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Experiences and Practices of Highly Proficient Teachers in Designing Technology-Enhanced Learning Materials

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Abstract. Teachers increasingly design technology-enhanced learning materials, yet the literature examined for this study mostly described beginning, pre-service, or general groups of teachers, leaving the practices of teachers designated as highly proficient less documented. This qualitative descriptive study aimed to describe the experiences, challenges, practices and strategies, and insights of such teachers in designing these materials. Twelve purposively selected Master Teachers, confirmed as such from school records and corresponding to the highly proficient career stage of the Philippine Professional Standards for Teachers, from one public secondary school in the Philippines answered an open-ended online interview form. The written responses were analyzed through inductive-deductive content analysis guided by technological pedagogical content knowledge with contextual knowledge. Ten participants anchored content on curriculum competencies, and eight began from learners' needs. Technology choices followed these decisions and were constrained by access. Most chose accessible tools such as presentation software, and six reported using generative artificial intelligence or design applications. Participants reported limited internet connectivity (nine), limited time and heavy workload (nine), and insufficient devices (five). They prepared offline or printed versions (ten), differentiated tasks (eight), kept designs simple (seven), and collaborated with colleagues (seven). Their insights were that technology should serve learning and not replace the teacher, and that inclusive design and continuous learning sustain good materials. The findings describe participants' perceptions only. Written responses without probing limited depth, no materials or learner outcomes were independently evaluated, and a single site limits generalization. The findings suggest that school-based mentoring, offline-ready design support, and guidance on responsible use of generative artificial intelligence may help teachers who design such materials.

Keywords: Highly Proficient Teachers; Instructional Design; Philippines; Qualitative Description; Technology-Enhanced Learning Materials

Introduction

Technology has transformed how teachers plan, develop, and deliver lessons. Technology-enhanced learning materials (TELM), such as multimedia presentations, digital modules, interactive worksheets, video lessons, and online activities, have become integral components of instructional practice rather than supplementary tools. This shift is reflected in international standards. For example, the European Framework for the Digital Competence of Educators identifies selecting, creating, modifying, and sharing digital resources as essential teacher competencies (Redecker, 2017). Similarly, the UNESCO ICT Competency Framework for Teachers positions teachers as designers of learning experiences at the highest level of technology integration (UNESCO, 2018).

Designing TELM requires more than technical competence. Teachers must integrate subject matter expertise, pedagogical approaches, and technological tools, while considering the specific conditions existing in their classrooms (Mishra, 2019). Teachers' beliefs about pedagogy and their work environments affect their technology use (Tondeur et al., 2017), and they are more likely to adopt technology when it corresponds with their instructional objectives (Backfisch et al., 2021). In the Philippine context, teachers developing digital materials commonly face limited infrastructure, scarce resources, and varying levels of student readiness for technology-based learning (Talite & Napil, 2024). Consequently, personal, professional, and circumstantial factors inform their design decisions, many of which survey methods may not capture.

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The COVID-19 pandemic greatly disrupted educational systems and highlighted teachers' key role. Hodges et al. (2020) distinguished between well-planned online learning and remote teaching, while Trust and Whalen (2020) documented the requirement for teachers to modify and redesign instructional materials in real time. In the Philippines, the Department of Education (DepEd) implemented the Basic Education Learning Continuity Plan, assigning teachers the responsibility of preparing and adapting resources for various instructional modalities (DepEd, 2020; Toquero, 2020). Local research shows teachers' resourcefulness in using available materials despite constraints, such as limited digital tools (Cabrejas et al., 2024) and heavy workloads (Pamor et al., 2024). The Philippine Professional Standards for Teachers (PPST) provides a framework for identifying experienced educators; its third career stage, Highly Proficient Teachers, designates those who have advanced their practice and are expected to contribute to the professional development of their colleagues (DepEd, 2017).

Despite the breadth of research on this subject, most of the literature examined for this study concentrates on novice or pre-service teachers, pandemic-related adaptations, quantitative assessments of technology competence, or general instructional practices. Within that literature, which was reviewed in a targeted rather than exhaustive way, no study was found that describes, in teachers' own words, how teachers designated as highly proficient design TELM, what challenges they encounter, how they respond, and what they learn. The nearest study found examined Master Teachers' use of artificial intelligence in instructional leadership (Magdato & Paglinawan, 2025). The gap is therefore claimed only within the sources examined. This study addresses this gap using a qualitative descriptive approach (Bradshaw et al., 2017; Doyle et al., 2020; Kim et al., 2017) to document these teachers' experiences and practices as they reported them. Its findings may help teachers, school leaders, and learning resource developers plan support for TELM design, within the limits described under Scope and Delimitation of the Study.

Research Questions

This study aimed to describe highly proficient teachers' experiences and practices in designing technology-enhanced learning materials. Specifically, it sought to answer the following questions:

1. What are the experiences of highly proficient teachers in designing technology-enhanced learning materials in terms of:
   1.1. Their professional background and the circumstances that led them to design such materials;
   1.2. The design process, including how they decide on content, pedagogy, and technology (TPACK); and
   1.3. The people, resources, and settings that influence their design decisions (contextual knowledge)?
2. What challenges do they encounter in designing technology-enhanced learning materials?
3. What practices and strategies do they employ in designing such materials and in dealing with these challenges?
4. What insights and best practices can be drawn from their accounts for teachers, school leaders, and policymakers?

Scope and Delimitation of the Study

The study focused on teachers designated as highly proficient, that is, Master Teachers of Valencia National High School, who correspond to Career Stage 3 of the PPST (DepEd, 2017), who had designed TELM for their own classes. In this study, TELM are the digital or digitally supported resources that participants designed, adapted, or substantially modified, such as slide presentations, interactive activities, offline HTML games, and flashcards. It covered their experiences, challenges, practices and strategies, and insights in designing, adapting, evaluating, and revising such materials. Data came from the written responses of 12 teachers of one public secondary school in Northern Mindanao, Philippines, to an open-ended online interview form, including their descriptions of a material they had designed. The study did not measure learner outcomes, examine the materials themselves, evaluate the quality or effectiveness of the materials, or seek statistical generalization. Statements about benefits or effectiveness therefore reflect participants' perceptions only. Findings are context-bound and are offered for transferability. Limitations follow from this design. Responses were written and could not be probed in real time, so some accounts are brief (e.g., P7, P11). One analyst coded the data without a second coder, and the researchers' insider position may have shaped interpretation despite reflexive safeguards. The design describes what participants said and does not explain why patterns arise.

