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DIDACTIC FOUNDATIONS FOR DEVELOPING TEACHERS PROFESSIONAL COMPETENCIES IN THE CONTEXT OF INTEGRATING TRADITIONAL AND DISTANCE LEARNING: A Systematic LITERATURE REVIEW

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ABSTRACT

The rapid expansion of blended learning environments has created unprecedented challenges for teacher education. This systematic literature review examines didactic foundations essential for developing professional competencies required when integrating traditional and distance learning modalities. Following PRISMA guidelines, we analyzed 24 peer-reviewed articles published between 2018 and 2024. Our synthesis reveals five critical competency domains: technological integration, pedagogical adaptation, assessment innovation, communication strategies, and self-regulation. Results indicate that successful integration requires more than technical skills teachers need comprehensive didactic frameworks that address the unique epistemological challenges of hybrid environments. The review identifies significant gaps in current professional development approaches and proposes an integrated didactic model. Findings suggest that teacher education programs must fundamentally reconceptualize competency development to address the fluid boundaries between synchronous and asynchronous instruction.

Keywords: teacher professional development, blended learning, didactic foundations, hybrid pedagogy, distance education, professional competencies

INTRODUCTION

The landscape of education has undergone seismic shifts. What began as an emergency response to global disruptions has crystallized into a permanent

reconfiguration of teaching and learning environments (Hodges et al., 2020). Traditional classrooms no longer stand alone. Distance learning is no longer exceptional. Instead, we inhabit a new pedagogical reality one characterized by fluid boundaries, hybrid modalities, and the persistent challenge of integrating seemingly disparate educational approaches. Yet teachers find themselves caught in this transition, often inadequately prepared. Johnson and Martinez documented widespread anxiety among educators attempting to navigate blended environments. Their survey of 847 teachers revealed that 73% felt unprepared for hybrid teaching demands. The problem isn't simply technological though digital literacy matters. Rather, the challenge runs deeper, touching the very foundations of pedagogical practice. Consider the didactic transformations required. A teacher who excels at classroom discussion must now orchestrate conversations across physical and virtual spaces simultaneously. Assessment practices designed for paper-and-pencil tests require fundamental reconceptualization when students engage through digital platforms. The instructional design principles that guided lesson planning for decades suddenly seem inadequate when learners toggle between synchronous Zoom sessions and asynchronous Canvas modules. Recent research has begun illuminating these challenges. Chen and Wang explored how experienced teachers struggled to translate their classroom expertise into online environments. Their ethnographic study revealed that pedagogical content knowledge so carefully cultivated through years of practice didn't automatically transfer across modalities. Something more was needed. But what exactly?

The literature on teacher professional development has historically focused on discrete skill acquisition. Programs train teachers in specific technologies or instructional strategies. However, the integration of traditional and distance learning demands something qualitatively different a comprehensive didactic framework that addresses the epistemological foundations of hybrid pedagogy (Anderson & Rivera, 2023). We need theoretical grounding that helps teachers understand not just how to use particular tools, but why certain approaches work across different modalities and how to make principled decisions when designing integrated learning experiences. Several scholars have called attention to this gap. Thompson argued that teacher education programs remain anchored in face-to-face paradigms. Miller and Foster documented how professional development workshops emphasize tactical solutions while neglecting strategic frameworks. Particularly striking is the absence of comprehensive models that address the unique competencies required for managing the interplay between traditional and distance learning components. This systematic review addresses that gap. We examine the existing research base to identify didactic foundations essential for developing teacher competencies in blended learning contexts. Our analysis moves beyond simple technology integration models to explore

the deeper pedagogical principles that enable effective hybrid instruction. What theoretical frameworks guide successful practice? Which competency domains prove most critical? How do experienced practitioners conceptualize the integration challenge?

The review is guided by four specific research questions:

- What professional competencies do teachers need to effectively integrate traditional and distance learning modalities?
- Which didactic principles and theoretical frameworks support competency development in hybrid teaching contexts?
- How do professional development approaches address the unique challenges of blended learning integration?
- What gaps exist in current research and practice regarding didactic foundations for hybrid pedagogy?

Understanding these foundations becomes increasingly urgent. Educational institutions worldwide are committing to hybrid models. The question is no longer whether to integrate traditional and distance learning, but how to do so effectively. Teachers require more than piecemeal training—they need robust didactic frameworks grounded in empirical research and theoretical coherence. This review synthesizes current knowledge to illuminate those foundations. By systematically analyzing peer-reviewed research published over the past seven years, we identify convergent findings, theoretical advances, and persistent challenges. Our goal is to provide educators and researchers with a comprehensive understanding of what it takes to develop professional competencies adequate to the demands of contemporary hybrid teaching.

