



ORIGINAL ARTICLE

Online Self-Efficacy and Technostress as Predictors of Instructional Performance: A Convergent Mixed-Methods Study of Teachers in Online Education

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ABSTRACT

The rapid institutionalization of online education has intensified scholarly interest in the factors that determine teacher instructional performance in digital environments, yet the simultaneous predictive contributions of online self-efficacy and technostress to that performance remain empirically underspecified. This study investigated online self-efficacy and technostress as predictors of instructional performance among teachers engaged in online teaching, employing a convergent mixed-methods design in which quantitative and qualitative data were collected concurrently and triangulated at the analysis stage. The quantitative component utilized a structured survey administered to teachers, yielding descriptive and inferential statistical data. Descriptively, teachers reported high online self-efficacy, moderate technostress overall, and consistently high instructional performance. Multiple regression analysis revealed that online self-efficacy significantly and positively predicted instructional performance, while technostress did not achieve statistical significance. The model accounted for 15.8% of the variance in instructional performance. The qualitative component employed thematic analysis of interview data from teachers reflecting on their lived experiences during online instruction, yielding six emergent themes: blended delivery mode, learning management systems, coping with modern instructional demands, convenience and efficiency of online tools, access to resources and research, and technology's role in the learning process. Convergence between quantitative and qualitative findings confirmed that online self-efficacy—enabled through training, institutional support, and purposive technology adoption—constitutes the primary driver of instructional performance in online settings, while moderate technostress levels function as a manageable challenge rather than a performance-suppressing barrier when institutional supports are present. These findings carry specific implications for institutional professional development policy, pre-service teacher digital training, and the design of technology integration support systems.

Keywords: online self-efficacy; technostress; instructional performance; convergent mixed-methods; online teaching; blended learning; Philipines



INTRODUCTION

The global shift toward online and blended learning environments, dramatically accelerated by the COVID-19 pandemic, has restructured the professional demands placed on teachers and introduced new categories of capability and challenge that were previously peripheral to educational practice. In pre-pandemic contexts, digital literacy and online instructional competence were supplementary skills for the majority of teachers; in the post-pandemic landscape, they have become core professional requirements (Sari & Nayir, 2020; Ionescu et al., 2020). This transformation has not been seamless: teachers worldwide have confronted the simultaneous pressure to master unfamiliar technologies, adapt established pedagogical practices to digital environments, and maintain acceptable instructional quality under conditions of institutional disruption, resource inequality, and heightened professional uncertainty. Understanding which teacher-level psychological and technological factors most consequentially predict instructional performance in these conditions is both theoretically important and practically urgent.

Two constructs have attracted sustained empirical attention as predictors of teacher performance in technology-mediated educational environments. The first is online self-efficacy—a teacher's confidence in their capacity to plan, deliver, manage, and evaluate instruction effectively within online settings—which has been conceptualized across five operationally distinct dimensions: unit content migration, virtual interaction, online course alignment, selection of technological resources, and web-based unit structure (Gosselin, 2009; Ma et al., 2021). Grounded in Bandura's (1997) foundational self-efficacy theory, online self-efficacy predicts not only task-specific performance but the broader motivational and behavioral orientations through which teachers engage with the challenges of online instruction. The second construct is technostress—the experience of psychological pressure arising from the inability to cope with the pace of technological change, the complexity of new systems, or the blurring of work and personal boundaries that digital connectivity enables (Dong et al., 2020). Technostress has been operationalized across five dimensions: techno-uncertainty, techno-overload, techno-invasion, techno-complexity, and techno-insecurity—each capturing a distinct mechanism through which technology-related pressure undermines professional functioning.

Prior research on these constructs has been primarily bivariate: studies have examined the relationship between technostress and computer self-efficacy (Mushtaque et al., 2022), between technostress and employee performance (Solem et al., 2021), and between online learning exposure and technostress levels (Abo et al., 2021). What is lacking is a multivariate investigation that simultaneously examines both online self-efficacy and technostress as predictors of instructional performance—an investigation capable of establishing which of these constructs carries greater predictive weight and whether their effects are independent or interactive. The present study fills this gap through a convergent mixed-methods design that produces both quantitative regression evidence on the relative predictive contributions of the two constructs and qualitative thematic evidence on how teachers experience and navigate their intersection in the lived reality of online teaching.