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Literature Review

Technology-Enhanced Learning Materials and Principles of Design

TELM are teaching resources that use digital technology to present content, encourage interaction, and guide student activities. Their effectiveness depends more on how well they support learning than on the technology itself. The cognitive theory of multimedia learning says people learn better from a mix of words and images than from words alone, as long as the materials consider how much information people can process at once (Mayer, 2021). Cognitive load theory adds that poorly organized materials can overwhelm students, so it is important to choose and arrange content carefully instead of just adding more features (Sweller et al., 2019). Universal Design for Learning (UDL) suggests using multiple ways to engage, represent, and allow learners to express themselves to meet varied needs (CAST, 2018). Instructional design models view material creation as a process that includes analysis, design, development, implementation, and evaluation (Morrison et al., 2019). The PICRAT model examines how students engage with technology (passively, interactively, or creatively) and how it changes teaching (replacing, amplifying, or transforming) (Kimmons et al., 2020). Together, these frameworks show that the quality of TELM depends on the teacher's decisions, pointing out the importance of understanding how experienced teachers think through their designs.

Teacher Competence, Proficiency Frameworks, and TPACK

Several frameworks describe what teachers should know and do with technology. DigCompEdu organizes educators' digital competence into six areas, including digital resources, teaching and learning, assessment, and empowering learners, with progressive proficiency levels (Redecker, 2017), while the UNESCO framework describes movement from knowledge acquisition to knowledge deepening to knowledge creation (UNESCO, 2018). In the Philippines, the PPST defines seven domains and four career stages (Beginning, Proficient, Highly Proficient, and Distinguished) and includes the positive use of ICT as a strand under the domain on content knowledge and pedagogy (DepEd, 2017). Because the PPST links career stages to indicators of increasing sophistication, it offers a defensible basis for identifying highly proficient teachers rather than relying on self-description. TPACK describes effective technology use as arising from the interaction of content, pedagogy, and technology, and its updated version adds contextual knowledge (Mishra, 2019). TPACK develops most readily through authentic design tasks (Koh et al., 2017; Voogt & McKenney, 2017), and teachers develop digital competence through experience, not only through courses (Instefjord & Munthe, 2017). Generative AI has triggered calls to revisit the framework, because tools that produce text, images, and lesson content require teachers to exercise judgment about when and how to use them (Mishra et al., 2023).

Challenges in Technology Integration

The relationship between teachers' pedagogical beliefs and technology use is complex and situation-dependent, not a simple one-way effect (Tondeur et al., 2017). Technology integration varies across lessons and depends on perceived utility, suggesting that teachers make this decision repeatedly (Backfisch et al., 2021). Barriers perceived by university teachers differ by academic discipline (Mercader & Gairín, 2020). In Philippine basic education, commonly cited challenges include limited infrastructure, shortage of materials, and differences in learners' readiness (Talite & Napil, 2024), and beginning science teachers likewise reported unstable internet access, problems with technology use, and adjustments to the teaching–learning process (Loseñara & Loseñara, 2024). These findings largely draw on teachers in general, beginning teachers, or emergency conditions, and leave open what difficulties remain for already competent teachers.

Teaching with Technology during the Pandemic and Philippine Studies

Hodges et al. (2020) and Bozkurt and Sharma (2020) described the rapid pandemic shift as emergency remote teaching, a temporary crisis response, and Trust and Whalen (2020) reported that teachers adopted new tools while continuing to teach. Early-career teachers' competence was related to how well they adapted to online teaching (König et al., 2020). In the Philippines, the Basic Education Learning Continuity Plan required teachers to prepare or adapt learning resources for multiple modalities (DepEd, 2020; Toquero, 2020). More recent Philippine studies (2023–2025) fall into four strands. First, qualitative studies describe teachers' experiences in particular conditions: pre-service Technology and Livelihood Education (TLE) teachers' resourcefulness amid inadequate learning materials (Cabrejas et al., 2024), TLE teachers' instructional experiences (Pamor et al., 2024), Filipino teachers' blended teaching (Talite & Napil, 2024), and beginning science teachers' online classes (Loseñara & Loseñara, 2024). Second, quantitative studies model technology-related knowledge among basic education teachers (Valle et al., 2024), and developmental studies design and validate digital modules or training packages (Bacio, 2025; Ramirez, 2024). Third, studies of Master Teachers, a position associated with the advanced PPST career stages, have examined lived experiences

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Original Article

in Science (General, 2019) and the use of artificial intelligence in instructional leadership (Magdato & Paglinawan, 2025). Fourth, narrative inquiries on technology use, such as language teachers' technological needs, come from other settings (Tafazoli & Meihami, 2023). These studies involve pre-service teachers, specific subjects, quantitative competence measures, module validation, or leadership, and most qualitative ones use phenomenological designs that emphasize the essence of an experience. Within the sources examined, none focused on how teachers designated as highly proficient design TELM. This statement is bounded: the review was targeted and not systematic, Philippine journals are indexed unevenly, and unpublished theses and local reports were not exhaustively searched, so related work may exist.

Methodology

Research Design

The study used a qualitative descriptive design, which aims to provide a clear, accurate summary of experiences or events in everyday language, staying close to what participants actually said (Bradshaw et al., 2017; Doyle et al., 2020). This approach works well for questions about who is involved, what happens, and how, and it helps teachers and decision-makers (Kim et al., 2017). The study used this method to clearly describe how highly proficient teachers design TELM, what challenges they face, how they respond, and what they have learned. Following this approach, the study looked at the topic as participants described it in their own settings (Creswell & Poth, 2018; Kim et al., 2017).

Research Locale

The study took place at Valencia National High School, a public secondary school in a city division in Northern Mindanao, Philippines. The school and division names are withheld to reduce the risk of identifying participants and are available to the editor on request. The school follows the DepEd curriculum, and teachers design and use TELM. The researchers chose it because it was accessible, had Master Teachers, and offered a variety of classroom situations in terms of internet access and resources.

