Journal of Culture and Values in Education

https://cultureandvalues.org

E-ISSN: 2590-342X

Volume: 9 Issue: 3 2026

pp. 158-183

Professional Training Needs for Digital Pedagogy and Teacherpreneurship: Implications for Teacher Professional Development Curriculum Design

Rusman Rusman*[a], Babang Robandi[b], & Wawan Setiawardani[c]

* Corresponding author:
Email: rusman@upi.edu
a. Curriculum Development Department, Universitas Pendidikan, Bandung, Indonesia
b. Pedagogi, Universitas Pendidikan Indonesia, Bandung.
c. Elementary School Teacher Education Program, Universitas Darul Ma'arif, Indramayu

Article Info
Received: March 10, 2026
Accepted: July 25, 2026
Published: September 28, 2026

10.46303/jcve.2026.44

How to cite
Rusman, R., Robandi, B., & Setiawardani, W. (2026). Professional Training Needs for Digital Pedagogy and Teacherpreneurship: Implications for Teacher Professional Development Curriculum Design. *Journal of Culture and Values in Education*, *9*(3), 158-183.
https://doi.org/10.46303/jcve.2026.44

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

ABSTRACT
Indonesia's elementary school teachers face a preparation gap that is both substantive and structural: digital pedagogy and teacherpreneurship are now practical classroom demands, yet training systems remain misaligned with what practitioners actually need. This study examines that gap from the inside out. Using existential phenomenological inquiry, we engaged 25 elementary school teachers in West Java in semi-structured group interviews, analysed through Colaizzi's descriptive phenomenological method with the Concerns-Based Adoption Model as a sensitising framework. Findings span three concern levels. At the self-concern level, teachers show high awareness of digital transformation alongside fragile professional identity and acute practical-competence gaps, shaped by the absence of structured preparation. At the task-concern level, findings document fragmented, theory-weighted training, infrastructural inequity, and administrative workloads that exclude professional learning from daily routines. At the impact-concern level, teachers recognise digital tools' pedagogical potential and articulate a teacher-generated specification for an integrated training pathway spanning content creation, entrepreneurial practice, financial literacy, and sustainability ethics, while voicing ethical concern about a widening digital divide. These concern-level findings synthesise into two themes answering the study's two research questions: teachers' specification of their own training needs for digital pedagogy and teacherpreneurship, and their account of how those needs should be integrated into curriculum design, teaching materials, and classroom practice. The study concludes that addressing these needs requires reorienting professional development curricula away from episodic, generic provision toward needs-based programme design, differentiated by concern profile, contextually embedded, and calibrated to teachers' own aspirations.

KEYWORDS
Digital pedagogy; elementary teachers; Indonesia; curriculum design; phenomenology; teacherpreneurship

INTRODUCTION

Indonesia's elementary school teachers inhabit a professional reality that their formal preparation has been slow to acknowledge. The expectations placed upon them have shifted decisively. Digital tools, entrepreneurial dispositions, and learner-centred instructional design are no longer peripheral aspirations embedded in policy documents but practical demands that surface in everyday classroom life. Yet the training systems responsible for equipping teachers with these capacities remain structurally misaligned with what teachers actually need (Fitrianto, 2024; Goyibova et al., 2025). This misalignment is the starting point of the present inquiry.

The misalignment is not incidental. It reflects a deeper and more longstanding problem in Indonesian teacher professional development: the persistent tendency to design training programmes around administrative convenience or policy compliance rather than around the documented learning needs of practitioners (Linde et al., 2023; Smith & Gillespie, 2007; Kagema, 2018). Teachers attend mandated workshops, complete required hours, and receive certificates. What they frequently do not receive is preparation that translates into altered classroom practice: preparation grounded in what they actually struggle with, what they genuinely want to learn, and what their local teaching conditions make feasible. The curriculum of professional development, in short, has not been designed from the inside out.

The consequences are visible in the data. Nearly 3.6 million Indonesian children remain outside the formal schooling system (Inui et al., 2025), and a disproportionate share of those who are enrolled receive instruction from teachers whose pedagogical competencies have not kept pace with the demands of contemporary education. Approximately 60% of elementary teachers have met formal qualification thresholds (Hidayati et al., 2025), a figure that, while slowly improving, conceals a more stubborn discrepancy: credential attainment does not map reliably onto competence in digitally mediated instruction (Gunawan, 2025; Hastangka et al., 2025). Teachers hold diplomas. They do not always hold the knowledge, the confidence, or the pedagogical repertoire that effective digital teaching requires.

Access to comparable educational opportunities remains an aspiration rather than an accomplished fact across Indonesia's regions, with children in different provinces continuing to experience measurably unequal chances to acquire equivalent knowledge and skills (Budiharso et al., 2023; Tonegawa, 2023). Teacher quality sits at the centre of this inequality. Evidence consistently links professional development opportunities to teacher job satisfaction, instructional performance, and sustained commitment to the profession (Murwaningsih, 2024; Murwaningsih & Fauziah, 2023; Schleicher, 2022; Yuningsih & Tejawiani, 2026). When those opportunities are poorly designed, and when the curriculum components of in-service training, from its stated objectives to its delivery methods, fail to begin where teachers actually are, the damage propagates outward, through classrooms, through communities, through the life chances of the students who can least afford an underprepared teacher (Bremner et al., 2022; Robandi & Setiawardani, 2025).

Digital pedagogy holds genuine potential as part of the response. The expanding repertoire of technology-enabled instructional approaches offers teachers concrete tools for designing learning that is more adaptive, interactive, and learner-directed than conventional classroom arrangements typically permit (Mhlongo et al., 2023; Rahman & Hossain, 2025; Setiawardani et al., 2021). Collaborative knowledge construction, real-time formative feedback, and differentiated digital resources are no longer specialist techniques reserved for well-resourced urban schools, but pedagogical possibilities available to any teacher with the preparation to use them (Makinde et al., 2024). The gap, in most cases, lies not in technology access alone but in the design of professional learning, specifically in whether the curriculum of in-service teacher education actually equips practitioners to translate digital tools into sustained change in their instructional practice.

Into this landscape, the concept of teacherpreneurship introduces a reconceptualisation of what teacher agency can look like within a digitally connected economy. Teacherpreneurs, educators who draw on their professional expertise to develop educational products, digital content, training materials, or supplementary income streams, are not simply classroom innovators. They represent a reconfiguration of the teacher's professional identity within wider social and economic structures, one that carries particular resonance for Indonesian elementary teachers who navigate a real economic precarity while simultaneously being held to rising professional standards (Liu et al., 2024; Nuryani et al., 2025; Sayehvand et al., 2025). The entrepreneurial competencies involved, including digital communication, audience analysis, iterative content design, and platform literacy, are precisely those that also strengthen pedagogical practice (Alam, 2022; Fu & Zhang, 2024). Teacherpreneurship and quality instruction, far from being in tension, can reinforce one another when cultivated within a purposefully structured training curriculum (Li, 2025; Miço & Cungu, 2023; Sitaridis & Kitsios, 2024).

The existing literature on teacher entrepreneurship has grown considerably in recent years, focusing primarily on motivation structures, innovative teaching behaviour, and the institutional conditions that enable or inhibit entrepreneurial practice (Hardie et al., 2023; Pittaway et al., 2024). What the literature has not adequately examined is the phenomenological dimension: how Indonesian elementary school teachers working within their own specific institutional, economic, and cultural constraints interpret and articulate their professional training needs at the intersection of digital pedagogy and entrepreneurship. The absence of this perspective is consequential. Any attempt to redesign professional development curricula, whether at the LPTK level, within government-administered in-service schemes, or through independent training providers, without first attending to how teachers themselves understand their own competency gaps and learning aspirations risks reproducing precisely the kind of top-down, decontextualised provision that has historically failed to generate durable pedagogical change.