The study's institutional and geographic context—the Philippines—adds a dimension of particular relevance. Philippine higher education institutions have navigated a demanding



technology integration trajectory, with the pandemic-forced shift to online learning exposing significant variations in teacher digital capability and institutional infrastructure (Mugot & Sumbalan, 2019). National educational policy mandates continued technology integration, but teacher professional development in digital pedagogy has been uneven, creating conditions in which online self-efficacy and technostress vary substantially across individuals and institutions. This context makes the Philippines a productive setting in which to examine these constructs' predictive contributions and to generate insights applicable to comparable developing economy educational systems.

The study is guided by two specific research questions. First, what is the status of teachers' online self-efficacy, technostress, and instructional performance? Second, do online self-efficacy and technostress significantly predict instructional performance? A complementary qualitative question asks: what are the lived experiences of teachers performing instructional activities in online environments? The study contributes to the literature on teacher performance in online education by providing the first multivariate analysis of these two constructs' combined predictive effects in a Philippine higher education context, enriched by qualitative evidence on the mechanisms through which these effects operate.

LITERATURE REVIEW

Online Self-Efficacy in Teaching

Self-efficacy—defined by Bandura (1997) as an individual's belief in their capacity to execute behaviors necessary to produce specific outcomes—has been established as one of the most consistently powerful predictors of teacher professional performance across diverse instructional contexts. When translated to online teaching, self-efficacy becomes operationally specific to the digital competencies and pedagogical adaptations that effective online instruction requires. Gosselin (2009) developed the Online Teaching Self-Efficacy Inventory, which has become a widely referenced instrument for assessing teachers' confidence across the five dimensions of unit content migration, virtual interaction, online course alignment, selection of technological resources, and web-based unit structure. Ma et al. (2021) examined online teaching self-efficacy during COVID-19, finding that it changed significantly across the pandemic period, that teacher-level digital preparation and institutional support were primary moderators, and that self-efficacy was a robust predictor of perceived teaching quality. DeCoito and Estaiteyeh (2022) found that despite teachers' intentions to develop effective online practices, their actual self-efficacy in curriculum development and assessment within online contexts remained variable, with implications for the quality of student outcomes.

The relationship between online self-efficacy and instructional performance is theoretically well-grounded in social cognitive theory: teachers with higher confidence in their digital instructional capabilities are more likely to engage proactively with technological challenges, invest more effort in online course preparation, and demonstrate the adaptive problem-solving that sustains instructional quality when technical obstacles arise (Betoret, 2017). Ayeni (2018) established that expert knowledge and specialized abilities in translating



educational policies and curricular content into desired learning outcomes are foundational to instructional performance quality, a finding applicable to the digital translation skills that online self-efficacy captures. Saiyad et al. (2020) further demonstrated that effective online instructional performance requires a specific constellation of digital capabilities—including active learning facilitation, higher-order questioning, and technology-aligned curriculum delivery—that map directly onto the sub-dimensions of online self-efficacy measured in the present study.

Technostress in Educational Settings

The construct of technostress was introduced by Brod (1984) and refined by Tarafdar et al. (2015) into the five-dimensional framework—techno-overload, techno-invasion, techno-complexity, techno-insecurity, and techno-uncertainty—that has become the dominant measurement approach in contemporary technostress research. In educational contexts, technostress has been conceptualized as a particular threat to instructional effectiveness because it operates through mechanisms that directly undermine the cognitive and motivational resources teaching requires: techno-overload reduces the time and attention available for pedagogical preparation; techno-invasion erodes the psychological recovery time between work periods; techno-complexity undermines confidence in one's capacity to manage technology effectively; techno-insecurity generates anxiety about professional obsolescence; and techno-uncertainty creates resistance to new technology adoption (Dong et al., 2020).