Research Participants

To be included, teachers had to: (a) be a Master Teacher of the school, which corresponds to Career Stage 3 (Highly Proficient Teachers) under the PPST (DepEd, 2017); (b) have at least two years of experience designing TELM; (c) have designed, adapted, or significantly changed at least two materials; (d) have a Very Satisfactory or higher rating for the last two evaluation periods; and (e) join voluntarily. Teachers who used only ready-made materials or had a close supervisory or evaluative relationship with the researchers were excluded. Twelve teachers agreed and completed the form (coded P1 to P12). It was confirmed from school records that all 12 participants are Master Teachers of the school. Participant details are reported in generalized form (Table 1) to reduce the risk of identification.

Research Instrument

The researcher gathered data through a researcher-developed, open-ended online interview form adapted from the study's semi-structured interview guide (Brinkmann & Kvale, 2018). The form contained a consent item, a space for the participant's pseudonymous code, 12 open-ended questions, and a final item inviting additional remarks. The questions were aligned with the research problems and the components of TPACK with contextual knowledge: questions 1 and 2 on professional background and change in approach (Problem 1.1); questions 3 to 6 on the material designed, content and activity decisions, tool choice, and evaluation and revision (Problem 1.2); questions 7 and 8 on influences and the learner and school context (Problem 1.3); question 9 on challenges (Problem 2); questions 10 and 11 on responses, strategies, and adaptations (Problem 3); and question 12 and the closing item on lessons learned and advice (Problem 4). Instrument testing. The form was validated by two experts before data collection. Each item was also mapped to one research problem, as listed above, so that every problem was addressed by at least one open-ended item and no item fell outside the study's aims.

Data Gathering Procedure

After obtaining the required permissions, the researchers invited eligible teachers in person and gave them an information sheet. The first question on the online form asked for voluntary consent, and all 12 teachers agreed before answering. Participants answered in their own time and words, were identified only by codes, and could skip any question. The form did not ask for names, and the responses were entered into a spreadsheet, checked for completeness, and retained as the original dataset. No audio recordings were made, so all data are written accounts.

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Original Article

Results and Discussions

Figure 1 shows the conceptual framework that organized the analysis. This section presents and discusses the findings by research problem. The categories are reported with the number of participants (n of 12) who expressed them, and short excerpts are quoted verbatim from participants' written responses. All findings describe what participants reported; none reflects an independent evaluation of the materials or of learner outcomes.

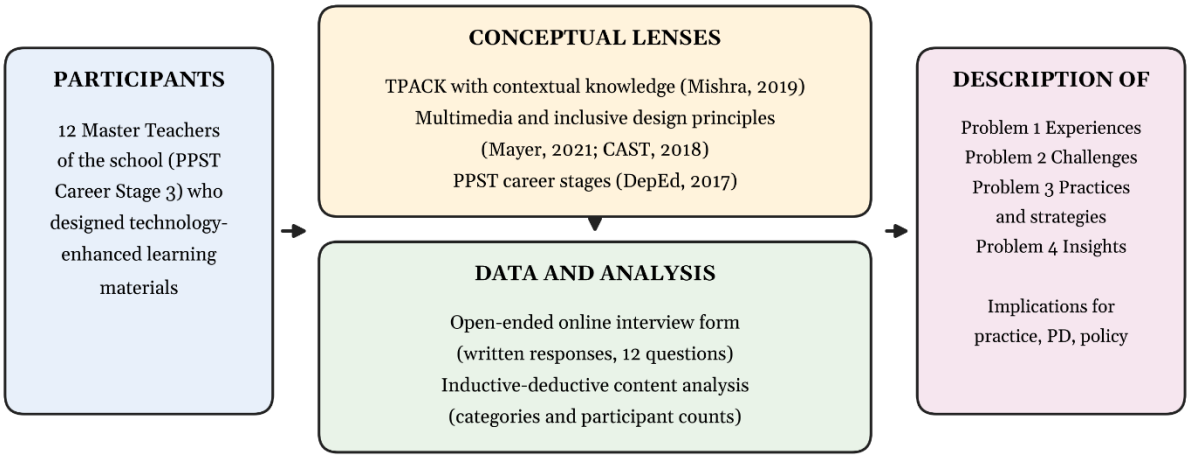

Figure 1: *Conceptual Framework of the Study*

Profile of the Participants

Table 1 profiles the 12 participants, all confirmed from school records as Master Teachers, in generalized form to reduce the risk of identification. They taught Science, Mathematics, Technology and Livelihood Education (TLE), and inclusive education (regular and special needs classes), or did not state their subject, in junior and senior high school. Stated teaching experience ranged from about nine years to more than two decades (three participants stated it). All 12 described a material they had designed: eight were presentation-based (PowerPoint or Canva), two were offline HTML activities, one was a set of multisensory digital flashcards, and one was produced through Overleaf (LaTeX) with agentic AI support.

Table 1. Profile of the Participants

	Code	Subject, level, and stated experience	Material described (TELM)	Main tools mentioned
1.	P1	Science, junior high school; about 13 years	Interactive science lesson presentation with digital formative assessments	PowerPoint, Canva, ChatGPT, online assessment tools
2.	P2	Subject and experience not stated	Offline HTML game-based activities	AI tools (prompted), HTML
3.	P3	More than two decades; subject not stated	Materials produced on Overleaf (LaTeX) with agentic AI support	Overleaf (LaTeX), agentic AI
4.	P4	Science, junior high school	Interactive PowerPoint on chemical reactions	PowerPoint
5.	P5	Subject and experience not stated	Educational presentation designed in Canva	Canva
6.	P6	Senior high school; about nine years	Canva-AI-generated PowerPoint with videos and images	PowerPoint, Canva AI, DeepSeek, ChatGPT, Claude
7.	P7	Subject and experience not stated; television in classrooms	PowerPoint with videos, online quizzes, and online worksheets (flipped classroom)	PowerPoint, videos, online quizzes
8.	P8	Technology and Livelihood Education	PowerPoint with pictures, interactive questions, and learning activities	PowerPoint
9.	P9	Mathematics	Interactive lesson with real-life problems and instant feedback	PowerPoint, digital quizzes
10.	P10	Mathematics, junior high school; large classes	Offline HTML materials on volume of prisms and pyramids, built with colleagues	HTML (offline), learners' phones
11.	P11	Subject and experience not stated	PowerPoint presentations	Laptop, PowerPoint, ChatGPT
12.	P12	Inclusive education (regular and special needs classes)	Multisensory digital flashcards for high-frequency words	Simple, accessible platforms (not named)

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Research Question 1: What are the experiences of highly proficient teachers in designing technology-enhanced learning materials in terms of their professional background and the circumstances that led them to design such materials; the design process, including how they decide on content, pedagogy, and technology (TPACK); and the people, resources, and settings that influence their design decisions (contextual knowledge)?