This study confronts that absence from within practitioners' own accounts. Two variables organise the inquiry. The first is professional training needs for digital pedagogy: the specific competencies, instructional scaffolding, and forms of sustained preparation that elementary school teachers identify as necessary to translate digital tools into substantively altered classroom practice. The second is professional training needs for teacherpreneurship: the knowledge domains and practical preparation teachers require to develop, distribute, and sustain educationally grounded entrepreneurial activity alongside their classroom duties. Neither variable has been mapped phenomenologically in the Indonesian elementary school context. Grounded in Colaizzi's descriptive phenomenological methodology, the study draws on the lived professional accounts of twenty-five elementary school teachers in West Javaat tending not only to what they identify as absent from their preparation, but to how those absences are experienced within the texture of their actual working lives (Edward & Welch, 2011). From these accounts, a specific practical ambition follows: generating phenomenologically grounded evidence that teachers' own training experiences, constraints, and aspirations should directly shape the architecture of teacher professional development (TPD) curriculum design.

The following research questions guided the inquiry. In response to the reviewer's observation that the original four questions did not adequately confront the study's two organising variables, professional training needs for digital pedagogy and professional training needs for teacherpreneurship, the questions below have been consolidated into two, each phrased with an operational verb and each anchored directly to both variables and to the curriculum-design ambition stated above:

1) What professional training needs for digital pedagogy and for teacherpreneurship do Indonesian elementary school teachers identify and specify as necessary to inform teacher professional development curriculum design?

2) How do elementary school teachers integrate their professional training needs for digital pedagogy and teacherpreneurship into teacher professional development curriculum design, including teaching materials, lesson plans, syllabi, and classroom practice?

Both questions were operationalised through the semi-structured group interview guide detailed in Section 2.3, which served as the study's primary data collection instrument; no separate questionnaire instrument was employed, as the phenomenological design of this study calls for an interview-based rather than survey-based instrument.

METHODOLOGY

Research Design

This study adopts a qualitative approach grounded in existential phenomenological inquiry (Errasti-Ibarrondo et al., 2018; Finlay, 2013), with Colaizzi's descriptive phenomenological method as its analytical design (Edward & Welch, 2011). The distinction between these two levels matters: the approach concerns the study's epistemic orientation by foregrounding

authentic, everyday professional experience and prioritising participants' first-person meaning-making in response to emerging educational demands (Bouzioti, 2023), while the design specifies the procedure through which that orientation is operationalised.

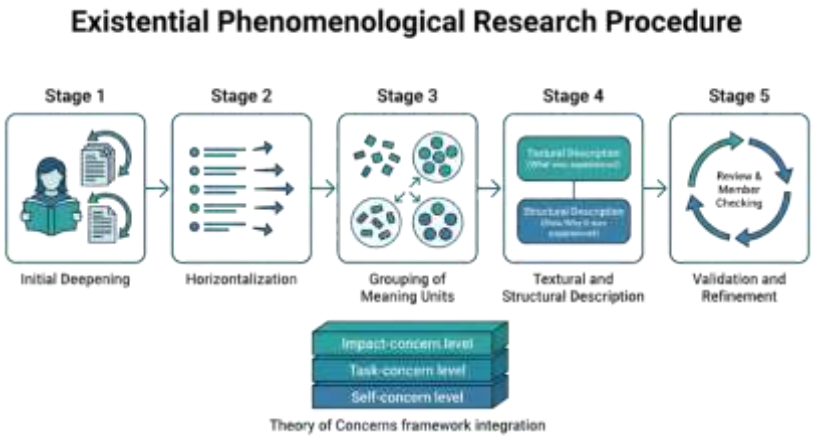
Colaizzi's method was chosen over Interpretative Phenomenological Analysis (Smith et al., 2009). The choice was deliberate. IPA is optimised for idiographic, case-by-case interpretation with small samples, typically three to eight participants, whereas Colaizzi is structured to extract invariant meaning across larger datasets (Grossoehme, 2014). With twenty-five participants, the presents study requires the latter.

The study operates within the hermeneutic phenomenological tradition (van Manen, 1997), which holds that complete theoretical bracketing as strict Husserlian phenomenology demands is neither fully realisable nor epistemologically productive. This position licenses the use of the Theory of Concerns as a sensitising framework, not an imposed coding taxonomy. Drawn from Hall and Loucks' (1977) Concerns-Based Adoption Model (CBAM) and operationalised for this context by Myrna et al. (2025), the framework's three analytical levels, namely self-concern (personal readiness and professional identity), task-concern (practical implementation demands), and impact-concern (effects on learners and sustainability) oriented thematic grouping without foreclosing meanings that fell outside its categorical boundaries. Throughout analysis, researchers maintained written bracketing notes documenting their own assumptions about digital pedagogy and professional development, making the interpretive fore-structure explicit and open to scrutiny rather than silently operative.

The five-stage phenomenological research procedure applied in this study is presented in Figure 1, adapted from Errasti-Ibarrondo et al. (2018) and Finlay (2013).

Figure 1.

Existential phenomenological research procedure applied in this study, adapted from Errasti-Ibarrondo et al. (2018) and Finlay (2013).



Research Setting and Participants

Table 1 presents twenty-five elementary school teachers from West Java Province, Indonesia, participated voluntarily. West Java was selected on three grounds: it is Indonesia's most populous and educationally diverse province, capturing a wide spectrum of infrastructure

conditions; it holds formal designation as a priority region under the National Education Strategic Plan 2020–2035, making it a productive site for examining how reform agendas translate or fail to translate into classroom reality; and its pronounced socio-economic variation across districts allows for systematic attention to how contextual factors shape teachers' adoption of digital pedagogy and entrepreneurial practice.

Table 1 presents the demographic profile of the participant sample.

Table 1.

The Demographic Profile of the Participant Sample.

Characteristic	**Category**	***n***	**%**
Gender	Female	18	72
	Male	7	28
Teaching Experience	3–7 years	6	24
	8–15 years	11	44
	16–23 years	8	32
	Mean = 12.4 years; Range = 3–23 years		
Age	28–35 years	7	28
	36–44 years	11	44
	45–52 years	7	28
	Mean = 38.6 years		
School Setting	Urban	10	40
	Suburban	9	36
	Rural	6	24
School Type	Public	19	76
	Private	6	24
Highest Qualification	S1 (Bachelor's Degree)	20	80
	S2 (Master's Degree)	5	20

Participants were selected through purposive sampling, with inclusion criteria requiring active employment at a formal elementary school, willingness to reflect critically on professional experience with digital tools and teacherpreneurship, and availability for 90–120-minute group interview sessions across urban, suburban, and rural settings. Sample size was determined by the principle of phenomenological saturation, and data collection ceased when thematic redundancy was consistent and no substantively new insights were emerging across successive sessions (Guest et al., 2006; Saunders et al., 2018). All participants provided written informed consent; ethical approval was secured from the institutional review board prior to fieldwork.

Research Instruments

The primary data collection instrument was a semi-structured interview guide developed along existential phenomenological principles (Jedličková et al., 2022). This interview guide constituted the study's sole formal instrument, consistent with the phenomenological research design; a quantitative questionnaire was not employed because the inquiry's aim was to elicit first-person meaning rather than to measure predefined variables. It comprised three sections: opening questions inviting participants to articulate their general orientation toward digital pedagogy and teacherpreneurship; core experiential questions probing specific instances of attempted integration, for example, "Can you describe a moment when you felt challenged by using digital technology in your classroom? What were you thinking and feeling at that time?"; and contextual reflective questions addressing structural barriers, training histories, and professional aspirations. The guide was piloted with three teachers outside the main sample and refined before fieldwork commenced. A structured field-notes protocol was maintained by a designated team observer throughout each session, capturing non-verbal responses, group dynamics, and reflexive analytic observations as supplementary data and as a component of the audit trail.