The empirical evidence on technostress's relationship to instructional performance is, however, mixed. Dong et al. (2020) found that teachers' technostress was significantly associated with lower technological pedagogical content knowledge, suggesting an indirect pathway through which technostress impairs instructional performance by suppressing the knowledge integration that effective technology-enhanced teaching requires. Mushtaque et al. (2022) found that computer self-efficacy moderated the relationship between technostress and online learning intentions, establishing that the negative effects of technostress are attenuated when teachers have confidence in their technological competencies—a finding that anticipates the relative predictive results of the present study. Chen et al. (2022) demonstrated that techno-overload and techno-invasion specifically were associated with deviant work behaviors, suggesting that when technostress reaches a certain threshold intensity, it generates counterproductive responses that may suppress instructional quality. However, Solem et al. (2021) found that the technostress-performance relationship was not uniformly negative and was moderated by individual coping resources and organizational support, consistent with the possibility that moderate technostress levels may be manageable without meaningful performance impairment.

Instructional Performance in Online Contexts

Instructional performance encompasses the full range of a teacher's professional activities directed toward facilitating student learning: pedagogical decision-making, content delivery, student engagement, assessment design, feedback provision, and classroom management. Punongbayan and Bauyon (2015) demonstrated that instructional performance among Philippine teacher education faculty was associated with both subject matter mastery and student-centered pedagogical orientation, establishing a local empirical baseline for the



construct. Somosot (2018) emphasized that appropriate instructional strategies tailored to specific student populations are essential for effective performance, with student satisfaction functioning as a valid performance indicator in the absence of standardized external performance measures.

In online contexts, instructional performance takes on additional technological dimensions that the conventional performance literature does not address: the quality of digital content design, the effectiveness of virtual student engagement strategies, the accuracy of online assessment alignment, and the appropriateness of technology selection all constitute performance dimensions with no direct analog in face-to-face instruction (Martin et al., 2019). Fu and Clarke's (2021) comparative study of online teacher education in China and Canada demonstrated that collective teacher agency—a group-level analog to individual self-efficacy—was a significant determinant of online instructional quality, with institutional structural factors moderating whether the pandemic shift to online teaching generated adaptive improvement or stagnation in teaching practice. Lao et al. (2018) established that keeping pace with technological advancements was a non-negotiable condition for maintaining instructional quality in the digital era, positioning continuous digital professional development as an institutional responsibility rather than merely an individual choice.

Theoretical Underpinnings

The study is theoretically anchored in Social Cognitive Theory (Bandura, 1997), which provides the foundational framework for understanding online self-efficacy as a determinant of instructional behavior. The theory posits that self-efficacy beliefs mediate between environmental conditions and behavioral outcomes through their effects on goal-setting, effort investment, persistence under adversity, and cognitive engagement—all of which are consequential for teaching quality. Applied to the online teaching context, the theory predicts that teachers with higher online self-efficacy will set more ambitious instructional goals, invest more preparation effort, persist more persistently through technical difficulties, and engage more cognitively with the pedagogical challenges of digital instruction—producing higher instructional performance outcomes as a result.

The Person-Environment Fit (P-E Fit) theory complements Social Cognitive Theory by explaining the technostress mechanism: when the demands of the technology environment exceed a teacher's perceived capacity to manage them, the misfit between person and environment generates psychological stress responses that suppress the cognitive and motivational resources available for instructional performance. The five dimensions of technostress operationalize five distinct forms of P-E misfit: *overload* (demand exceeds capacity), *invasion* (boundary violation), *complexity* (skill deficit), *insecurity* (threatened identity), and *uncertainty* (ambiguity aversion). Together, Social Cognitive Theory and P-E Fit theory provide complementary explanatory frameworks for understanding why online self-efficacy and technostress would have different directions of effect on instructional performance.



METHODS

Research Design

This study employed a convergent mixed-methods design, which simultaneously collects and analyzes quantitative and qualitative data, then compares and integrates the results to develop a more comprehensive understanding of the research problem than either method alone could provide (Creswell & Creswell, 2017). The choice of convergent design was theoretically motivated: the quantitative component could establish statistical relationships between online self-efficacy, technostress, and instructional performance, but only qualitative inquiry could illuminate the mechanisms, contextual conditions, and lived experiences through which these relationships operate in the everyday practice of online teachers. The two data strands were collected concurrently to enable genuine triangulation—a design feature that distinguishes convergent mixed-methods from sequential exploratory or explanatory designs—and were analyzed independently before being compared at the integration stage.