Table 2. Categories on the Experiences of Designing Technology-Enhanced Learning Materials (n = 12)

Category / Theme	Description	n (participants)	Illustrative excerpt (participant)
1. Professional background and circumstances			
Learner-centered motive	Wanting lessons that are more engaging, accessible, and responsive to learners' needs	9 (P1, P3–P6, P8–P10, P12)	"began as a response to the diverse needs of my learners especially those with disabilities" (P12)
Efficiency and ease of preparation	Using technology to work faster, more accurately, and with less effort	4 (P2, P3, P6, P11)	"I've always been inclined to use technology to improve productivity, efficiency, and accuracy" (P2)
Keeping pace with changing times	Responding to trends and changing needs in education	3 (P2, P4, P7)	"I want to cope up with the trends in teaching" (P7)
From basic tools to interactive designs	Moving from simple presentations or tools to interactive, learner-centered materials	6 (P1, P4, P5, P8, P9, P12)	"shifted from simply using PowerPoint presentations and digital resources to creating more interactive, learner-centered, and meaningful learning experiences" (P4)
2. Design process (content, pedagogy, technology)			
Anchoring on the curriculum	Basing content and activities on competencies, objectives, or the Budget of Work	10 (P1, P2, P4–P11)	"I based the content on the learning competencies and objectives prescribed in the curriculum guide." (P8)
Starting from learners' needs	Using learners' prior knowledge, misconceptions, difficulties, and interests as the starting point	8 (P1, P3, P5, P7–P10, P12)	"I also considered previous assessment results and common misconceptions as springboard." (P1)
Following a design sequence	Working through an identifiable order of steps from objective to use	5 (P1, P5, P6, P8, P12)	"Activities were arranged following 7E Learning framework-from simple understanding to application, analysis, and inquiry" (P1)
Choosing tools for ease and accessibility	Selecting tools that are easy to use, accessible, and familiar	8 (P1, P4–P9, P12)	"I chose PowerPoint because it is accessible, familiar to teachers, and useful for presenting information" (P8)
Matching tool to purpose and accuracy	Fitting the tool to the learning objective, feedback needs, and reliability of output	5 (P1, P2, P7, P9, P10)	"I don't really want any inaccuracy in the output generated." (P2)
Availability of devices and resources	Letting what is available or affordable decide the tool	3 (P1, P6, P11)	"Based on the availability of the technology." (P11)
3. People, resources, and settings that influence design			
Learners' needs and characteristics	Learners' abilities, interests, and needs shape what is designed	11 (P1–P10, P12)	"The learner's capacity influence as to design technology enhanced learning materials." (P10)
Access conditions factored into design	Connectivity, devices, class time, and workload shape design choices	12 (P1–P12)	"Since technology and internet access may be limited, I design materials that are simple, accessible offline" (P9)
Colleagues, collaboration, and mentoring	Fellow teachers as models, guides, and co-designers	6 (P1, P4–P6, P8, P10)	"With their guidance, I was able to learn and develop my confidence in navigating technology" (P6)
Professional development and trainings	Trainings and professional learning activities as sources of ideas	4 (P1, P4, P8, P9)	"professional development trainings have influenced my design" (P9)
Online resources and self-directed learning	Teaching oneself through online resources, tutorials, and trial	4 (P3, P5–P7)	"I have to teach myself in order to cope up." (P7)
Enabling school conditions	School internet, free tools, and classroom televisions that make design feasible	3 (P1, P6, P7)	"all classrooms in our school already has television" (P7)

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Table 2 shows that most participants (n = 9) entered TELM design out of concern for their learners: they wanted lessons that were more engaging, accessible, and responsive to learner needs, in some cases because of very large or heterogeneous classes (P10) or learners with disabilities (P12). Four named efficiency and ease of preparation, three the need to keep pace with changing times, and six described a shift from basic presentations or tools to more interactive, learner-centered designs. For these teachers, the starting point is the classroom rather than the technology, which is consistent with the role of contextual knowledge in TPACK (Mishra, 2019). The shift from presenting content to interactive materials can also be read as a move from passive toward interactive use in PICRAT terms (Kimmons et al., 2020). However, participants did not use that language. The accounts were not uniformly positive. P2 observed that technology makes work easier but raises expectations, so that "higher-ups expect you to make thrice that amount," and P7, who described belonging to a "digital immigrant generation," was "barely coping up" with available technology. Designation as highly proficient did not remove tension about workload and skills.

Design decisions were anchored mainly on the curriculum. Ten participants based their content and activities on competencies, objectives, or the DepEd Budget of Work, and eight began from learners' needs, prior knowledge, or interests. Five described an identifiable sequence, such as P1's use of the 7E framework, P6's lesson outline fed into Canva AI and then edited manually, or P12's cycle of needs assessment, development, implementation, monitoring, and reflection, which resembles the analyze-design-develop-implement-evaluate logic of instructional design models (Morrison et al., 2019). Tool choice was pragmatic: eight chose tools for ease of use, accessibility, and familiarity; five for fit with the learning purpose or output accuracy; and three for the availability of devices and resources. PowerPoint and Canva dominated, and they added interactive questions or online quizzes (P1, P7, P9) to gather feedback. Participants described multimedia choices in practical terms; only P12's multisensory flashcards echoed UDL's multiple means of representation (CAST, 2018), and none named multimedia or cognitive load principles. In TPACK terms, participants prioritized content and pedagogical decisions, with technology selection following and constrained by context (Mishra, 2019).

All participants described accommodating access conditions (n = 12), and eleven named learners' needs and characteristics as shaping influences, in accordance with the contextual component of TPACK (Mishra, 2019). Other main influences included colleagues (n = 6), professional development (n = 4), and self-directed learning from online resources and trial (n = 4). P6, whose colleagues are mostly younger, credited their guidance for building confidence, and P1 described exchanging practices with colleagues through LAC (Learning Action Cell) sessions. Three participants noted enabling conditions such as school internet and classroom televisions (P1, P6, P7), consistent with evidence that perceived barriers are not uniform (Mercader & Gairín, 2020). This collegial learning corresponds strongly with the PPST expectation that Career Stage 3 teachers support colleagues' growth (DepEd, 2017) and with the view that digital competence develops through experience (Instefjord & Munthe, 2017).