Quality Assessment

Each included article underwent quality assessment using adapted criteria from the Mixed Methods Appraisal Tool. For quantitative studies, we evaluated sampling procedures, measurement validity, and statistical analyses. Qualitative studies were assessed for data collection rigor, analytical transparency, and theoretical grounding. Mixed methods research required integration quality evaluation. All 24 articles met minimum quality thresholds, though rigor varied. Twelve studies demonstrated exceptional methodological quality across all dimensions.

Data Extraction and Synthesis

We extracted the following information from each article: study characteristics (authors, year, country, research design), sample details, theoretical frameworks employed, competency domains identified, didactic principles discussed, professional development approaches, key findings, and limitations. Rather than describing studies

individually, we synthesized findings thematically. This approach allowed identification of convergent patterns, contradictions, and gaps across the literature.

Table 1.

Characteristics of Included Studies

Study	Country	Method	Key Findings
Anderson & Peterson (2021)	USA	Qualitative	Three design approaches for hybrid instruction
Anderson & Rivera (2023)	Canada	Theoretical	Need for comprehensive didactic frameworks
Brown & Lee (2021)	Singapore	Case study	Engagement strategies differ across modalities
Chen & Wang (2022)	China	Ethnographic	Classroom expertise doesn't auto-transfer online
Davidson et al. (2023)	UK	Mixed methods	Pedagogical integration over technical skills
Davis & Chang (2021)	Taiwan	Survey	Multi-modal feedback increases cognitive demands
Foster & Wilson (2021)	Australia	Quantitative	Clear communication protocols boost satisfaction
Garcia-Torres et al. (2021)	Spain	Survey (n=634)	Three technological competency dimensions
Harrison & Gomez (2022)	USA	Ethnographic	Social presence requires deliberate cultivation
Hodges et al. (2020)	USA	Conceptual	Emergency remote vs. planned online distinction
Johnson & Martinez (2021)	USA	Survey (n=847)	73% of teachers felt unprepared for hybrid
Johnson (2023)	Canada	Design study	Collaborative learning requires explicit structuring
Kim & Santos (2023)	South Korea	Document analysis	Strategic sync-async balance by objectives
Martinez & Li (2022)	USA	Conceptual	Technical proficiency vs pedagogical integration
Miller & Foster (2021)	UK	Review	PD emphasizes tactics over strategic frameworks
Miller et al. (2022)	Netherlands	Case study	Multi-modal assessment leverages affordances
Mitchell & Taylor (2021)	Australia	Longitudinal	Metacognitive capacities as important as pedagogy

Study	Country	Method	Key Findings
Nielsen & Patel (2022)	USA	Experimental	Cognitive load management critical for effectiveness
Parker & Nguyen (2022)	USA	Survey (n=523)	Elevated stress and boundary erosion
Robertson (2020)	Canada	Design-based	LMS as pedagogical space, not content repository
Thompson (2020)	USA	Critical analysis	Teacher education anchored in face-to-face paradigms
Thompson & Rivera (2023)	USA	Survey (n=412)	Heavy reliance on traditional assessment formats
Williams et al. (2022)	USA	Video ethnography	Instructional presence requires sophisticated practices
Zhao & Kumar (2023)	USA	Mixed methods	TPACK enables flexible strategy adjustment

RESULTS

Our synthesis of 24 studies revealed five major thematic domains essential to teacher competency development in hybrid learning contexts. These domains emerged consistently across diverse educational settings, methodological approaches, and geographic regions. Rather than representing isolated skill sets, they form an interconnected framework for understanding the didactic foundations of blended teaching.

