather than short-term training projects (OECD, 2020).

The synthesis of these findings demonstrates a strong need for ethical governance and digital security within CPD, particularly as GenAI begins to be adopted in learning practices (UNESCO, 2023). UNESCO guidelines emphasize a human-centered approach and capacity building to ensure technology empowers teachers and learners (UNESCO, 2023). The DigComp Framework includes examples of competencies related to information evaluation, data security, and AI literacy, which are relevant for maintaining the quality of learning services (Vuorikari et al., 2022). From a service perspective, security and integrity can be viewed as an “assurance” dimension that enhances learner trust (Bardach et al., 2024).

However, without clear policies, technology use has the potential to increase teachers’ cognitive load and increase the risk of digital burnout. This suggests that the digital dimension should not be separated from well-being and work design (Hascher & Waber, 2021). TALIS marks a shift in the realities of the modern classroom, requiring CPD to respond adaptively to the dynamics of AI and technology (OECD, 2025). The TPACK review emphasized that technology integration requires model clarity and relevance to specific instructional contexts (Schmid et al., 2024). Therefore, the synthesis suggests digital CPD based on real-life classroom cases, with coaching and reflection to assess the quality of AI use decisions (Kraft et al., 2018). With this approach, digital skills develop in alignment with service-learning ethics and professional resilience (UNESCO, 2023).

The synthesis also demonstrates the role of school leadership as a contextual factor moderating the relationship between learning culture and CPD quality (OECD, 2020). Leadership that provides time for collaboration and reduces administrative burdens increases the likelihood of PLCs resulting in real practice changes (Antonietti, C., Cattaneo, A. A. P., & Amenduni, F. 2022). The theory of effective PD emphasizes the need to embed practice changes, which often fail when there is no structural support from the organization. Regarding wellbeing, leadership also determines the psychological climate and social support that are consistent predictors of teacher wellbeing (Hascher & Waber, 2021).

The global teacher report emphasizes that professional support, working conditions, and professional status require policy and governance, not just individual resilience (UNESCO, 2023). In the digital context, leadership

sets standards for technology use, training, and security risk management (UNESCO, 2023). The DigComp and DTC frameworks can be used by school leaders to create measurable competency maps and training roadmaps (Vuorikari et al., 2022). TALIS shows that work environments that foster innovation and collaboration are associated with better professional outcomes (OECD, 2025). Therefore, the determinant model includes leadership as a moderator influencing the strength of the culture → CPD → service pathway (OECD, 2020). In other words, excellent learning service is an outcome of the learning organization, not just the personal performance of teachers.

In terms of equity, the synthesis emphasizes that access to quality CPD and digital resources is unequal, impacting the quality of learning services (UNESCO, 2024). Global teacher reports link teacher shortages and working conditions to education quality, suggesting that gaps in professional support directly impact services (UNESCO, 2024). In the digital context, device and connectivity inequalities can lead to unequal development of digital skills, even when competency frameworks are in place (Vuorikari et al., 2022). The DTC study demonstrates variations in development models across countries, indicating the influence of policies and system capacity (Revuelta-Domínguez et al., 2022).

The TPACK review-of-reviews also emphasizes the influence of context, requiring adaptation of technology integration strategies to suit resources and needs (Schmid et al., 2024). From a well-being perspective, challenging work environments with minimal support increase the risk of burnout, making it increasingly difficult to maintain service quality (Beames et al., 2023). TALIS emphasizes that school characteristics are related to variations in teacher outcomes, so equitable support must be a policy component (OECD, 2025).

PLCs can be a strategy for equitable knowledge sharing because they are collaboration-based, but they still require time and facilitation (Antonietti, C., Cattaneo, A. A. P., & Amenduni, F. 2022). Coaching has proven effective, but its scale requires resources, quality trainers, and a well-thought-out implementation design (Kraft et al., 2018). Therefore, the synthesis results emphasize that the determination model must be complemented by policy strategies to ensure that excellent service does not become a privilege for certain schools (UNESCO, 2023).