Research Question 2: What challenges do they encounter in designing technology-enhanced learning materials?

Table 3. Categories on the Challenges Encountered (n = 12)

Category / Theme	Description	n (participants)	Illustrative excerpt (participant)
1. Limited or unstable internet connectivity	Lack of a reliable connection when designing or using materials	9 (P2–P7, P9, P11, P12)	"No internet connection" (P2)
2. Limited time and heavy workload	Little time to prepare materials, plus rising expectations for output	9 (P1, P2, P4–P6, P8–P10, P12)	"limited time available to develop quality learning materials because of my teaching responsibilities" (P8)
3. Insufficient devices and access	Learners or teachers lacking devices or access to technology	5 (P4–P6, P9, P12)	"Limited access to technology and connectivity among SNED learners make it difficult to rely on digital materials or platforms" (P12)
4. Varied digital skills and readiness	Differences in digital skills among learners, and the teacher's own learning curve	3 (P1, P6, P7)	"my digital knowledge and skills. I belong to a digital immigrant generation." (P7)
5. Keeping technology purposeful	Ensuring alignment with objectives, accuracy of output, and avoiding over-dependence	3 (P1, P2, P11)	"teachers depend too much on the use of technology that their teaching becomes crippled in its absence" (P2)
6. Learner distraction in large classes	Managing off-task phone use among more than 50 learners	1 (P10)	"There were those, diverting the activities using cellphone games or facebook and more." (P10)

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Table 3 shows that connectivity, time, and devices dominate. Nine participants cited limited or unstable internet connectivity (P2's entire answer was "No internet connection"), nine cited limited time or heavy workload, and five cited insufficient devices or access to technology, often in combination (e.g., P4, P5, P6, P9, P12). For P2, easier technology brought higher expectations, with the quota of materials rising to "thrice" the earlier number. Three participants pointed to varied digital skills and capability among learners; P7 cited the teacher's own limited training; and P10 reported managing off-task phone use in a class of more than 50 learners. Three worried about keeping technology purposeful: P2 cautioned that teachers can depend on technology so much that their teaching becomes crippled in its absence; P11 admitted depending heavily on the internet for ChatGPT, and P1 stressed making sure that technology supports the lesson objectives. These challenges closely match those reported for Filipino teachers generally (Loseñara & Loseñara, 2024; Talite & Napil, 2024) and indicate that Master Teachers report them too. Concerns about AI accuracy and dependence echo the call to judge when and how to use generative tools (Mishra et al., 2023) and the view that integration is a decision made repeatedly (Backfisch et al., 2021).

Research Question 3: What practices and strategies do they employ in designing such materials and in addressing these challenges?

Table 4. Categories on the Practices and Strategies Employed (n = 12)

Category / Theme	Description	n (participants)	Illustrative excerpt (participant)
1. Offline, printed, and dual-mode versions	Preparing fallbacks so lessons continue without connectivity or devices	10 (P1, P2, P4–P10, P12)	"I create different versions of the same material so I always have Plan B or C whenever Plan A does not work" (P2)
2. Differentiating by readiness	Simplifying tasks, varying difficulty, scaffolding, or adding enrichment	8 (P1, P3, P5–P7, P9–P11)	"simplify activities for struggling learners, and offer enrichment tasks for advanced students" (P9)
3. Keeping designs simple and reusable	Simple, practical, modular designs, templates, and advance preparation	7 (P1, P4–P6, P8, P9, P12)	"I keep my designs simple, prepare materials in advance" (P5)
4. Using AI and design apps	Using generative AI and design tools to speed up and enrich production	6 (P1–P3, P5, P6, P11)	"I create an outline of the lesson flow then feed the same to Canva ai. I then download the file as PPT then enhance or modify the presentation manually." (P6)
5. Collaborating and sharing	Seeking help, co-designing, and sharing practices with colleagues	7 (P1, P3, P4, P6–P8, P10)	"We grade 7 math teachers do collaboration of outputs and share best practices" (P10)
6. Reported use of learner evidence to judge materials	Participants' own judgments from participation and assessment results; not independently evaluated	9 (P1, P2, P4, P5, P7–P11)	"The material was effective, if the learners can explain the process and generalize the content given." (P10)
7. Revising materials after use	Simplifying, adding visuals or features, and adjusting activities	6 (P1, P2, P5, P6, P9, P12)	"I improved the material by simplifying instructions, adding more visual examples, and providing additional practice for difficult concepts." (P9)
8. Personal workarounds and rules	Own internet, waiting out outages, positive mindset, and class rules	4 (P2, P3, P10, P11)	"I provided my own internet at home since the internet in school is not always available." (P11)

Responses regarding these constraints were strikingly similar. Ten participants prepared offline, printed, or dual-mode versions so that lessons could continue without connectivity: P2 keeps "Plan B or C," P7 "always" has "a non digital or printed version," and P10's group built offline HTML materials that run on learners' phones. Eight participants differentiated tasks by readiness through simplified instructions, varied difficulty, scaffolding, or enrichment, and seven kept designs simple, practical, and reusable, sometimes using ready-made templates and advance preparation. Six used AI and design apps to speed production; P6 fed a lesson outline to Canva AI and refined the downloaded file by hand, whereas P2 stressed that AI output is only as good as the prompt. Seven collaborated with or sought help from colleagues, and four used personal workarounds such as paying for their own internet (P11) or setting activity rules and monitoring learners (P10). To judge effectiveness, nine used learner participation and assessment results as evidence, and six revised materials after use. These strategies show the resourcefulness and adaptability reported among Filipino teachers (Cabrejas et al., 2024; Talite & Napil, 2024). Differentiated, multi-format materials correspond to UDL's multiple means of engagement, representation, and expression (CAST, 2018), and simplicity may reduce extraneous load (Mayer, 2021; Sweller et al., 2019), although participants justified simplicity by time and access rather than cognitive demand. Collaboration fits the PPST expectation of peer support at Career Stage 3 (DepEd, 2017). Participants' statements that materials worked, were effective, or were enjoyed are self-

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Volume 1, Issue 10, pp. 449-461, November 2026
https://ijroms.com
Original Article

reports. No material was examined and no learner outcome was measured, so these statements show how participants judged their materials, not that the materials were effective.