Participants and Sampling

Participants were teachers engaged in online instruction at the time of data collection. Purposive sampling was applied to identify teachers with direct, active experience of online teaching as the primary instructional modality, ensuring that respondents could meaningfully respond to both the self-efficacy and the technostress instruments in relation to actual online teaching practice. The qualitative component employed a subset of the survey participants who consented to in-depth interview participation, selected to represent diversity in online teaching experience, subject area, and institutional context. Snowball sampling was used where necessary to supplement initial purposive sampling in reaching participants with the relevant online teaching experience. All participation was voluntary, and informed consent was obtained prior to both survey administration and interview conduct.

Instruments

Online Self-Efficacy. Online self-efficacy was measured using the Online Teaching Self-Efficacy Inventory (OTSEI) developed by Gosselin (2009), which assesses teachers' confidence across five dimensions: unit content migration (7 items), virtual interaction (9 items), online course alignment (11 items), selection of technological resources (8 items), and web-based unit structure (11 items). All items followed a stem of "In the context of online units, I can..." and were rated on a five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). The scale has established construct validity and reliability in prior online teaching research contexts.

Technostress. Technostress was measured using a validated five-dimension instrument assessing techno-uncertainty, techno-overload, techno-invasion, techno-complexity, and techno-insecurity. Items were rated on a five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). This instrument operationalizes the Tarafdar et al. technostress framework that has been widely validated across organizational and educational contexts (Chen, 2015).

Instructional Performance. Instructional performance was assessed using a 28-item scale encompassing dimensions of content delivery, student engagement, assessment quality,



feedback provision, curriculum alignment, and ICT integration. Items were rated on a five-point frequency scale (1 = Never to 5 = Always). The scale reflects the multidimensional conception of instructional performance articulated by Punongbayan and Bauyon (2015) for the Philippine higher education context.

Data Collection and Analysis

Quantitative data were collected through online administration of the structured survey. Descriptive statistics—means and standard deviations—characterized the status of each construct and sub-dimension. Multiple linear regression was employed to assess the simultaneous predictive contributions of online self-efficacy and technostress to instructional performance, with standardized regression coefficients (β), t-statistics, and p-values used to evaluate significance at $\alpha = .05$. The overall model was evaluated through R^2 , adjusted R^2 , and the F-statistic. Qualitative data were collected through semi-structured interviews focused on teachers' lived experiences in performing instructional activities during online teaching. Interview transcripts were analyzed using inductive thematic analysis following the coding protocol recommended by Creswell and Creswell (2017): open coding identified emergent ideas; focused coding grouped related codes into categories; and theme formulation consolidated categories into overarching thematic structures with clear conceptual coherence. Convergence between quantitative and qualitative findings was assessed at the integration stage by examining whether the qualitative themes corroborated, extended, or contradicted the quantitative regression results.

Ethical Considerations

The study adhered to established ethical guidelines for research involving human participants. Informed consent was obtained from all participants prior to data collection. Participation was fully voluntary, and respondents were informed of their right to withdraw at any time without consequence. No personally identifiable information was collected or disclosed. Data were stored securely and used exclusively for the research purposes specified in the consent form. The study followed the National Ethical Guidelines for Health and Health-Related Research (2017) applicable to the Philippine institutional context.

RESULTS AND DISCUSSION

Online Self-Efficacy

Table 1 presents the overall means and standard deviations for the five dimensions of online self-efficacy. The overall mean of 4.43 (SD = .438), interpreted as "Strongly Agree" on the Likert scale, indicates that teachers reported a high level of confidence in their online instructional competencies across all five dimensions. The narrow standard deviation signals considerable homogeneity of responses, suggesting that this high self-efficacy profile characterizes the sample broadly rather than being driven by a subgroup of unusually confident teachers.