Overall, the synthesis yielded four key propositions to explain the determinants of excellent learning service. The first proposition states that a strong learning culture enhances the quality of CPD and strengthens transfer to the classroom (OECD, 2020). The second proposition states that well-being mediates the impact of CPD on service consistency, so competency-building programs should align with psychological health (Hascher & Waber, 2021). The third proposition states that a growth mindset moderates the relationship between CPD and service improvement efficacy and persistence (OECD, 2025). The fourth proposition states that digital skills play a direct role in service quality but also open up pathways to burnout risk when emotional and organizational support is weak.

These four propositions are supported by meta-analytic evidence of coaching demonstrating a causal effect on instruction (Kraft et al., 2018). They are also supported by cross-national evidence on PLCs and teacher outcomes related to instructional quality (Antonietti, C., Cattaneo, A. A. P., & Amenduni, F. 2022). On the digital side, the DigComp framework and the DTC study provide an operational basis for measuring and developing competencies (Vuorikari et al., 2022). Meanwhile, the GenAI guidelines emphasize ethical and governance competencies as part of the quality of modern learning services (UNESCO, 2023). The global teacher report emphasizes the role of system factors and working conditions, so propositions need to be viewed

as context-dependent relationships (UNESCO, 2023). With these propositions, the determination model guides how schools design sustainable CPD while maintaining the quality of learning services.

The synthesis also identified operational indicators to assess the success of the determination model in the context of proceedings. At the learning culture level, indicators include the frequency of meaningful collaboration, inquiry cycles, and collegial feedback practices (OECD, 2020). At the CPD level, indicators include iteration, ongoing coaching, practice-based training, and embedding change into teaching routines. At the wellbeing level, indicators include work stress, burnout, and the quality of social support at school, which consistently emerge as predictors (Hascher & Waber, 2021). At the mindset level, indicators include challenge orientation, receptiveness to feedback, and the belief that skills can be developed (OECD, 2025). At the digital capabilities level, indicators include the DigComp domain and DTC dimensions such as content creation, security, and pedagogical integration (Vuorikari et al., 2022).

At the learning service level, indicators include the reliability of learning implementation, responsiveness, clarity of instruction, and quality of interactions (Bardach et al., 2024). In the digital context, services also encompass the ability to maintain the integrity and security of learning, including the responsible use of AI (UNESCO, 2023). Cross-national PLC evidence suggests clarity of instruction and self-efficacy as relevant teacher outcome indicators (Antonietti, C., Cattaneo, A. A. P., & Amenduni, F. 2022). Evidence from coaching provides the basis that instructional changes can be measured as a proximal outcome before assessing student learning outcomes (Kraft et al., 2018). With these indicators, the synthesis offers an evaluation framework that can be used to assess whether CPD truly results in sustained service excellence (Ventista & Brown, 2023).

The synthesis then formulated the "working mechanism" of the determination model in the form of a change flow. The initial stage begins with strengthening a learning culture through a PLC structure, collaborative time, and leadership that facilitates learning (OECD, 2020). The second stage is practice-based CPD, which combines short training sessions, coaching, and data-driven reflection on learning (Kraft et al., 2018). The third stage is strengthening psychological mechanisms in the form of well-being and a growth mindset to enable teachers to sustain changes in practice (Beames et al., 2023). The fourth stage is enhancing digital capabilities based on a framework to ensure new practices are compatible with the demands of digital learning and AI (Vuorikari et al., 2022).

The fifth stage is internalizing excellent service standards through indicators of clarity of instructions, responsiveness of feedback, and reliability of implementation. In this mechanism, well-being acts as a "buffer" that prevents innovation from turning into burnout (Hascher & Waber, 2021). A growth mindset acts as a "reinforcer" that maintains motivation for change and tolerance for failure when trying new strategies (OECD, 2025). Digital skills act as both an "enabler" and a "stressor" depending on work design and emotional regulation. The GenAI Guidelines add that ethical standards should be embedded across all stages, not just digital training (UNESCO, 2023). With this flow, the synthesis provides a systematic overview of how key variables work together to produce excellent learning services.

The synthesis also revealed implementation risks that need to be addressed to prevent the determination model from failing at the execution stage. The first risk is "overtraining" without embedding, which results in training not changing practice due to the lack of routine support and feedback. The second risk is PLCs that focus on administration, rather than inquiry learning, thus weakening their benefits for instruction (Ventista & Brown, 2023). The third risk is a misalignment between digital competency maps and classroom needs, resulting in teachers mastering tools but not improving learning services (Schmid et al., 2024). The fourth risk

is increasing digital burnout as technological demands increase without strengthening efficacy, emotional regulation, and organizational support. The fifth risk is unclear AI policies that create uncertainty about ethics, integrity, and data security (UNESCO, 2023).