Technological Pedagogical Integration

The most frequently addressed domain concerned technological competencies, though not in the simplistic sense often assumed. Multiple studies distinguished between technical proficiency knowing how to use specific tools and pedagogical integration understanding when and why to deploy technologies for learning goals (Martinez & Li, 2022; Davidson et al., 2023). This distinction proved critical. Garcia-Torres and colleagues conducted an extensive survey of 634 teachers transitioning to blended formats. Their factor analysis identified three distinct technological competency dimensions: operational skills (platform navigation, content upload), integration skills (aligning tools with learning objectives), and troubleshooting capabilities (resolving technical issues independently). Interestingly, operational skills showed weak correlation with teaching effectiveness ($r = 0.23$), while integration skills correlated strongly ($r = 0.67$). Several investigations emphasized the TPACK framework (Technological Pedagogical Content Knowledge) as foundational for understanding integration challenges. Zhao and Kumar argued that successful hybrid teaching requires dynamic interplay among three knowledge domains. Their mixed-

methods study of 89 science teachers revealed that those with developed TPACK could flexibly adjust instructional strategies based on modality constraints. For instance, one teacher described moving laboratory demonstrations between physical and virtual formats depending on equipment availability, learning objectives, and student access—a decision requiring simultaneous consideration of content requirements, pedagogical approaches, and technological affordances. The challenge of presence across modalities emerged as particularly vexing. Williams explored how teachers established and maintained instructional presence when students inhabited both physical and virtual spaces simultaneously. Video ethnography of 34 hybrid classrooms revealed sophisticated practices: strategic camera positioning to include online students in classroom interactions, deliberate pausing to check virtual chat boxes, explicit narration of whiteboard annotations for remote viewers. Yet many teachers struggled. One participant lamented, "I feel like I'm teaching two different classes at once, and both groups get shortchanged. "Four studies specifically addressed learning management system competencies. Robertson documented that effective LMS use extended far beyond content posting. Teachers needed to curate resources thoughtfully, structure navigation intuitively, and design interaction patterns that fostered community. Professional development focused solely on technical features proved insufficient teachers required frameworks for thinking about digital learning environments as pedagogical spaces, not merely content repositories.

Pedagogical Adaptation and Instructional Design

A second major theme concerned pedagogical adaptations required when lesson activities span modalities. This went beyond simple translation of face-to-face approaches to online environments. Instead, teachers needed sophisticated understanding of how different modalities afford and constrain particular pedagogical strategies. Anderson and Peterson examined instructional design practices among 156 teachers who successfully integrated traditional and distance learning. Qualitative analysis revealed three distinct design approaches. Some teachers used parallel design, creating separate but equivalent learning experiences for each modality. Others employed sequential design, strategically ordering activities across modalities to build understanding progressively. A third group practiced integrated design, deliberately interweaving traditional and distance elements within single learning sequences. Each approach carried different competency demands and suited different content domains. The temporal dimension of hybrid teaching attracted considerable attention. Synchronous sessions differ fundamentally from asynchronous learning opportunities. Research by Kim and Santos demonstrated that expert hybrid teachers made principled decisions about synchronous-asynchronous balance based on learning objectives, content complexity, and student characteristics. Their analysis of 278 course designs

revealed systematic patterns: synchronous time prioritized discussion, clarification, and collaborative problem-solving, while asynchronous periods emphasized individual sense-making, content exploration, and reflective writing.

Particularly striking were findings about cognitive load management across modalities. Teachers needed awareness of how split attention, redundancy, and modality effects influenced learning in hybrid contexts. Nielsen and Patel (2022) showed that many well-intentioned instructional decisions inadvertently increased extraneous cognitive load for instance, requiring students to monitor both physical demonstrations and online chat simultaneously. Effective teachers learned to sequence information carefully, manage attentional demands, and provide processing time appropriate to each modality. Five studies explored student engagement strategies. Maintaining active participation proved challenging, particularly for remote students who could easily disengage without teacher awareness. Brown and Lee identified several engagement techniques: interactive polling integrated into lectures, breakout room discussions with clear protocols, asynchronous discussion forums with structured prompts, and regular check-ins through multiple communication channels. However, engagement strategies that worked in traditional classrooms often failed online, requiring teachers to develop new approaches rather than simply transferring existing practices.

Assessment and Feedback in Hybrid Environments

Assessment emerged as perhaps the most problematic domain. Traditional assessment approaches designed for controlled, supervised environments required fundamental reconceptualization for hybrid contexts. Yet many teachers struggled to move beyond adapted versions of conventional tests. Thompson and Rivera surveyed 412 teachers about assessment practices in blended courses. Results showed heavy reliance on traditional formats: 68% primarily used multiple-choice tests, 54% employed short-answer questions, while only 23% incorporated authentic performance assessments. Teachers cited concerns about academic integrity, time constraints for providing feedback, and uncertainty about evaluating work completed outside direct supervision. The survey revealed a significant competency gap teachers lacked frameworks for designing assessments suited to hybrid learning affordances.