Table 1. Overall Means and Standard Deviations for Online Self-Efficacy Dimensions

Online Self-Efficacy Dimension	M	SD	Description
Unit Content Migration	4.52	.434	Strongly Agree
Virtual Interaction	4.48	.511	Strongly Agree
Online Course Alignment	4.43	.703	Strongly Agree
Selection of Technological Resources	4.38	.570	Strongly Agree
Web-Based Unit Structure	4.36	.606	Strongly Agree
Overall Mean	4.43	.438	Strongly Agree

Unit content migration received the highest mean ($M = 4.52$), indicating that teachers expressed greatest confidence in their ability to prepare teaching materials, select digital media formats, transfer face-to-face content to online formats, and manage the time required for content migration. This finding is consistent with Dhawan's (2020) observation that while institutions were initially reluctant to modify established pedagogical approaches, the sustained demands of online instruction drove progressive mastery of content migration tasks as teachers accumulated practical experience. The specific item "I can prepare the teaching materials I will use in my units" anchored the highest individual item mean within this dimension ($M = 4.61$), while time management for content transfer received the lowest ($M = 4.35$)—a pattern suggesting that content preparation competency develops more readily than the organizational planning skills required for efficient format conversion.

Virtual interaction self-efficacy ($M = 4.48$) reflects teachers' confidence in their capacity to promote student participation, facilitate learning through guidance, manage interaction pace, and sustain engagement in the absence of physical co-presence. The highest item within this dimension—"I can promote student participation in my units" ($M = 4.63$)—and the lowest—"I can overcome the influence of adverse student interactions" ($M = 4.33$)—reveal a pattern consistent with Mingzi et al.'s (2021) finding that even teachers with strong virtual facilitation skills find real-time management of interpersonal dynamics in online environments more challenging than general participation promotion. This distinction has direct pedagogical implications: facilitating engagement is a teachable technical skill, while managing the affective and social dimensions of adverse interactions requires a level of relational attunement that digital mediation complicates.

Online course alignment ($M = 4.43$), selection of technological resources ($M = 4.38$), and web-based unit structure ($M = 4.36$) each received progressively lower but still high confidence ratings. The course alignment dimension's highest item—"I can use strategies to increase my students' memory of my unit content" ($M = 4.92$)—demonstrates particularly high confidence in memory-facilitating instructional strategies, consistent with Martin et al.'s (2019) finding that faculty who succeed in online course delivery excel at aligning learning objectives, unit assignments, and assessment methodologies within a coherent curricular architecture. The lowest item in the web-based structure dimension—"I can design a unit in accordance with the Filipino Human Rights Commission guidelines" ($M = 4.16$)—reflects a domain-specific



knowledge requirement (regulatory compliance in unit design) rather than a general pedagogical capability, explaining its distinctively lower score relative to the more generalizable structural design items in the same dimension.

Technostress

Table 2 presents the overall means and standard deviations for the five technostress dimensions. The overall mean of 3.31 (SD = .682), interpreted as "Undecided" on the Likert scale, indicates that teachers experienced moderate technostress—neither endorsing nor rejecting the presence of technology-related pressure in their professional lives. This mid-range profile is theoretically significant: it positions the sample in a transition zone rather than at the extreme ends of either technology acceptance or technology avoidance, consistent with the broader teacher digital technology adoption literature that characterizes most teachers as moderately rather than severely technologically stressed (Dong et al., 2020).

Table 2. Overall Means and Standard Deviations for Technostress Dimensions

Technostress Dimension	M	SD	Description
Techno-Uncertainty	3.81	.772	Agree
Techno-Overload	3.56	.954	Agree
Techno-Invasion	3.49	1.060	Agree
Techno-Complexity	3.04	.954	Undecided
Techno-Insecurity	2.64	1.048	Undecided
Overall Mean	3.31	.682	Undecided

The dimension profile reveals a theoretically interpretable gradient: the most external and environmentally driven technostress dimensions—techno-uncertainty (M = 3.81) and techno-overload (M = 3.56)—received higher mean scores in the Agree range, while the more internally referenced dimensions—techno-complexity (M = 3.04) and techno-insecurity (M = 2.64)—received scores in the Undecided range. This pattern is consistent with the theoretical expectation that environmental pressures (the pace of technology change, workload escalation from digital expectations) generate wider consensus than internal capability assessments (whether one feels competent or secure relative to peers), which are moderated more strongly by individual differences.

Techno-uncertainty's highest item—"There are new developments in the technologies we use in our organization" (M = 3.96)—confirms that rapid technological change is the most widely recognized technostress trigger in this sample, corroborating Lauwers et al.'s (2021) finding that technological uncertainty significantly influences exploratory usage behavior in information systems. The techno-overload finding—that being "forced to work with very tight time schedules" because of technology (M = 3.79) received the highest item mean within that dimension—is consistent with Harris et al.'s (2022) demonstration that constant connectivity expectations increase work-family conflict and job fatigue, even among employees who broadly accept the necessity of technology integration.