Data Collection Procedures

Data were gathered across five group interview sessions conducted between March and June 2024, each involving four to six participants drawn from varied school contexts and experience levels. Group formats can enrich phenomenological data through collective resonance; hearing a peer's account frequently prompts participants to surface experiences they might not have accessed in isolation (Vella, 2025). The research team was nonetheless attentive to the risks that this format carries for individual narrative depth. To mitigate them, the facilitator employed directed reflection prompts at key intervals, actively encouraged quieter participants to contribute, and distributed a short-written reflection template by email after each session. Three participants submitted reflections that contributed substantively to the final dataset. All sessions were conducted in Bahasa Indonesia, audio-recorded with consent, transcribed verbatim, and translated into English by bilingual team members with expertise in qualitative educational research; the translations were verified for conceptual fidelity before analysis began.

Data Analysis

Analysis followed Colaizzi's seven-step phenomenological procedure, summarised in Table 2 (Edward & Welch, 2011). After independent familiarisation with all twenty-five transcripts, significant statements were extracted through horizontalisation, treating each statement as provisionally equal in weight before interpretive judgements were introduced (Chikobola, M. M., & Mutono-Mwanza, 2026). Formulated meanings were then clustered thematically, with the CBAM concern levels (Hall & Loucks, 1977; Myrna et al., 2025) serving as a sensitising scaffold, while a parallel open-coded structure retained emergent meanings that fell outside the framework's categories. The two coding streams remained analytically distinct until late-stage

synthesis, preventing the inductive logic of phenomenological reduction from being subordinated to deductive category-fitting. Textural and structural descriptions were subsequently developed, followed by member checking with ten randomly selected participants, whose feedback informed targeted refinements to two thematic areas (Grossoehme, 2014). Investigator triangulation across three independent analysts, peer debriefing sessions, and a systematic audit trail provided additional credibility support. NVivo 12 was used for transcript management and code retrieval; interpretive authority resided in participants' accounts, not in software-generated frequency outputs (Mortelmans, 2019). Saturation was confirmed when thematic redundancy was consistent and additional transcripts generated no consequential new insights (Saunders et al., 2018).

Table 2 below summarises, stage by stage, how Colaizzi's generic seven-step procedure was translated into the specific analytic tasks carried out by the research team, from initial transcript familiarisation through to participant validation; this summary is presented so that the table that follows can be read as an operational record of the analysis rather than as a restatement of Colaizzi's original framework (Edward & Welch, 2011).

FINDINGS

The findings presented here are grounded in what participants described as their actual professional experience moments of pedagogical frustration, institutional friction, emergent aspiration, and practical improvisation. These are not survey responses or generalised preferences. They are phenomenological accounts: first-person articulations of how these twenty-five West Java teachers have inhabited, negotiated, and at times struggled against the professional conditions in which digital pedagogy and teacherpreneurship operate as simultaneous and pressing demands.

The findings below are organised into two themes that correspond directly to the two research questions rather than to the Theory of Concerns levels alone. Theme 1 answers RQ1 by presenting teachers' narrative accounts of their lived experience of digital pedagogy and of teacherpreneurship, together with the structural conditions that shape what those experiences make possible, and what this experience implies for curriculum design. Theme 2 answers RQ2 by presenting teachers' lived experience of integrating digital pedagogy and teacherpreneurship into actual teaching practice, culminating in the concrete curriculum, lesson-plan, and syllabus specification teachers themselves articulated. The self-concern, task-concern, and impact-concern levels of the Theory of Concerns (Hall & Loucks, 1977; Myrna et al., 2025) continue to function within this structure as the sensitising analytical lens described in Section 2.1, rather than as the primary organising architecture of the presentation. A single teacher's account may still carry self-concern about technical confidence, task-concern about resource scarcity, and impact-concern about differential digital access all at once; that layering is what lived professional experience looks like in practice, and it is preserved within each theme rather than dissolved by it.

Theme 1: Lived Experience of Digital Pedagogy and Teacherpreneurship Informing Curriculum Design

This theme addresses RQ1 directly. It presents, in turn, teachers' narrative accounts of their lived experience of digital pedagogy, their narrative accounts of teacherpreneurship, and the structural and institutional conditions within which those accounts are embedded, together specifying what teachers themselves identify as necessary for teacher professional development curriculum design.

Narrative Inquiry in Digital Pedagogy Experience: Discursive Awareness Without Operational Confidence

Participants demonstrated consistent cognitive recognition that digital pedagogy is no longer elective. P3 articulated what most expressed:

"I realise that digital technology is no longer an option, but an urgent necessity in teaching. Children are now growing up with technology, so we as teachers must be able to utilise it for learning."

This awareness is declarative and culturally informed, shaped by wider societal narratives about digital modernity, but it does not translate automatically into instructional capability. The gap between knowing that change is necessary and knowing how to enact it is where most participants reside. P7 captured this precisely:

"Digital transformation is important, but I still wonder whether I have sufficient skills to use it effectively in the classroom."

P12 sharpened the curricular dimension of the deficit:

"I know there are many good learning apps, but I feel left behind because I have never been formally trained on how to integrate them into the curriculum."

In direct response to RQ1, these accounts collectively reveal that teachers' primary self-identified gap is not motivational or attitudinal. It is the absence of structured professional preparation that bridges awareness and practice. Recognition of the need has outrun the capacity to act on it.

Competence Doubts and the Erosion of Professional Identity

A distinct and emotionally charged strand within self-concern was the affective dimension of perceived digital inadequacy. P5 located the gap at a practical level:

"I can use WhatsApp and email, but when it comes to creating interactive learning content like videos or digital quizzes, I don't know where to start."

P14 expressed something more psychologically consequential:

"Sometimes I feel embarrassed when students are more adept at using technology than I am. This makes me doubt whether I deserve to be called a modern teacher."

This statement signals more than a skills deficit. Asymmetrical digital competence, with the student outpacing the teacher,destabilises professional self-concept in ways that technical upskilling alone is unlikely to resolve. P18 gave this instability a biographical frame:

"I've been teaching for 15 years using conventional methods. Now, suddenly, I have to change completely. It feels like I have to learn to be a teacher all over again."

Fifteen years of accumulated professional identity had been rendered insufficient by a shifted technological baseline. This is not a technical problem. It is an identity problem, and any training curriculum that addresses digital skills while ignoring the professional ontological disruption that teachers experience is likely to generate resistance rather than adoption. For training design, this finding argues for structured attention to professional confidence and identity alongside technical instruction.

Teacherpreneurship: Economic Motivation Ahead of Practical Knowledge

Participants showed genuine interest in teacherpreneurship, though their understanding of the concept remained predominantly economic in framing. P9 stated:

"Teachers' salaries are limited, so if I could earn extra income from selling learning content or offering online tutoring, it would really help my family."

Economic precarity is an acknowledged reality here, not a distraction from pedagogical purpose, and recognising it as a legitimate driver of teacherpreneurship motivation is analytically significant for training programme design. P22 extended this with a question that signals precisely where practical knowledge breaks down:

"I see fellow teachers on social media who have successfully sold books or learning modules. I'm interested, but I don't know how. Do I need a special permit? How do I market it?"

The aspiration is present, but the procedural knowledge is not. Addressing RQ1, these accounts identify a distinct and currently unmet training need that is not simply pedagogical digitisation but an introduction to the mechanics, ethics, and regulatory dimensions of teacher-led content creation and commercial practices.

Lived Experience of Structural Conditions Shaping Curriculum Design Preparation

Still within Theme 1 and RQ1, participants moved beyond self-appraisal to articulate the concrete institutional, infrastructural, and organisational conditions that constrain their capacity to engage with digital pedagogy and teacherpreneurship, and that any curriculum design responding to RQ1 must therefore take as a starting constraint rather than an afterthought.

Infrastructure: Fragmented Access and its Classroom Consequences

P4 described the disproportion plainly:

"In our school, there is only one computer room with 15 computers for 600 students. How can we possibly implement digital learning equitably?"

The mathematics of that access ratio communicates the problem without elaboration. P16 added the connectivity dimension:

"The internet connection at school is very slow and often disconnects. When I try to show learning videos, students lose focus because they have to wait a long time."

Infrastructure failure does not merely slow digital learning; it actively undermines pedagogical credibility when the technology on which a lesson depends publicly malfunctions. P21 extended the access problem beyond school walls:

"Many of my students don't have smartphones or laptops at home. Their parents work as farm labourers with limited income. So, the digital learning I design is not accessible to all students."