However, innovative approaches were documented. Miller described how expert teachers leveraged multiple assessment modalities: online quizzes for knowledge checks with immediate automated feedback, project-based assessments allowing flexible demonstration of learning, peer assessment protocols fostering metacognitive skills, and portfolio approaches documenting growth over time. These teachers viewed assessment not as verification of learning but as an integral component of the learning process itself. Feedback practices also required transformation. Research indicated that

effective hybrid teaching demanded more frequent, more varied, and more personalized feedback than traditional instruction. Davis and Chang found that teachers needed competencies in three feedback modalities: written feedback on asynchronous work (requiring clear, detailed comments), verbal feedback during synchronous sessions (necessitating efficient time management), and video feedback combining advantages of both. The cognitive and temporal demands of multi-modal feedback provision challenged many teachers. Formative assessment strategies proved particularly important. Six studies highlighted the necessity of frequent, low-stakes checks for understanding distributed across modalities. Such practices allowed teachers to identify learning gaps quickly and adjust instruction responsively. Yet implementing systematic formative assessment required new competencies: designing quick assessments, interpreting data rapidly, and modifying teaching plans flexibly all while managing the complexity of hybrid delivery.

Communication and Community Building

A fourth critical domain involved communication strategies for building learning communities across distributed spaces. The social dimension of learning often taken for granted in traditional classrooms required deliberate cultivation in hybrid environments. Harrison and Gomez (2022) investigated how teachers established social presence across modalities. Their ethnographic study of 28 higher education instructors identified key practices: using students' names frequently, sharing personal experiences appropriately, responding promptly to communications, and creating opportunities for informal interaction. These social behaviors didn't emerge automatically but required conscious effort and strategic planning. Teachers needed to understand how relational dynamics differed across synchronous, asynchronous, physical, and virtual contexts. Communication expectations posed particular challenges. Students inhabited different temporal rhythms some engaged primarily during scheduled sessions while others worked asynchronously according to personal schedules. Teachers needed clear communication protocols: when to expect responses, which channels to use for different purposes, how to handle urgent versus routine inquiries. Foster and Wilson (2021) found that explicit communication norms, established early and reinforced consistently, significantly reduced student confusion and increased satisfaction.

Several studies examined collaborative learning strategies. Traditional collaborative activities relied on spontaneous interaction facilitated by physical proximity. Distance components required explicit structuring. Johnson (2023) documented successful practices: clear role assignments, specific timelines, structured protocols for online collaboration tools, and mechanisms for equitable participation. Teachers needed competencies in designing, facilitating, and troubleshooting

collaborative activities that spanned modalities. The cultivation of inclusive learning environments demanded particular attention. Three studies highlighted equity concerns in hybrid contexts. Remote students often reported feeling marginalized, less connected to classmates, and disadvantaged in receiving teacher attention. Successful teachers actively worked to create parity across modalities through deliberate design choices, explicit inclusion efforts, and regular checks on equitable participation. This required awareness of potential inequities and commitment to addressing them competencies that many teacher education programs had not systematically developed.

Self-Regulation and Professional Adaptation

A final domain less frequently discussed but clearly important concerned teachers own self-regulation and adaptive capacities. Hybrid teaching intensified workload demands, required continuous technological updating, and often generated stress and uncertainty. Research by Parker and Nguyen examined teacher wellbeing in hybrid teaching contexts. Survey data from 523 teachers revealed elevated stress levels, time management difficulties, and work-life boundary erosion. Many reported feeling constantly accessible to students, struggling to establish sustainable work patterns, and experiencing decision fatigue from the increased complexity of instructional planning. These findings suggested that teacher competencies must extend beyond pedagogical skills to include self-care practices and professional boundary-setting. Several researchers explored teachers learning processes as they developed hybrid teaching competencies. Mitchell and Taylor conducted longitudinal case studies following 18 teachers through their first year of blended instruction. Results showed that successful teachers engaged in deliberate reflection, systematically experimented with new approaches, actively sought feedback from students and colleagues, and maintained growth mindsets despite frequent setbacks. These metacognitive and self-regulatory capacities appeared as important as specific pedagogical knowledge.

Table 2.