Research Question 4: What insights and best practices can be drawn from their accounts for teachers, school leaders, and policymakers?

Table 5. Categories on the Insights and Best Practices (n = 12)

Category / Theme	Description	n (participants)	Illustrative excerpt (participant)
1. Technology serves learning	Technology is a means that should support, not replace or complicate, teaching	8 (P1, P2, P4–P6, P8, P9, P12)	"They are ASSISTANTS not teachers." (P2)
2. Learner-centered and aligned	Start from learners' needs and the competencies, not from the tool	8 (P1, P4–P9, P12)	"It is about understanding the needs of learners, aligning the materials with the learning competencies" (P8)
3. Simple, practical, accessible tools	Prefer simple, familiar, practical tools over sophisticated ones	5 (P1, P5, P6, P9, P12)	"use simple, accessible technology and focus on improving students' understanding rather than just using digital tools" (P9)
4. Plan for access and inclusion	Provide alternatives so that no learner is left out	4 (P2, P6, P7, P12)	"make sure to consider digital divide so that no learners will be left out." (P7)
5. Continuous learning and reflection	Keep learning, creating, testing, and refining materials	8 (P1, P3–P6, P9, P10, P12)	"designing technology-enhanced learning materials is also a continuous learning process for teachers" (P1)
6. Collaboration and mentoring	Teachers learn and improve together through sharing and support	4 (P1, P4, P6, P10)	"It is also helpful if we emersed co teachers in technology enhance learning materials. Educate them and give support." (P10)
7. Perceived practical value	Participants' beliefs that technology can raise creativity, engagement, efficiency, and learning	5 (P2, P3, P5, P10, P11)	"it helps the generation Alpha to learn better" (P11)

The insights in Table 5 converge on a few principles. Eight participants framed technology as a means that must serve learning and not replace the teacher or complicate the lesson ("They are ASSISTANTS not teachers," P2; "Technology should enhance learning rather than complicate it," P6), and eight stressed learner-centered, needs-based design aligned with competencies. Five advised simple, accessible tools; four urged planning for access and inclusion with fallbacks so that "no learners will be left out" (P7); eight emphasized continuous learning, reflection, and creativity; and four highlighted collaboration and mentoring (P10 proposed immersing and supporting co-teachers). Five also noted benefits such as creativity, engagement, efficiency, and, for P11, helping "generation Alpha" learn better. Together, the insights describe design as an ongoing professional practice in which technology knowledge supports pedagogical and contextual knowledge, in line with TPACK (Mishra, 2019), and they bear on Mishra et al.'s (2023) question about the role of generative AI. They also suggest that highly proficient teachers can share expertise, such as offline-ready design, differentiation, and careful use of AI, through mentoring and school-based learning communities. Perceived benefits (Table 5) are likewise participants' beliefs and were not tested.

Summary of Findings

Table 6 brings the findings together under the components of TPACK with contextual knowledge. It shows that the knowledge highly proficient teachers described is anchored in the curriculum and in learners, that technology choices are practical and constrained by access, and that context is the thread that runs through every other component.

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Volume 1, Issue 10, pp. 449-461, November 2026
https://ijroms.com
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Table 6. Synthesis of Findings by TPACK Component with Contextual Knowledge

Component	What participants described	Most widespread categories (n of 12)
Content and curriculum knowledge	Content and activities are derived from competencies, objectives, and the Budget of Work; learners' misconceptions and prior knowledge set the starting point.	Anchoring on the curriculum (10); starting from learners' needs (8)
Pedagogical knowledge	Teachers follow a design sequence, differentiate tasks, judge effectiveness from learner evidence, and revise after use.	Differentiating by readiness (8); learner evidence (9); revising (6); design sequence (5)
Technological knowledge	Tools are chosen for ease, accessibility, and familiarity; generative AI and design apps speed production but call for careful prompting and checking.	Choosing for ease (8); AI and design apps (6); matching tool to purpose (5)
Contextual knowledge	Connectivity, devices, time, workload, colleagues, and learner characteristics shape what is designed; fallbacks and collaboration are the usual responses.	Access conditions (12); learners' characteristics (11); connectivity challenge (9); time challenge (9); offline versions (10); collaboration (7)

In summary, regarding Problem 1, teachers initiated TELM design primarily out of concern for their students, followed curriculum guidance in content selection, and chose user-friendly tools. They adapted their designs based on access conditions, student needs, and collegial input. For Problem 2, the principal challenges identified were unstable internet connectivity, limited time, heavy workloads, and insufficient devices. Additional concerns included disparities in digital skills and the requirement of thoughtful technology integration. For Problem 3, teachers addressed these challenges by creating offline and printed versions, differentiating tasks by ability level, keeping materials simple, using AI and design applications, collaborating with colleagues, and refining materials based on student feedback. For Problem 4, participants emphasized that technology should support learning; materials should be student-centered, simple, and inclusive; and continuous professional learning and collaboration are essential for effective design.

Two cases illustrate the way these elements combine. P6 began with the lesson competency and objectives, reviewed the lesson plan, outlined the lesson flow, generated a presentation in Canva AI, and then enhanced it manually, varying activities after seeing learners' responses. P12 began with a needs assessment, selected simple, accessible platforms with multisensory features, developed and implemented the flashcards, and monitored learners' progress, with the material itself emerging from action research. In both cases, technology entered late in a sequence that began with learners and the curriculum.

Reported practical value versus evaluated effectiveness. Participants described materials as engaging, helpful, or effective (Table 4, learner evidence; Table 5, perceived practical value). These are perceptions. Their evidence was mostly informal, such as participation, quiz results, and learners' ability to explain a process (e.g., P10), and none of it was independently examined. The study therefore reports practical value as participants perceived it and cannot say which practices improve learning or material quality.

Ethical Considerations

This study sought permission from the schools division superintendent and the school principal of the school where the study was conducted. Participation was voluntary: the first item in the online form was a consent statement explaining the purpose, procedures, risks, and benefits, and the right to withdraw at any moment without consequence; all 12 respondents agreed. Responses were identified only by pseudonymous codes (P1 to P12) and no names were collected. Because the participants came from one school and the group was small, descriptors were generalized (Table 1), the school and division names are withheld, and excerpts were screened for identifying details.