The structural fragmentation of access across schools, within classrooms, and between home environments means that training for digital pedagogy must address not only teacher competence but also the conditions under which that competence can be equitably exercised.

Workload: Administrative Compression of Professional Learning Time

P8 described the temporal squeeze with characteristic precision:

"The administrative burden on teachers is already very heavy filling out report cards, creating lesson plans, and reporting on many different matters. If I have to add technology-based learning and develop entrepreneurship content, when will I have time for my family?"

P11 enumerated it:

"I teach 32 hours per week, plus I have to supervise extracurricular activities, attend coordination meetings, and join mandatory training from the department. I want to learn how to create digital content, but after school I'm exhausted."

These accounts answer a specific dimension of RQ3. Workload and administrative demands are not background context for understanding training barriers; they are the mechanism through which professional development is structurally excluded from teachers' lives. Training designed without accounting for this reality will either not be attended or not be retained.

Training Inadequacy: Episodic, Decontextualised, Incomplete

The quality of existing training was a consistent source of professional frustration. P6 described the experience:

"We once received two hours of training on Google Classroom and were then told to just use it. There was no follow-up support, so when problems arose, we were left at a loss."

Two hours. No follow-up. The training event ended precisely where the actual learning challenge began in the classroom, without scaffolding or support. P19 identified the pedagogical mismatch between content and application:

"The training provided was too theoretical, not practical. We were taught concepts but not given step-by-step guidance on how to apply them in real-world classroom situations."

P24 named a gap the existing training ecosystem has not addressed at all:

"I need training in digital marketing to sell the learning modules I create. But no institution offers that for teachers. The existing training focuses only on pedagogy, not entrepreneurship."

In response to RQ2, these accounts converge on a clear specification. Teachers do not need more training as currently conceived, namely episodic, generic, and theoretically weighted. They need preparation that is sustained, practically scaffolded, contextually

embedded, and expanded in scope to encompass the entrepreneurial competencies that teachers' professional development has historically excluded.

Institutional Support: Encouragement Without Substance

P13 captured the contradiction that characterises many institutional responses to educational innovation:

"Our principal encourages us to be innovative but doesn't provide the facilities or budget for it. So, innovation is just talk."

P17 offered a more pointed illustration:

"I once submitted a proposal to purchase learning tablets, but it was rejected due to budget constraints. I saw that there was a budget for renovating the principal's office, which wasn't actually urgent."

The allocation of institutional resources communicates priorities more clearly than policy rhetoric does. Where technology procurement loses out to administrative renovation, teachers receive an unambiguous signal about the actual institutional status of pedagogical modernisation. For RQ3, this pattern of rhetorical support without material commitment constitutes one of the more consequential structural barriers to professional development participation.

Theme 2: Integrating Digital Pedagogy and Teacherpreneurship into Teaching Practice and Curriculum Materials

This theme addresses RQ2 directly. It presents teachers' lived experience of integrating digital pedagogy into their teaching practice, their lived experience of integrating teacherpreneurship into their teaching experience, and, finally, their lived experience of developing the teaching materials, lesson plans, syllabi, and whole-curriculum specification through which that integration would be enacted.

Lived Experience Integrating Digital Pedagogy into Teaching Practice: Evidence from Classroom Use

Among participants who had begun integrating technology, the observed effects on student engagement were consistently positive and reported with notable specificity. P10 described:

"When I use Kahoot for quizzes, students are very enthusiastic. Those who are usually passive suddenly become active, competing to answer quickly and correctly. This shows that technology can make learning more fun."

The shift from passive to active participation is not incidental. It maps directly onto the learner-centred instructional goals that professional development curricula for digital pedagogy should prioritise as measurable outcomes. P15 added:

"I created a simple animated video to explain the water cycle. Students understood it more easily than when I only explained it using pictures on the board. They also asked to share the video so they could watch it at home."

The spontaneous request to extend learning beyond the classroom suggests a level of student motivation that conventional instruction may not have produced. Both accounts ground

aspirational claims about digital pedagogy in teacher-observed classroom reality and identify concrete instructional modes (game-based assessment, animated explanation) that training design should address explicitly.

The Digital Divide: Ethical Unease Alongside Opportunity

Impact-concern also surfaced an ethical tension that more abstracted accounts of digital transformation tend to elide. P20 stated:

"I'm worried that digital learning will widen the gap between students from wealthy and poor families. Those with good internet access will advance, while those without will be left further behind."

This is not technophobia. It is an instructionally grounded concern about distributive justice in learning outcomes, a concern that emerges precisely because these teachers have enough proximity to their students' lives to see what differential access produces. P23 gave it a geographical register:

"Schools in the city already have smart classrooms, but we in the suburbs often have power outages. How can our children compete with city children if their opportunities are already unequal from the start?"

These accounts establish that any professionally responsible training pathway for digital pedagogy must incorporate critical reflection on equity and access, not as an addendum to technical instruction, but as a foundational dimension of the curriculum's values orientation.

Lived Experience Integrating Teacherpreneurship into Teaching Experience: Sustainability and Ecopreneurship

Some participants articulated a vision of teacherpreneurship that was notable for its normative depth. P25 stated:

"If we want to teach entrepreneurship to students, we shouldn't just focus on profit. There must be sustainability values, such as how businesses are environmentally friendly, empower communities, and are not exploitative."

This is a coherent educational philosophy, not a peripheral sentiment. P2 translated it into curricular aspiration:

"I want to create learning content about ecopreneurship, or environmentally conscious entrepreneurship. For example, how to make products from recycled materials. But I need more knowledge about this."

The expressed aim is to develop instructional content that connects entrepreneurial practice to ecological responsibility. For RQ4, this signals that teachers' vision of an integrated training pathway extends beyond technical and commercial skill; it includes the preparation necessary to embed sustainability values into the educational materials they create and the entrepreneurial practices they model.

Lived Experience Developing Teaching Materials, Lesson Plans, Syllabi, and Curriculum: A Teacher-Generated Specification

The most programmatically significant finding in this section was the specificity with which participants described what a genuinely adequate training pathway would entail. P1 offered a structured formulation:

"We need training that covers three things: first, how to create quality learning content; second, how to market it through social media and digital platforms; and third, how to manage the finances of the content business."

Three domains: content creation, distribution, and financial management. P7 extended the specification to include the legal and regulatory dimensions that most professional development programmes leave entirely unaddressed:

"The training should also cover the legal aspects: how to copyright content, how to obtain business permits, and how to pay tax on additional income. We shouldn't break the law just because we don't know."

Taken together, these accounts constitute a teacher-generated curriculum specification for integrated professional development, one that places the voices of practitioners, rather than the assumptions of training designers, at the centre of programme architecture. This specification directly answers RQ4: the coherent training pathway teachers envision integrates digital content creation, platform-based distribution, entrepreneurial business practice, financial literacy, legal compliance, and sustainability ethics, a scope that current provision, focused narrowly on pedagogy, has yet to approach.

Synthesis of Findings: Patterns of Interrelated Concerns

The three concern levels are not hierarchical rungs. They are concurrent and mutually reinforcing. A single teacher can simultaneously express self-concern about technical confidence, task-concern about institutional resource allocation, and impact-concern about the equity implications of digital learning for their students. That simultaneity is not analytical complexity to be resolved, but the actual phenomenological structure of how these teachers experience professional transformation.

Taken as a whole, the findings reveal eight interconnected dimensions of this challenge. On the constraint side: limited personal digital competence; inadequate technological infrastructure; excessive administrative workload; episodic and decontextualised training; and institutional support that is rhetorical rather than material. Alongside these constraints, the data disclose substantial motivational and aspirational resources: high engagement with teacherpreneurship as a concept; genuine ethical concern for digital equity in student learning outcomes; and an articulated, detailed aspiration to integrate sustainability values into entrepreneurial educational practice.