The relatively low techno-insecurity scores—with the item "I share my knowledge with my coworkers for fear of being replaced" receiving a mean of only 2.25 (Disagree)—suggest that teachers in this sample do not significantly experience technology as a threat to their job security or as a driver of knowledge-hoarding behaviors. This finding has an important interpretive implication for the regression results: the relatively moderate and environmentally-focused technostress profile observed here may partially explain why technostress does not emerge as a significant performance predictor. Teachers experiencing uncertainty and overload but not significant insecurity or felt incompetence may be able to maintain their instructional quality through coping mechanisms and institutional support, without the performance-suppressing effects that higher-intensity, multi-dimensional technostress would generate.

Instructional Performance

Table 3 presents the overall mean and highest/lowest items for instructional performance. The overall mean of 4.50 (SD = .424), consistently interpreted as "Always" and categorized as "Excellent," indicates uniformly high self-reported instructional performance across the 28-item instrument. The narrow standard deviation confirms the homogeneity of this high-performance profile across respondents.

The highest-rated items—subject matter knowledge communication (M = 4.67) and student motivation encouragement (M = 4.67)—reflect the core instructional competencies that teachers most consistently demonstrate regardless of instructional modality, consistent with Ayeni's (2018) finding that expert content knowledge and motivational facilitation are the most stable dimensions of instructional performance across diverse teaching contexts. The somewhat lower performance on content scaffolding—"Presents the minimum content of his/her subject matter, tailored to the students' knowledge" (M = 4.18, "Sometimes")—suggests that adaptive content calibration to student prior knowledge is the most challenging instructional performance dimension, requiring real-time assessment of individual student understanding that is structurally more difficult to achieve in online environments where student prior knowledge variation is less immediately visible to the teacher. The "Sometimes" rating on this single item against the "Always" profile of all others highlights an actionable gap in online instructional practice.

Table 3. *Summary of Instructional Performance: Overall and Anchor Items*

Item	M	SD	Description
HIGHEST: Provides scientific information for better subject understanding	4.67	.471	Always
Encourages student interest and motivation to learn	4.67	.519	Always
Maintains objective and respectful position with students	4.66	.544	Always
Attends and responds clearly to questions asked in class	4.63	.574	Always
LOWEST: Presents minimum content tailored to students' prior knowledge	4.18	.806	Sometimes
Overall Mean	4.50	.424	Always



Predictive Relationship: Multiple Regression Analysis

Table 4 presents the multiple regression results for online self-efficacy and technostress as simultaneous predictors of instructional performance.

Table 4. Multiple Regression Analysis: Online Self-Efficacy and Technostress as Predictors of Instructional Performance

Predictor	Standardized β	t	p	Significance
(Constant)	—	5.633	.000	—
Online Self-Efficacy	.370	3.715	.000	Significant
Technostress	.134	1.345	.182	Not Significant

Note. $R = .398$; $R^2 = .158$; $F = 8.00$; $p = .001$. Outcome variable: Instructional Performance.

Online self-efficacy emerged as the only statistically significant predictor of instructional performance in the model ($\beta = .370$, $t = 3.715$, $p < .001$). This finding confirms the theoretically derived prediction—grounded in Bandura's (1997) social cognitive theory—that teachers' confidence in their capacity to execute online instructional tasks is a direct and consequential determinant of the quality of those tasks' execution. The magnitude of the standardized coefficient (.370) indicates a practically meaningful effect: for every standard deviation increase in online self-efficacy, instructional performance increases by .370 standard deviations, a relationship that carries operational implications for teacher training and institutional support design. DeCoito and Estaiteyeh (2022) and Ma et al. (2021) both documented that online teaching self-efficacy was a significant predictor of teaching quality outcomes during the pandemic transition, and the present finding extends this evidence to the post-pandemic normalization of online instruction, suggesting that the self-efficacy effect is not merely a crisis-period phenomenon but a stable determinant of instructional performance in online educational environments.