Conclusion

This study described how twelve Master Teachers reported designing technology-enhanced learning materials at one school. According to their written accounts, design began with learners and the curriculum rather than the technology: participants anchored content on competencies and learner needs, chose accessible tools such as PowerPoint and Canva, reported growing use of generative AI, and adapted to access conditions. The challenges they reported were unstable connectivity, limited time and heavy workload, and insufficient devices, with smaller groups noting varied digital skills and the need to use technology purposefully. They reported responding with offline and printed versions, differentiated and simple materials, AI-assisted production, collegial support, and informal evidence from learners to revise materials. Their insights were that technology serves learning and does not replace the teacher, that materials should be learner-centered, simple, and inclusive, and that continuous learning and collaboration sustain good design. These conclusions are limited to participants' perceptions and to a single site. No materials or learner outcomes were evaluated, so the study cannot say whether the described practices improve learning or material quality.

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Volume 1, Issue 10, pp. 449-461, November 2026
https://ijroms.com
Original Article

Recommendations

Recommendations drawn directly from participants' reported practices. Teachers may keep an offline or printed version of each digital lesson, differentiate tasks by readiness, keep designs simple and purposeful, and check AI-generated content against the competency before use; these steps fit within existing preparation time and school equipment. School heads and learning action cell coordinators may use one session each quarter for teachers to demonstrate a material and exchange offline files, and may keep a shared offline folder on school computers, which requires no new funding. School heads may also avoid raising material-production quotas without matching support. Proposals beyond the data, to be tested before adoption. Schools division and DepEd personnel may consider professional development on offline-ready design, differentiated materials, and responsible AI use, scheduled within available budgets and drawing on teachers who reported such practices as resource persons; better connectivity and devices depend on funding decisions beyond the school. Teacher education institutions and learning resource developers may consider offline-capable formats and authentic design tasks. Future researchers may use artifact-based interviews, classroom observation, learner and colleague perspectives, multi-site samples, and recorded position and career stage, and may evaluate learner outcomes, which this study did not.

References

Bacio, S. P., Jr. (2025). Identifying learners' least-mastered competencies in Filipino 11: A foundation for digital module development. *International Journal of Information and Education Technology, 15*(6), 1277–1288. https://doi.org/10.18178/ijiet.2025.15.6.2330

Backfisch, I., Lachner, A., Stürmer, K., & Scheiter, K. (2021). Variability of teachers' technology integration in the classroom: A matter of utility! *Computers & Education, 166*, Article 104159. https://doi.org/10.1016/j.compedu.2021.104159

Bozkurt, A., & Sharma, R. C. (2020). Emergency remote teaching in a time of global crisis due to coronavirus pandemic. *Asian Journal of Distance Education, 15*(1), i–vi. https://doi.org/10.5281/zenodo.3778083

Bradshaw, C., Atkinson, S., & Doody, O. (2017). Employing a qualitative description approach in health care research. *Global Qualitative Nursing Research, 4*, 1–8. https://doi.org/10.1177/2333393617742282

Brinkmann, S., & Kvale, S. (2018). *Doing interviews* (2nd ed.). SAGE Publications. https://doi.org/10.4135/9781529716665

Cabrejas, M., Fajardo, J. L., Jusay, J. R., & Bagas, J. (2024). Stories of technology and livelihood pre-service teachers' utilization of learning materials during blended learning. *Psychology and Education: A Multidisciplinary Journal, 20*(9), 1121–1135. https://doi.org/10.5281/zenodo.11663078

Campbell, S., Greenwood, M., Prior, S., Shearer, T., Walkem, K., Young, S., Bywaters, D., & Walker, K. (2020). Purposive sampling: Complex or simple? Research case examples. *Journal of Research in Nursing, 25*(8), 652–661. https://doi.org/10.1177/1744987120927206

CAST. (2018). *Universal design for learning guidelines* (Version 2.2). http://udlguidelines.cast.org

Creswell, J. W., & Poth, C. N. (2018). *Qualitative inquiry and research design: Choosing among five approaches* (4th ed.). SAGE Publications.

Department of Education. (2017). *National adoption and implementation of the Philippine Professional Standards for Teachers* (DepEd Order No. 42, s. 2017). https://deped.gov.ph/?p=1619

Department of Education. (2020). *Adoption of the Basic Education Learning Continuity Plan for School Year 2020–2021 in the light of the COVID-19 public health emergency* (DepEd Order No. 12, s. 2020). https://naro.law.upd.edu.ph/documents/1336

Doyle, L., McCabe, C., Keogh, B., Brady, A., & McCann, M. (2020). An overview of the qualitative descriptive design within nursing research. *Journal of Research in Nursing, 25*(5), 443–455. https://doi.org/10.1177/1744987119880234

General, J. R. D. (2019). From novice to expert: The lived experience of Master Teachers in Science. *CNU Journal of Higher Education, 13*(1), Article 3. https://doi.org/10.70997/2546-1796.1013

Hennink, M., & Kaiser, B. N. (2022). Sample sizes for saturation in qualitative research: A systematic review of empirical tests. *Social Science & Medicine, 292*, Article 114523. https://doi.org/10.1016/j.socscimed.2021.114523

Hodges, C., Moore, S., Lockee, B., Trust, T., & Bond, A. (2020, March 27). The difference between emergency remote teaching and online learning. *EDUCAUSE Review*. https://er.educause.edu/articles/2020/3/the-difference-between-emergency-remote-teaching-and-online-learning

Instefjord, E. J., & Munthe, E. (2017). Educating digitally competent teachers: A study of integration of professional digital competence in teacher education. *Teaching and Teacher Education, 67*, 37–45. https://doi.org/10.1016/j.tate.2017.05.016

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Volume 1, Issue 10, pp. 449-461, November 2026
https://ijroms.com
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Kim, H., Sefcik, J. S., & Bradway, C. (2017). Characteristics of qualitative descriptive studies: A systematic review. *Research in Nursing & Health, 40*(1), 23–42. https://doi.org/10.1002/nur.21768

Kimmons, R., Graham, C. R., & West, R. E. (2020). The PICRAT model for technology integration in teacher preparation. *Contemporary Issues in Technology and Teacher Education, 20*(1), 176–198.