Read against the two research questions rather than against four, the fit between findings and questions is direct rather than approximate. RQ1, addressed by Theme 1, is answered not by a checklist of missing competencies but by an integrated specification of

professional training needs: teachers name specific gaps in digital pedagogy competence, specific gaps in teacherpreneurship knowledge, and specific structural conditions, infrastructure, workload, training design, institutional backing, that any curriculum design responding to those needs must accommodate. RQ2, addressed by Theme 2, is answered by teachers' own account of how that training would be integrated into practice: through classroom level use of digital tools, through teacherpreneurial content bound to sustainability values, and, most concretely, through the teaching materials, lesson plans, syllabi, and whole curriculum specification that participants themselves articulated. The two themes are sequential rather than parallel: Theme 1 establishes what teachers need and why, and Theme 2 establishes how teachers themselves propose to enact that need in curriculum and classroom terms, so that the results confirm directly to the research questions rather than standing apart from them.

DISCUSSION

Before turning to the wider literature, it is worth stating plainly what the two themes mean for the two research questions. Theme 1 shows that Indonesian elementary teachers can specify their own professional training needs with considerable precision once given room to do so: the need is not generic "digital training" but training that closes a named gap between declarative awareness and operational confidence (digital pedagogy), that introduces the mechanics and ethics of monetised content creation (teacherpreneurship), and that is designed around named structural constraints, namely infrastructure scarcity, a compressed working week, and training events with no follow-up. Theme 2 shows that the same teachers already possess a working theory of how that training should be integrated: not as an abstract competency framework but as classroom-tested practices (game-based assessment, explanatory video), as a sustainability-oriented model of teacherpreneurship, and as an explicit specification for content, marketing, and financial legal modules that maps onto concrete curriculum components. Read together, Theme 1 supplies the needs analysis and Theme 2 supplies the implementation logic; neither theme stands as a free-standing empirical answer, and the interpretive weight of the study rests on their combination, which is what the discussion below unpacks in relation to the existing literature.

The findings confirm a meaningful gap between elementary school teachers' awareness of digital pedagogy and teacherpreneurship and their actual competence and confidence in enacting them. The dominant pattern of self-concern places most participants in the early stages of the Concerns-Based Adoption Model (CBAM), where doubts about personal capacity become the primary psychological barrier to change, a phase the model identifies as natural but potentially self-reinforcing without deliberate, well-designed intervention (Myrna et al., 2025). Left unaddressed, self-concern calcifies into resistance. Digital competence does not develop along a simple trajectory from conceptual awareness to operational mastery, but requires a structured, sustained, and contextually grounded professional development ecosystem to close

that distance (Gisbert Cervera &Caena, 2022; Skantz-Åberg et al., 2022). In the Indonesian context specifically, Mardiana and Yakub (2025) and Wardhana et al. (2024) found that while digital literacy and teacher motivation account for more than 70% of the variance in teachers' capacity to design technology-based learning, the implementation gap persists as a direct consequence of training that is episodic rather than embedded, and theoretical rather than mentored in practice.

The identity-level disruption expressed by experienced participants adds a dimension to this picture that skills-centred analysis typically misses. Teachers who have taught for fifteen or twenty years within established pedagogical conventions experience digital transformation not merely as a competence requirement but as a challenge to the professional self they have spent decades constructing (Code et al., 2022). Asking them to become facilitators of digital learning without also creating structured space for reflection, professional communities, and institutional acknowledgement of what they already know is a curriculum design failure as much as a policy one. Studies on teacher identity change in the context of technology make the case that effective professional development must be sensitive to teachers' professional biographies, treating accumulated experience as pedagogical capital to be integrated with new digital literacy rather than as institutional dead weight to be discarded (Bacova& Turner, 2023; Robandi et al., 2025). The implications for the design of professional development curricula are direct: programme objectives and instructional methods must attend explicitly to professional identity reconstruction alongside technical skill-building, positioning new digital competencies as an expansion of existing pedagogical repertoire, not a replacement of it.

The structural barriers documented in the task-concern findings, including fragmented infrastructure, unstable connectivity, and asymmetrical access between schools and students' home environments, establish that individual teacher readiness is not separable from the institutional and policy ecosystems surrounding it. This cumulative pattern of access inequality risks deepening educational stratification if digital pedagogical innovations are deployed without accounting for the infrastructural realities of under-resourced schools and communities (Setiasih et al., 2023). The ethical concern articulated by teachers who fear digital learning will widen the gap between economically advantaged and disadvantaged students is consistent with well-established principles of digital equity and inclusion (Francesca & Weise, 2023; Pittman et al., 2021; Warschauer, 2007). In the Indonesian context, characterised by pronounced regional disparities in educational service distribution and digital readiness, these findings signal the urgency of treating ICT infrastructure investment as a prerequisite for educational equity, not as a subsequent refinement once quality has already been secured for the privileged (Jaya et al., 2024; Judijanto, 2025).

The administrative burden teachers described warrants direct analytical engagement, not peripheral acknowledgement. Cross-national evidence consistently shows that disproportionate administrative demands reduce teachers' available time for pedagogical exploration, erode professional satisfaction, and contribute to both burnout and attrition

(Heffernan et al., 2022; Joseph et al., 2025). A teacher working 32 contact hours per week, managing extracurricular programmes, preparing administrative reports, and attending mandatory in-service sessions has, in any realistic accounting, no protected time for the kind of iterative experimentation that digital integration requires. Restructuring teachers' professional duties by introducing clearer role differentiation and carving out protected time for professional learning within the working week is not an aspirational refinement (Stumbrienė et al., 2023). It is a precondition for any professional development investment to yield durable returns. The quality of teachers' working conditions shapes what professional development can accomplish. This is the practical argument for addressing teacher welfare as a component of instructional quality reform, not a distraction from it.

The sporadic, theory-weighted, and mentor-light training patterns reported by participants stand in direct contrast to what the professional development literature identifies as effective. Continuous, practice-embedded, and contextually anchored training, supported by professional learning communities and responsive technical and pedagogical guidance, is not an idealistic best case (Gore & Rosser, 2022; Meletiou-Mavrotheris & Paparistodemou, 2024; Osmond-Johnson & Fuhrmann, 2022). It is the baseline condition for competence transfer from workshop to classroom. De Putter-Smits et al. (2022) identified three elements that distinguish successful digital competence programmes: formal training that articulates structured frameworks such as TPACK and DigCompEdu; direct in-school mentoring by change facilitators; and collaborative communities of practice where teachers share challenges and co-develop solutions over time. None of these elements is present in the training experiences described by participants in this study. The gap between current provision and what is actually needed is not marginal; it is structural. From a curriculum development perspective, these findings argue for a fundamental reorientation: away from event-based delivery and toward a needs-based professional development curriculum that sequences competence-building across time, integrates practical application within professional learning cycles, and explicitly expands its scope beyond pedagogy to encompass the entrepreneurial competencies that teachers have articulated as absent. The finding that teachers expect training covering digital content creation, marketing, financial management, and legal literacy points to a scope of professional preparation that neither existing in-service programmes nor LPTK-administered teacher education has yet systematically addressed.

Teacherpreneurship, as it emerged from participants' accounts, presents genuine opportunities alongside risks that professional development policy must address with precision. On the one hand, teacherpreneurship offers a viable pathway for supplementing inadequate salaries, expanding pedagogical reach through digital content, and exercising a form of professional autonomy that institutional employment often constrains (Liu et al., 2024; Sayehvand et al., 2025). On the other hand, the predominantly economic framing through which most participants understood the concept signals that its pedagogical and social dimensions have not yet been adequately conceptualised or communicated through any formal

preparation. Kadarisman et al. (2025) articulate a conception of teacherpreneurship that balances economic, pedagogical, and social goals, a tripartite framework that participants in this study are approaching intuitively but have not yet reached through structured engagement. The risk of commodifying education in ways that disadvantage students from lower-income backgrounds is real and must be managed through ethical training content, equitable access provisions, and regulatory frameworks that ensure teacher-developed digital products contribute to learning opportunity rather than stratify it.