Competency Domains Identified Across Studies

Competency Domain	Key Components	PD Implications
Technological Pedagogical Integration	TPACK framework, platform proficiency, tool selection, instructional presence across modalities, troubleshooting	Move beyond tool training to integration frameworks; emphasize pedagogical reasoning
Pedagogical Adaptation & Instructional Design	Parallel, sequential, and integrated design; synchronous-asynchronous balance; cognitive load management; engagement strategies	Provide design frameworks and exemplars; support iterative design processes

Competency Domain	Key Components	PD Implications
Assessment & Feedback	Multi-modal assessment design, authentic performance tasks, formative assessment, written/verbal/video feedback competencies	Develop assessment literacy for hybrid contexts; address workload management
Communication & Community Building	Social presence, communication protocols, collaborative activity structuring, inclusive environment creation, equity awareness	Model effective communication; explicit attention to equity and inclusion
Self-Regulation & Professional Adaptation	Time management, work-life boundaries, reflective practice, growth mindset, technological resilience, collegial learning	Build sustainable practice patterns; foster learning communities; address wellbeing

Professional learning communities proved valuable for supporting adaptation. Research indicated that teachers who participated in collaborative professional development sharing strategies, troubleshooting problems together, observing each other's practice developed competencies more rapidly and sustained innovation more successfully than those learning in isolation. Yet organizational support for such communities varied widely across institutions. Finally, technological resilience emerged as a crucial but under-recognized competency. Things break. Platforms crash. Internet connections fail. Effective hybrid teachers developed troubleshooting skills, maintained backup plans, and cultivated flexibility when technology disrupted carefully designed lessons. This adaptive capacity distinguished teachers who thrived in hybrid contexts from those who struggled persistently.

DISCUSSION

The synthesis reveals both promising developments and persistent challenges in understanding how to develop teacher competencies for hybrid learning environments. Several key insights emerge from the collective evidence.

Theoretical Implications

First, the findings challenge simplistic notions of competency as skill acquisition. The literature consistently demonstrates that effective hybrid teaching requires not just technical proficiency but sophisticated understanding of pedagogical principles that transcend specific modalities. This aligns with situated learning theory, which emphasizes how knowledge develops through authentic practice in complex contexts (Lave & Wenger, 1991). Teachers don't simply need to know how to use Zoom or Canvas—they need conceptual frameworks for understanding when synchronous discussion serves learning goals better than asynchronous forums, or how to sequence activities across modalities to support progressive knowledge building. The

prominence of TPACK as an organizing framework across multiple studies suggests its utility for conceptualizing the integration challenge. However, the research also reveals TPACK's limitations. Several investigations found that teachers with well-developed TPACK still struggled with assessment design, community building, and self-regulation domains the framework doesn't adequately address. This suggests need for expanded theoretical models that capture the full complexity of hybrid teaching competencies. Interestingly, the temporal dimension of hybrid teaching the interplay between synchronous and asynchronous engagement emerged as more pedagogically significant than the spatial dimension of physical versus virtual environments. This finding has important theoretical implications. It suggests that models emphasizing "online versus face-to-face" may obscure more fundamental pedagogical questions about how learners engage with content, interact with peers, and receive feedback across different temporal structures.

Didactic Foundations for Professional Development

The reviewed research points toward several didactic principles that should guide teacher education for hybrid contexts. These principles synthesize convergent findings while addressing gaps in current approaches.

Principle 1: Integration over isolation. Professional development must address the integration of modalities explicitly rather than treating traditional and distance learning as separate domains. Teachers need frameworks for thinking about how different modalities complement each other, when to use which approaches, and how to create coherent learning experiences that leverage the affordances of each.

Principle 2: Experiential learning with reflection. Competency development requires authentic practice opportunities followed by structured reflection. Workshops that demonstrate tools without providing chances to design, implement, and refine hybrid lessons prove insufficient. Teacher education needs to embed experiential cycles plan, enact, reflect, revise within supportive professional learning communities.

Principle 3: Adaptive expertise over routine expertise. Given the rapid evolution of technologies and pedagogies, teachers need adaptive expertise the capacity to modify practices in response to new situations rather than merely routine expertise in executing fixed procedures. This requires developing metacognitive awareness, cultivating experimental mindsets, and building tolerance for productive struggle.

Principle 4: Equity and inclusion by design. Competencies must include explicit attention to equitable learning experiences across modalities. Teachers need to understand how hybrid formats can exacerbate or mitigate educational inequities, and develop practices that actively promote inclusive participation regardless of how students access learning.

Principle 5: Sustainable practice. Given the workload intensity of hybrid teaching, professional development must address sustainable practice patterns. Teachers need competencies not just in instructional strategies but in time management, boundary-setting, and self-care to maintain long-term effectiveness.

Practical Recommendations

The synthesis suggests several specific actions for teacher education programs and professional development initiatives:

• Redesign pre-service teacher education to treat hybrid pedagogy as foundational rather than supplementary. All teachers entering the profession now need competencies for integrating traditional and distance learning.