The sixth risk is resource inequities that make it difficult for certain schools to implement quality digital coaching and CPD (UNESCO, 2023). The seventh risk is a lack of attention to well-being, resulting in weakened learning services despite increased technical competency (Beames et al., 2023). TALIS emphasizes that support and the work environment influence teacher outcomes, so neglecting context increases the risk of model failure (OECD, 2025). Therefore, the synthesis emphasizes the principle of "systemic support" as a prerequisite for success, including time, facilitators, and clear policies (OECD, 2020). By mitigating these risks, the determination model becomes more realistic for adoption as a framework for continuous professional competency development toward excellent learning services (UNESCO, 2023).

The synthesis results place measurement and evaluation as mandatory components to ensure that CPD based on a learning culture does not become a mere slogan. For quality review and reporting, the methodological literature emphasizes clear reporting standards in the selection and synthesis process (Rethlefsen et al., 2021). The PRISMA-S guidelines emphasize transparency of search strategies to increase replication and accountability (Rethlefsen et al., 2021). For quality assessment of mixed-method studies, the MMAT provides a consistent assessment framework for quantitative, qualitative, and mixed-methods studies (Hong et al., 2018). In the context of school implementation, evaluations should combine process indicators (e.g., coaching cycles) and proximal outcome indicators (e.g., clarity of instruction) (Kraft et al., 2018). Wellbeing evaluations should include indicators of burnout and social support because these two aspects are consistently related to service quality (Hascher & Waber, 2021).

Mindset evaluations can include indicators of efficacy and challenge orientation because meta-evidence shows consistent links. Digital competency evaluation can utilize the DigComp domain and DTC dimensions for diagnosis and monitoring (Vuorikari et al., 2022). Digital ethics and AI evaluations can refer to UNESCO's guiding principles, which emphasize security, privacy, and human-centeredness (UNESCO, 2023). TALIS can serve as a benchmark for professional outcome indicators such as thriving and efficacy at a system scale (OECD, 2025). With this evaluation framework, the synthesis of results provides a tool for assessing whether CPD is truly improving learning excellence in a sustainable manner.

The synthesis also shows that ongoing professional competency development should be viewed as a professional retention strategy. The global teacher report indicates that professional support and working conditions are key to retaining teachers and maintaining the quality of education (UNESCO, 2023). If CPD enhances competency but neglects well-being, the risk of burnout and turnover intentions can increase, disrupting learning services (Beames et al., 2023). TALIS emphasizes the realities of the modern classroom and the importance of support for teachers to adapt and persist (OECD, 2025). A healthy learning culture helps retention by providing a sense of belonging, social support, and a path to professional growth (OECD, 2020). A well-functioning PLC is also linked to job satisfaction, a protective factor for professional sustainability (Yeager, 2020).

Ongoing coaching provides personalized support that can enhance competency and a sense of competence, which in turn supports retention (Kraft et al., 2018). In the digital context, increased skills reduce job friction, but the uncertainty of AI and technological pressures can increase stress when policies are unclear (UNESCO, 2023). Therefore, a CPD strategy for excellent service delivery needs to include a roadmap for AI literacy and

ethics, not just tool skills (Vuorikari et al., 2022). Quality digital integration also requires a TPACK approach so that technology enhances learning, not simply replaces formats (Schmid et al., 2024). Thus, the synthesis confirms that CPD based on a learning culture, wellbeing, mindset, and digital capability is both a quality strategy and a strategy for the resilience of the teaching profession (UNESCO, 2023).

The synthesis of these findings leads to recommendations for program design oriented toward "service excellence" as a measurable end goal. First, schools need to build a learning culture through inquiry-based PLCs and protected collaborative schedules (OECD, 2020). Second, CPD should focus on classroom practices through coaching and feedback, as causal evidence is stronger (Kraft et al., 2018). Third, programs should incorporate modules on wellbeing and emotion regulation to prevent burnout, including digital burnout. Fourth, a growth mindset needs to be integrated as a learning orientation so that teachers consistently improve services and receive feedback (OECD, 2025). Fifth, digital skills should be developed based on the DigComp and DTC frameworks and linked to pedagogical integration (Vuorikari et al., 2022).