The sustainability-oriented aspirations of some participants point toward a possibility the professional development literature has not yet fully theorised: the integration of ecological ethics and circular-economy principles into teacherpreneurship as a distinct and formative competence domain. The aspiration to develop ecopreneurship content, or entrepreneurial education that is environmentally aware and community-empowering rather than merely profit-seeking reflects a values orientation that reaches beyond short-term market logic (Asikainen et al., 2021; Kavitha et al., 2025). It aligns with longstanding critiques of conventional entrepreneurship education's limited engagement with sustainability (Wyness et al., 2015), and resonates with Education for Sustainable Development frameworks that position teachers not only as deliverers of sustainability content but as practitioners and models of sustainability values. Gulabdin and Madli (2026) and Bayram and Aslan (2025) point toward professional development frameworks that embed sustainability literacy alongside business ethics and social entrepreneurship as core rather than elective competencies. Realising this in the context of Indonesian elementary teacher education requires a purposeful redesign of in-service training curricula at the level of both LPTK programme architecture and government-administered professional development schemes, positioning the Triple Bottom Line framework not as an advanced optional module for interested teachers, but as a foundational dimension of what it means to be a professionally prepared teacherpreneur (Khajuria, 2025). The curriculum design workthis demands, including sequencing sustainability competencies, identifying appropriate instructional methods, and embedding ethical reflection into entrepreneurial practice, falls precisely within the terrain of curriculum development scholarship, and within the institutional responsibility of the agencies that design, accredit, and evaluate teacher professional education in Indonesia.

CONCLUSION

The core finding is simple to state but harder to dismiss. Elementary school teachers in West Java entered this study with genuine awareness of digital transformation and teacherpreneurship as professional imperatives. What they consistently lack is the preparation, institutional support, and protected time to act on that awareness. High motivation coexists with limited digital competence, professional identity strain, and structural constraints that no amount of individual effort can overcome. That is not a motivation deficit. It is a provision deficit,

and it calls for a different kind of response than the training landscape in Indonesia currently offers.

Theoretically, situating the Theory of Concerns within an existential phenomenological framework demonstrates the CBAM's capacity to map affective and ethical dimensions of innovation adoption, including professional identity disruption, moral unease about student equity, and aspirations toward sustainable practice that conventional survey-based approaches cannot adequately capture. Practically, the findings argue against the continued fragmentation of teacher professional development into episodic, decontextualised events. What is needed instead is a coherent, needs-based professional development curriculum that integrates digital competence, entrepreneurial literacy, and sustainability values as a single developmental sequence, differentiated by teachers' concern profiles rather than delivered uniformly to heterogeneous professional populations.

The study's scope of twenty-five participants from a single province limits its transferability to remote, 3T-classified, or religiously affiliated school contexts. The phenomenological design produced interpretive depth but cannot quantify the effects of digital pedagogy or teacherpreneurship on student outcomes or teacher economic sustainability. Future research should combine regional concern-mapping with longitudinal measurement of competence development and learning impact across diverse school settings.

The normative argument this study supports is not abstracted from the data. It emerges from what specific teachers described: a teacher who felt professionally diminished when her students outperformed her digitally; one whose lessons could not reach students whose parents were farm labourers; another who wanted to develop ecopreneurship content but was never given the preparation to begin. These are not exceptional cases. They are the lived consequences of a professional formation system that has not kept pace with what teachers' classrooms now demand. Closing that gap is a curriculum design responsibility as much as a policy ambition, and it requires placing teachers' own experiences, concerns, and aspirations at the centre of the professional development systems that are, ostensibly, built for them.

Conflicts of Interest

The authors declare that they have no conflicts of interest regarding the publication of this article.

REFERENCES

Alam, A. (2022). Investigating sustainable education and positive psychology interventions in schools towards achievement of sustainable happiness and wellbeing for 21st century pedagogy and curriculum. *ECS Transactions*, 107(1), 19481. https://doi.org/10.1149/10701.19481ecst

Asikainen, E., Tapani, A., Seikkula-Leino, J., Westerberg, M., Verma, P., Salomaa, M., & García-Aracil, A. (2021). Exploring the connections of education for sustainable development

and entrepreneurial educationa case study of vocational teacher education in Finland. *Sustainability*, 13(21), 11887. https://doi.org/10.3390/su132111887

Bacova, D., & Turner, A. (2023). Teacher vulnerability in teacher identity in times of unexpected social change. *Research in Post-Compulsory Education*, 28(3), 349–372. https://doi.org/10.1080/13596748.2023.2221115

Bayram, K., & Aslan, O. (2025). A skills training model integrated with entrepreneurship for sustainability: Design and evaluation study. *Journal of Pedagogical Research*, 9(5), 214–244. https://doi.org/10.33902/JPR.202537328

Bouzioti, D. (2023). Introducing the phenomenological model of performance practice (PMPP): phenomenological research design and the lived experience in performance. *International Journal of Qualitative Methods*, 22. https://doi.org/10.1177/16094069231211142

Bremner, N., Sakata, N., & Cameron, L. (2022). The outcomes of learner-centred pedagogy: A systematic review. *International Journal of Educational Development*, 94(3), 102649. https://doi.org/10.1016/j.ijedudev.2022.102649

Budiharso, T., Bakri, S. & Sujito, S. (2023). Transformation of Education System of the Pesantren in Indonesia from the Dutch Colony to Democratic Era. *Journal of Social Studies Education Research, 14*(4), 179-206. https://jsser.org/index.php/jsser/article/view/5460/646

Code, J., Ralph, R., & Forde, K. (2022). A disorienting dilemma: Teaching and learning in technology education during a time of crisis. *Canadian Journal of Science, Mathematics and Technology Education*, 22(1), 170–189. https://doi.org/10.1007/s42330-022-00191-9

de Putter - Smits, L. G. A., Nieveen, N. M., Taconis, R., & Jochems, W. (2022). A one-year teacher professional development programme towards context-based science education using a concerns-based approach. *Professional Development in Education*, 48(3), 523–539. https://doi.org/10.1080/19415257.2020.1712616

Edward, K. L., & Welch, T. (2011). The extension of Colaizzi's method of phenomenological enquiry. *Contemporary nurse*, 39(2), 163-171. https://doi.org/10.5172/conu.2011.39.2.163

Errasti-Ibarrondo, B., Jordán, J. A., Díez-Del-Corral, M. P., & Arantzamendi, M. (2018). Conducting phenomenological research: Rationalizing the methods and rigour of the phenomenology of practice. *Journal of Advanced Nursing*, 74(7), 1723–1734. https://doi.org/10.1111/jan.13569

Finlay, L. (2013). Unfolding the phenomenological research process: Iterative stages of "seeing afresh." *Journal of Humanistic Psychology*, 53(2), 172–201. https://doi.org/10.1177/0022167812453877

Fitrianto, I. (2024). Innovation and technology in Arabic language learning in Indonesia: trends and implications. *International Journal of Post Axial: Futuristic Teaching and Learning*, 134–150. https://doi.org/10.59944/POSTAXIAL.V2I3.375

Francesca, G., & Weise, C. (2023). Digital equity and inclusion in education. *OECD Education Working Papers*, 299, 1–75. https://doi.org/10.1787/7cb15030-en

Fu, Q., & Zhang, X. (2024). Promoting community resilience through disaster education: Review of community-based interventions with a focus on teacher resilience and well-being. *PLOS ONE*, 19(1), e0296393. https://doi.org/10.1371/journal.pone.0296393

Gisbert Cervera, M., &Caena, F. (2022). Teachers' digital competence for global teacher education. *European Journal of Teacher Education*, 45(4), 451–455. https://doi.org/10.1080/02619768.2022.2135855

Gore, J., & Rosser, B. (2022). Beyond content-focused professional development: Powerful professional learning through genuine learning communities across grades and subjects. *Professional Development in Education*, 48(2), 218–232. https://doi.org/10.1080/19415257.2020.1725904

Goyibova, N., Muslimov, N., Sabirova, G., Kadirova, N., &Samatova, B. (2025). Differentiation approach in education: Tailoring instruction for diverse learner needs. *MethodsX*, 14(13), 103163. https://doi.org/10.1016/j.mex.2025.103163