• Develop comprehensive professional development sequences (not isolated workshops) that follow teachers through multiple semesters as they implement hybrid approaches, providing ongoing support, feedback, and opportunities for reflection.

• Create institutional structures supporting professional learning communities focused on hybrid teaching. Allocate time, provide facilitation, and value this collegial learning in evaluation systems.

• Build repositories of exemplary hybrid instructional designs across disciplines, making visible the pedagogical reasoning behind design decisions. Teachers need models showing not just what to do but why particular approaches work.

• Invest in ongoing instructional design support rather than expecting teachers to master complex design principles through brief training. Educational technologists and instructional designers should partner with teachers throughout course development.

• Address workload explicitly. Sustainable hybrid teaching requires institutional recognition of the increased planning time, communication demands, and assessment workload involved.

• Develop leadership capacity for supporting hybrid teaching at department and program levels. Individual teacher competencies matter, but so does organizational infrastructure.

Limitations and Future Directions

Several limitations warrant acknowledgment. First, despite our systematic approach, publication bias may have influenced findings. Studies reporting successful interventions may be overrepresented while accounts of failed approaches remain unpublished. Second, most research examined short-term outcomes, we lack longitudinal studies tracking competency development over multiple years. Third, the literature remains heavily concentrated in higher education contexts. K-12 teaching involves different constraints and opportunities that require additional investigation. Additionally, few studies employed rigorous experimental designs allowing causal inferences about professional development effectiveness. Most research relied on

surveys, interviews, and descriptive observations. While these methods provide valuable insights, the field needs controlled studies testing specific interventions against comparison conditions. Future research should pursue several directions. Longitudinal investigations tracking teacher competency development over extended periods would illuminate developmental trajectories and identify critical transition points. Comparative studies examining different professional development approaches could establish evidence-based practices. Research exploring how competency requirements vary across disciplines, educational levels, and institutional contexts would enhance practical applicability. Perhaps most importantly, the field needs research examining student learning outcomes in relation to teacher competencies. While this review focused on teacher development, the ultimate goal is enhanced student learning. Studies connecting specific teacher competencies to student achievement, engagement, and satisfaction would strengthen the evidence base for prioritizing particular professional development investments.

CONCLUSION

This systematic review examined didactic foundations for developing teacher competencies required when integrating traditional and distance learning. Analysis of 24 peer-reviewed studies revealed five critical competency domains: technological pedagogical integration, pedagogical adaptation and instructional design, assessment and feedback practices, communication and community building, and self-regulation and professional adaptation. These domains are interconnected and mutually reinforcing effective hybrid teaching requires their simultaneous development rather than sequential mastery. The synthesis advances understanding beyond simple technology integration models. Successful hybrid teaching demands sophisticated pedagogical frameworks that help teachers make principled decisions about when and how to leverage different modalities for specific learning goals. It requires going beyond technical skills to develop adaptive expertise the capacity to modify practice thoughtfully in response to complex, evolving contexts. Current approaches to teacher professional development often prove inadequate to these demands. One-off workshops focused on specific tools cannot develop the integrated competencies hybrid teaching requires. Instead, the field needs comprehensive professional development sequences grounded in experiential learning, supported by professional learning communities, and sustained over extended periods. Teacher education programs must reconceptualize preparation to treat hybrid pedagogy as foundational rather than supplementary. The proposed didactic model offers a framework for organizing competency development initiatives. By situating the five core domains within cycles of knowledge building, experimentation, reflection, and collaboration—all grounded in principles of integration, experiential learning, adaptive expertise,

equity, and sustainability this model provides direction for both research and practice. Looking forward, educational institutions face a choice. They can continue treating hybrid teaching as a temporary adaptation, providing minimal support while expecting teachers to figure things out individually. Or they can recognize hybrid learning as a permanent feature of contemporary education, warranting substantial investment in research-informed professional development systems. The evidence reviewed here suggests the latter approach is not merely advisable but necessary. The question is no longer whether to invest in teacher competency development for hybrid contexts, but how to do so most effectively. Teachers cannot develop these competencies in isolation. They require supportive organizational infrastructure, access to ongoing professional learning, and recognition that developing adaptive expertise for hybrid teaching represents serious intellectual work. Only through sustained, comprehensive, and theoretically grounded approaches to professional development can education systems cultivate the teacher competencies that contemporary learning environments demand.

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