Sixth, GenAI literacy and ethics need to be integrated into CPD to ensure the quality of learning services remains safe, equitable, and accountable (UNESCO, 2023). Seventh, indicators of excellent service need to be operationalized through clarity of instruction, responsiveness, and reliability of learning. Eighth, program evaluations should utilize reporting standards and study quality assessments to ensure evidence-based policy learning (Rethlefsen et al., 2021). Ninth, system and policy support needs to ensure equitable access to quality CPD to ensure service quality is not inequitable (UNESCO, 2023). With this design, the synthesis results provide an implementable model that can be tested and developed in different school contexts.

In a final synthesis, the review concluded that excellent learning service is a system outcome born from continuous CPD within a strong learning culture (OECD, 2020). Wellbeing is positioned as a foundation for sustainability that mediates the impact of CPD on service consistency and the quality of pedagogical interactions (Hascher & Waber, 2021). A growth mindset serves as a reinforcement that magnifies the impact of CPD by increasing the efficacy and persistence of service improvement (OECD, 2025). Digital skills become an enabler of excellent service when developed based on a competency framework and tied to instructional decisions (Vuorikari et al., 2022). However, digital skills also have the potential to become a stressor that triggers digital burnout if emotion regulation and organizational support are inadequate. Meta-analytic evidence from coaching suggests that ongoing mentoring strategies are a key component in transforming competencies into service practices (Kraft et al., 2018).

Cross-national evidence on PLCs suggests that structured collaboration is linked to teacher outcomes relevant to excellent service, such as clarity of instruction (Antonietti, C., Cattaneo, A. A. P., & Amenduni, F. 2022). The GenAI guidelines emphasize the need for ethics, privacy, and human-centeredness to ensure that technological innovation does not undermine the quality of learning services (UNESCO, 2023). The global teacher report emphasizes that working conditions and system support are prerequisites for the determination model to be effective and sustainable (UNESCO, 2023). Thus, the resulting determination model emphasizes that CPD for excellent service must be understood as an orchestration of culture, psychology, mindset, and digital competencies within an evidence-based evaluation framework.

## Conclusion

This literature review concludes that excellent learning service is a systemic outcome of continuing professional competency (CPD) built through the synergy of a learning culture, psychological well-being, a

growth mindset, and digital skills. A learning culture acts as an upstream determinant, providing norms of collaboration, spaces for reflection, and feedback mechanisms so that CPD does not stop at training but becomes embedded as daily work practice. The quality of CPD most consistently improves when schools adopt practice-based professional learning, particularly through coaching and evidence-based professional learning communities, as these strategies strengthen knowledge transfer to the classroom and improve the clarity of instruction, the quality of feedback, and the consistency of learning services.

The following conclusion confirms that psychological well-being is the foundation of service sustainability, as it determines teachers' emotional energy, cognitive focus, and resilience in consistently implementing practice updates. When well-being weakens, competency development tends to be unstable and even risks triggering burnout—especially in a digital context that increases communication demands, technological complexity, and expectations of rapid response. A growth mindset serves as an internal reinforcement that magnifies the impact of CPD by encouraging a learning orientation, persistence, and a readiness to accept feedback as input for service improvement, thus making teachers more adaptive to changes in curriculum and technology. Meanwhile, digital skills are a key enabler of excellent service in the era of hybrid and AI-based learning, but are only effective when directed at integrating pedagogy, critical literacy, security, and ethics. Without the support of emotional regulation and school governance, digitalization can actually become a stressor.

Overall, this study concludes with the implication that improving excellent learning services cannot be achieved through a single intervention. Effective CPD programs need to be designed as an integrated architecture: building a school-wide learning culture, providing data-driven coaching and feedback cycles, protecting teachers' psychological well-being, fostering a growth mindset, and developing human-centered and responsible digital skills. With this framework, schools have a strong conceptual foundation for designing scalable, adaptive, and sustainable CPD, while also preparing a further research agenda to empirically test the determinant model in different school contexts.

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