Grossoehme, D. H. (2014). Overview of qualitative research. *Journal of Health Care Chaplaincy*, 20(3), 109–122. https://doi.org/10.1080/08854726.2014.925660

Gulabdin, S., & Madli, F. (2026). Conceptualizing the role of higher education in promoting SDG-aligned entrepreneurship. *International Journal of Academic Research in Business and Social Sciences*, 16(1), 229–245. https://doi.org/10.6007/IJARBSS/v16-i1/24516

Gunawan, W. Ben. (2025). Revisiting the sustainable development goal 4 "quality education": insights, prospects, and recommendations. *SAKAGURU: Journal of Pedagogy and Creative Teacher*, 2(1), 12–36. https://doi.org/https://doi.org/10.70211/sakaguru.v2i1.202

Hall, G. E., & Loucks, S. F. (1977). A developmental model for determining whether the treatment is actually implemented. *American Educational Research Journal*, 14(3), 263–276. https://doi.org/10.3102/00028312014003263

Hardie, B., Highfield, C., & Lee, K. (2023). Attitudes and values of teachers and leaders towards entrepreneurship education. *Research Papers in Education*, 38(4), 690–714. https://doi.org/10.1080/02671522.2022.2028891

Hastangka, Rahma, A., Fitria, H., Sihombing, A. A., Agung, I., & Siswanto, H. W. (2025). Education for sustainable development (2005–2025): A critical policy analysis of global and local frameworks. *Journal of Environmental Education*, 56(6), 477–492. https://doi.org/10.1080/00958964.2025.2565483

Heffernan, A., Bright, D., Kim, M., Longmuir, F., & Magyar, B. (2022). 'I cannot sustain the workload and the emotional toll': Reasons behind Australian teachers' intentions to

leave the profession. *Australian Journal of Education*, 66(2), 196–209. https://doi.org/10.1177/00049441221086654

Hidayati, N. N., Sugihartati, R., & Rahayu, T. P. (2025). Between loyalty and precarity: Teachers living as "precarious workers" of education sectors in Indonesian rural areas. In *Proceedings of the International Conference on Multidisciplinary Studies (ICoMSi 2024) (Advances in Social Science, Education and Humanities Research*, Vol. 926, pp. 47–61). Atlantis Press. https://doi.org/10.2991/978-2-38476-406-8_5

Inui, M., Ogisu, T., Kamogawa, A., & Nakaya, A. (2025). Out-of-school children in Southeast Asia: A case study of Cambodia, Laos, Indonesia, and Malaysia. *Cogent Education*, 12(1). https://doi.org/10.1080/2331186X.2025.2481004

Jaya, I. G. N. M., Pahlevi, S. M., Susenna, A., Agustina, L., Kusumasari, D., Sukma, Y. A. A., Hernikawati, D., Rahmi, A. A., Pravitasari, A. A., & Kristiani, F. (2024). framework for monitoring the spatiotemporal distribution and clustering of the digital society index of Indonesia. *Sustainability,* 16(24), 11258. https://doi.org/10.3390/su162411258

Jedličková, L., Müller, M., Halová, D., & Cserge, T. (2022). Combining interpretative phenomenological analysis and existential hermeneutic phenomenology to reveal critical moments of managerial lived experience: A methodological guide. *Qualitative Research in Organizations and Management: An International Journal*, 17(1), 84-102. https://doi.org/10.1108/QROM-09-2020-2024

Joseph, S., Abo-Zaed Arar, E., Schunka, L., Karaburk, H., & Arar, K. (2025). Superintendent leadership for teacher retention: Combating burnout in teachers of color and fostering well-being through a social justice lens. *Power and Education*, 17577438251338540 https://doi.org/10.1177/17577438251338540

Judijanto, L. (2025). Challenges and opportunities in education equity through the 13-year compulsory education program in Indonesia. *The Eastasouth Journal of Learning and Educations*, 3(01), 1–8. https://doi.org/10.58812/esle.v3i01.510

Kadarisman, Siswanto, R., Akadira, T., Zulfikri, Fatmasari, R., Mudayat, & Budi, U. L. (2025). Breaking The 3T Barrier: Smart Teacherpreneurs of Harapan Island. *Unram Journal of Community Service*, 6(3), 583–590. https://doi.org/10.29303/ujcs.v6i3.1169

Kagema, J. (2018). The school curriculum and its' influence on teacher motivation in curriculum implementation in Kenya. *Journal of Culture and Values in Education*, 1(1), 26–49. https://doi.org/10.46303/jcve.01.01.2

Kavitha, K., Roohi, K. K. S., & Vivekananda, J. (2025). Empowering school principals as sustainable educational entrepreneurs for SDG 4 achievement. In L. Prasad, A. Goncharuk, T. Fauzi, H. Doroshuk, & S. Sundari (Eds.), *Sustainable smart technology businesses in global economies* (pp. 337–349). Routledge. https://doi.org/10.4324/9781003616306-34

Khajuria, A. (2025). Integrating circular economy education into education for sustainable development: A conceptual advancement and typology of integration strategies.

Journal of Environmental Education, 56(6), 493–507. https://doi.org/10.1080/00958964.2025.2565488

Li, J. (2025). Entrepreneurial skill augmented neural network (ESANN): A deep learning approach for enhancing entrepreneurial competencies in teachers. *International Journal of Computational Intelligence Systems*, 18(1), 127-. https://doi.org/10.1007/s44196-025-00851-2

Linde, I., Sarva, E., & Daniela, L. (2023). The impact of an online professional development course on teachers' comprehension and self-efficacy in developing students' self-regulated learning skills. *Sustainability*, 15(12), 9408. https://doi.org/10.3390/su15129408

Liu, D., Chaemchoy, S., &Siribanpitak, P. (2024). Unlocking teacherpreneur potential in higher education: Validating a competency measurement scale. *Education Sciences*, 14(9), 1005. https://doi.org/10.3390/educsci14091005

Makinde, S. O., Ajani, Y. A., & Abdulrahman, M. R. (2024). Smart learning as transformative impact of technology: A paradigm for accomplishing sustainable development goals (SDGs) in education. *Indonesian Journal of Educational Research and Technology*, 4(3), 213–224. https://doi.org/10.17509/ijert.v4i3.66097

Mardiana, H., & Yakub, Y. (2025). The impact of digital literacy and digital competence on online teaching productivity: The moderating role of work behavior. *Asian Association of Open Universities Journal*, 20(2), 104–121. https://doi.org/10.1108/AAOUJ-09-2024-0120

Meletiou-Mavrotheris, M., &Paparistodemou, E. (2024). Sustaining teacher professional learning in stem: Lessons learned from an 18-year-long journey into tpack-guided professional development. *Education Sciences*, 14(4), 402. https://doi.org/10.3390/educsci14040402

Mhlongo, S., Mbatha, K., Ramatsetse, B., & Dlamini, R. (2023). Challenges, opportunities, and prospects of adopting and using smart digital technologies in learning environments: An iterative review. *Heliyon*, 9(6), e16348. https://doi.org/10.1016/j.heliyon.2023.e16348

Miço, H., &Cungu, J. (2023). entrepreneurship education, a challenging learning process towards entrepreneurial competence in education. *Administrative Sciences*, 13(1), 22. https://doi.org/10.3390/admsci13010022

Mortelmans, D. (2019). Analyzing qualitative data using NVivo. In *The Palgrave handbook of methods for media policy research* (pp. 435-450). https://doi.org/10.1007/978-3-030-16065-4_25

Murwaningsih, T. (2024). The influence of teacher professional attitude, welfare, continuous selfdevelopment, and job satisfaction on high school teachers performance. *International Journal of Instruction*, 17(1), 229–252. https://e-iji.net/ats/index.php/pub/article/view/504

Murwaningsih, T., & Fauziah, M. (2023). The influence of professional attitude, welfare, self-sustaining development, and job satisfaction on teacher performance. *Journal of Education and Learning (EduLearn)*, 17(2), 271–284. https://doi.org/10.11591/edulearn.v17i2.20785

Myrna, C., Alarcón, M., Lasekan, O. A., & Godoy Pena, M. T. (2025). AI concerns among educators: A thematic analysis. *International Research Journal of Multidisciplinary Scope (IRJMS)*, 6(1), 1031–1045. https://doi.org/10.47857/irjms.2025.v06i01.01929

Nuryani, P., Setiawardani, W., Robandi, B., & Ramadhan, R. (2025). Improving the competence of nonformal education tutor teacherpreneurs through the web-based application based on multiliteracy pedagogy. *Journal of Engineering Science and Technology*, 20(5), 1645–1672.