Koh, J. H. L., Chai, C. S., & Lim, W. Y. (2017). Teacher professional development for TPACK-21CL: Effects on teacher ICT integration and student outcomes. *Journal of Educational Computing Research, 55*(2), 172–196. https://doi.org/10.1177/0735633116656848

König, J., Jäger-Biela, D. J., & Glutsch, N. (2020). Adapting to online teaching during COVID-19 school closure: Teacher education and teacher competence effects among early career teachers in Germany. *European Journal of Teacher Education, 43*(4), 608–622. https://doi.org/10.1080/02619768.2020.1809650

Loseñara, J. M. M., & Loseñara, C. P. (2024). Beginning science teachers' online classes: A narrative inquiry. *JPBI (Jurnal Pendidikan Biologi Indonesia), 10*(1), 47–57. https://doi.org/10.22219/jpbi.v10i1.31800

Magdato, G. R. C., & Paglinawan, J. L. (2025). Narratives of master teachers on artificial intelligence integration in instructional leadership. *International Journal of Scientific and Management Research*. https://doi.org/10.37502/ijsmr.2025.81010

Malterud, K., Siersma, V. D., & Guassora, A. D. (2016). Sample size in qualitative interview studies: Guided by information power. *Qualitative Health Research, 26*(13), 1753–1760. https://doi.org/10.1177/1049732315617444

Mayer, R. E. (2021). *Multimedia learning* (3rd ed.). Cambridge University Press. https://doi.org/10.1017/9781316941355

Mercader, C., & Gairín, J. (2020). University teachers' perception of barriers to the use of digital technologies: The importance of the academic discipline. *International Journal of Educational Technology in Higher Education, 17*, Article 4. https://doi.org/10.1186/s41239-020-0182-x

Mishra, P. (2019). Considering contextual knowledge: The TPACK diagram gets an upgrade. *Journal of Digital Learning in Teacher Education, 35*(2), 76–78. https://doi.org/10.1080/21532974.2019.1588611

Mishra, P., Warr, M., & Islam, R. (2023). TPACK in the age of ChatGPT and generative AI. *Journal of Digital Learning in Teacher Education, 39*(4), 235–251. https://doi.org/10.1080/21532974.2023.2247480

Morrison, G. R., Ross, S. M., Morrison, J. R., & Kalman, H. K. (2019). *Designing effective instruction* (8th ed.). Wiley.

Nowell, L. S., Norris, J. M., White, D. E., & Moules, N. (2017). Thematic analysis: Striving to meet the trustworthiness criteria. *International Journal of Qualitative Methods, 16*(1), Article 1609406917733847. https://doi.org/10.1177/1609406917733847

Olmos-Vega, F. M., Stalmeijer, R. E., Varpio, L., & Kahlke, R. (2023). A practical guide to reflexivity in qualitative research: AMEE Guide No. 149. *Medical Teacher, 45*(3), 241–251. https://doi.org/10.1080/0142159X.2022.2057287

Pamor, N. F., Andoy, M. L., & Andoy, A. A. (2024). Experiences of technology and livelihood education teachers in the Division of Davao del Norte: A phenomenological study. *Asian Journal of Education and Social Studies, 50*(7), 438–450. https://doi.org/10.9734/ajess/2024/v50i71475

Ramirez, I. A. L. (2024). e-Training package for secondary pre-service teachers. *International Journal of Technology in Education, 7*(3), 417–433. https://doi.org/10.46328/ijte.593

Redecker, C. (2017). *European framework for the digital competence of educators: DigCompEdu*. Publications Office of the European Union. https://doi.org/10.2760/159770

Sweller, J., van Merriënboer, J. J. G., & Paas, F. (2019). Cognitive architecture and instructional design: 20 years later. *Educational Psychology Review, 31*(2), 261–292. https://doi.org/10.1007/s10648-019-09465-5

Tafazoli, D., & Meihami, H. (2023). Narrative inquiry for CALL teacher preparation programs amidst the COVID-19 pandemic: Language teachers' technological needs and suggestions. *Journal of Computers in Education, 10*, 163–187. https://doi.org/10.1007/s40692-022-00227-x

Talite, E. P., & Napil, M. C. (2024). Blended teaching approach in the eyes of Filipino teachers: A phenomenological study. *Asian Journal of Education and Social Studies, 50*(6), 232–241. https://doi.org/10.9734/ajess/2024/v50i61409

Tondeur, J., van Braak, J., Ertmer, P. A., & Ottenbreit-Leftwich, A. (2017). Understanding the relationship between teachers' pedagogical beliefs and technology use in education: A systematic review of qualitative evidence. *Educational Technology Research and Development, 65*(3), 555–575. https://doi.org/10.1007/s11423-016-9481-2

Toquero, C. M. (2020). Challenges and opportunities for higher education amid the COVID-19 pandemic: The Philippine context. *Pedagogical Research, 5*(4), Article em0063. https://doi.org/10.29333/pr/7947

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https://ijroms.com
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Tracy, S. J. (2020). *Qualitative research methods: Collecting evidence, crafting analysis, communicating impact* (2nd ed.). Wiley-Blackwell.

Trust, T., & Whalen, J. (2020). Should teachers be trained in emergency remote teaching? Lessons learned from the COVID-19 pandemic. *Journal of Technology and Teacher Education, 28*(2), 189–199.

UNESCO. (2018). *UNESCO ICT competency framework for teachers* (Version 3). https://unesdoc.unesco.org/ark:/48223/pf0000265721

Valle, L. C., Gonzales, R. R., Almacen, R. M. L., Batucan, G., & Gonzales, G. G. (2024). Modeling the relationship of the TPACK framework with cyber wellness, school climate, and digital nativity of basic education teachers. *Frontiers in Education, 9*, Article 1397888. https://doi.org/10.3389/feduc.2024.1397888

Vears, D. F., & Gillam, L. (2022). Inductive content analysis: A guide for beginning qualitative researchers. *Focus on Health Professional Education, 23*(1), 111–127. https://doi.org/10.11157/fohpe.v23i1.544

Voogt, J., & McKenney, S. (2017). TPACK in teacher education: Are we preparing teachers to use technology for early literacy? *Technology, Pedagogy and Education, 26*(1), 69–83. https://doi.org/10.1080/1475939X.2016.1174730

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