Osmond-Johnson, P., & Fuhrmann, L. R. (2022). Supporting teacher candidates to become collaborative teaching professionals: developing professional capital through a collaborative inquiry-based community of practice. *Journal of Professional Capital and Community*, 7(3), 243–255. https://doi.org/10.1108/JPCC-02-2022-0013

Pittaway, L., Fayolle, A., Udekwe, E., & Gervase Iwu, C. (2024). The nexus between digital technology, innovation, entrepreneurship education, and entrepreneurial intention and entrepreneurial motivation: A systematic literature review. *Education Sciences*, 14(11), 1211. https://doi.org/10.3390/educsci14111211

Pittman, J., Severino, L., DeCarlo-Tecce, M. J., &Kiosoglous, C. (2021). An action research case study: digital equity and educational inclusion during an emergent COVID-19 divide. *Journal for Multicultural Education*, 15(1), 68–84. https://doi.org/10.1108/JME-09-2020-0099

Rahman, M. M., & Hossain, M. E. (2025). Digital dynamics in technology adoption: Exploring socio-economic development through technology and education. *Technology in Society*, 82, 102906. https://doi.org/10.1016/j.techsoc.2025.102906

Robandi, B., Setiawardani, W., & Apriyanto, A. (2025). Factors influencing the pedagogical competence of elementary school teachers in the digital era: A survey study. *Journal of General Education and Humanities*, 4(2), 561–574. https://doi.org/10.58421/gehu.v4i2.421

Robandi, B., & Setiawardani, W. (2025). Training curriculum needs for entrepreneurship literacy of higher education in society 5.0. *Curricula: Journal of Curriculum Development*, 4(1), 567-580. https://doi.org/10.17509/curricula.v4i1.83520

Saunders, B., Sim, J., Kingstone, T., Baker, S., Waterfield, J., Bartlam, B., Burroughs, H., & Jinks, C. (2018). Saturation in qualitative research: Exploring its conceptualization and operationalization. *Quality & Quantity,* 52(4), 1893–1907. https://doi.org/10.1007/s11135-017-0574-8

Sayehvand, Z., Alami, F., &SalimiNamin, S. (2025). Exploring actions of teacherpreneurs in education: Insights from a qualitative study. *Education + Training*, 67(7–8), 821–839. https://doi.org/10.1108/ET-08-2022-0321

Schleicher, A. (2022). Lessons from high-performing school systems. In W. O. Lee, P. Brown, A. L. Goodwin, & A. Green (Eds.), *International handbook on education development in Asia-Pacific* (pp. 1–19). Springer. https://doi.org/10.1007/978-981-16-2327-1_100-1

Setiasih, O., Setiawardani, W., & Yusron, E. (2023). Exploring factors influencing student's learning difficulties during pandemic in Indonesia: A structural equation modelling. *European Journal of Educational Research*, 12(1), 1-14. https://doi.org/10.12973/eu-jer.12.1.1

Setiawardani, W., Robandi, B., & Djohar, A. (2021). Critical pedagogy in the era of the industrial revolution 4.0 to improve digital literacy students welcoming society 5.0 in Indonesia. *PrimaryEdu: Journal of Primary Education*, 5(1), 107–118. https://doi.org/10.22460/pej.v5i1.2073

Sitaridis, I., & Kitsios, F. (2024). Digital entrepreneurship and entrepreneurship education: A review of the literature. *International Journal of Entrepreneurial Behavior & Research*, 30(2–3), 277–304. https://doi.org/10.1108/IJEBR-01-2023-0053

Skantz-Åberg, E., Lantz-Andersson, A., Lundin, M., & Williams, P. (2022). Teachers' professional digital competence: An overview of conceptualisations in the literature. *Cogent Education*, 9(1). https://doi.org/10.1080/2331186X.2022.2063224

Smith, C., & Gillespie, M. (2007). Research on professional development and teacher change: Implications for adult basic education. In J. Comings, B. Garner, & C. Smith (Eds.), *Review of adult learning and literacy, Volume 7: Connecting research, policy, and practice* (pp. 205–244). Lawrence Erlbaum Associates. https://doi.org/10.4324/9781003417996-7

Smith, J. A., Flowers, P., & Larkin, M. (2009). *Interpretative phenomenological analysis: Theory, method and research*. Sage Publications.

Stumbrienė, D., Jevsikova, T., &Kontvainė, V. (2023). Key factors influencing teachers' motivation to transfer technology-enabled educational innovation. *Education and Information Technologies*, 29(2), 1697–1731. https://doi.org/10.1007/s10639-023-11891-6

Tonegawa, Y. (2023). Education in SDGs: What is inclusive and equitable quality education? In S. Urata, K. Kuroda, & Y. Tonegawa (Eds.), *Sustainable development disciplines for humanity* (pp. 55–70). Springer. https://doi.org/10.1007/978-981-19-4859-6_4

van Manen, M. (1997). *Researching lived experience: Human science for an action sensitive pedagogy (2nd ed.).* Althouse Press.

Wardhana, M. A., Lestari, E., &Nikmah, M. (2024). Strengthening the competitiveness of Indonesian industry human resources through IQF-based workplace learning.

JurnalIlmiahManajemen Dan Bisnis, 9(2), 169–184. https://doi.org/10.38043/jimb.v9i2.5674

Warschauer, M. (2007). A teacher's place in the digital divide. *Teachers College Record*, 109(14), 147–166. https://doi.org/10.1177/016146810710901408

Wyness, L., Jones, P., & Klapper, R. (2015). Sustainability: What the entrepreneurship educators think. *Education + Training*, 57(8–9), 834–852. https://doi.org/10.1108/ET-03-2015-0019

Yuningsih, I., &Tejawiani, I. (2026). Teacher performance management in improving learning achievement of elementary school students. *Journal of Innovation and Research in Primary Education*, 5(1), 185–195. https://doi.org/10.56916/jirpe.v5i1.2759

APPENDIX

Table 2.

Colaizzi's Phenomenological Method: Stages of Analysis as Applied in This Study

Stage	Definition	Application in This Study
Familiarisation	Repeated reading of transcripts to develop an empathetic, non-reductive grasp of participants' accounts before systematic extraction begins.	Each researcher read all 25 transcripts independently on multiple occasions, attending to teachers' concerns, aspirations, and perceptions regarding digital pedagogy, teacherpreneurship, and professional development.
Horizontalisation	Identification of all significant statements while practising reflexive bracketing, resisting premature interpretive closure.	All statements pertaining to teachers' awareness, experiences, challenges, motivations, and training needs were extracted, with each treated as provisionally equivalent before weight was assigned.
Grouping of meaning units	Formulated meanings organised into coherent emerging thematic clusters.	Significant statements were arranged into meaning categories, including digital readiness, resource constraints, training preferences, and economic aspirations guided sensitively, not prescriptively, by the Theory of Concerns.
Textural and structural description	Synthesis of what participants experienced (textural) and how and why they experienced it (structural).	An integrative narrative was developed capturing both the concrete content of teachers' experiences with digital pedagogy and teacherpreneurship and the contextual conditions that shaped those experiences.
Validation and refinement	Themes reviewed through participant feedback and collaborative team deliberation.	Thematic interpretations were shared with 10 participants for member checking; two thematic areas were refined in response to feedback, improving the overall representational accuracy of the account.