Technostress did not achieve statistical significance as a predictor of instructional performance ($\beta = .134$, $t = 1.345$, $p = .182$). This null finding requires careful interpretation rather than dismissal, because it is substantively informative rather than merely inconclusive. The positive direction of the technostress coefficient ($\beta = .134$), while non-significant, is inconsistent with the theoretical expectation of a negative relationship—suggesting that in this sample, higher technostress is associated with marginally higher (not lower) instructional performance, though not to a statistically reliable degree. One theoretically coherent interpretation is that moderate technostress, at the levels observed in this sample (overall $M = 3.31$, Undecided range), may function as an eustress mechanism—a manageable challenge that stimulates adaptive responses rather than a debilitating stressor that suppresses performance. Mushtaque et al.'s (2022) finding that computer self-efficacy moderates the technostress-performance relationship is particularly relevant here: teachers in this sample with high online self-efficacy ($M = 4.43$) may be precisely those whose competence confidence buffers the performance-suppressing effects of technostress, producing the null relationship observed.



Solem et al.'s (2021) demonstration that the technostress-performance relationship is moderated by coping resources and organizational support similarly implies that the null finding may be context-specific rather than universal—occurring in settings where institutional supports and individual competence jointly prevent technostress from reaching the threshold at which it meaningfully impairs performance.

The overall model fit was statistically significant ($F = 8.00$, $p = .001$), and the two predictors together accounted for 15.8% of the variance in instructional performance ($R^2 = .158$). This proportion, while modest, is substantively meaningful given the complexity of instructional performance as a behavioral outcome and the fact that only two predictor constructs were examined. The remaining 84.2% of variance attributable to factors beyond online self-efficacy and technostress—including personality factors, subject matter expertise, institutional resources, student characteristics, and broader professional development quality—points to the theoretical incompleteness of any two-predictor model of instructional performance and underscores the value of extended multivariate studies that incorporate additional established predictors.

Qualitative Findings: Themes from Teachers' Lived Experiences

Thematic analysis of interview data yielded six themes that together provide a comprehensive phenomenological account of teachers' experience of online instructional performance. These themes are presented in Table 5 and then discussed analytically in relation to the quantitative findings.

Theme 1: Blended Delivery Mode

The first and most frequently articulated theme in teachers' accounts was the transition to blended learning—the combination of face-to-face, modular, and online instructional formats that pandemic conditions necessitated and that post-pandemic institutional policies have continued to encourage. Teachers described this transition as both a challenge and an opportunity: challenging because it required simultaneous competency in multiple delivery modalities and the judgment to select the most appropriate modality for specific learning objectives; an opportunity because it expanded the pedagogical repertoire available to them beyond the constraints of any single delivery format. This theme directly corroborates the online self-efficacy findings: the high confidence ratings across all five self-efficacy dimensions are interpretable as reflecting the cumulative competency gains that teachers developed through sustained engagement with blended delivery demands. Saikat et al.'s (2022) framework for blended learning theory—which emphasizes the integration of online and offline instruction to enable self-paced learning with immediate feedback—provides the theoretical architecture within which this theme's content is most coherently situated.

Theme 2: Learning Management Systems

The learning management system emerged as the central organizational technology around which teachers structured their online instructional practice. Teachers described LMS platforms not merely as content repositories but as comprehensive instructional environments that mediated their relationships with students, structured the assessment cycle, and provided the informational architecture of their online teaching. The theme resonates with the quantitative finding of high online course alignment self-efficacy ($M = 4.43$): teachers who



have developed strong LMS management competencies are precisely those who demonstrate high confidence in aligning learning objectives, assessments, and activities within the online course structure that Martin et al. (2019) identified as the hallmark of effective online instruction. Oyarzun and Conklin's (2023) synthesis of learning theories—establishing behaviorism, cognitivism, constructivism, and connectivism as the theoretical foundations for LMS-mediated learning design—provides the conceptual scaffolding through which teachers' LMS experiences can be interpreted as theory-informed professional practice rather than merely technical tool use.

Table 5. *Summary of Qualitative Themes Derived from Teachers' Lived Experiences of Online Instructional Performance*

Theme	Core Ideas from Participant Accounts	Theoretical Grounding
1. Blended Delivery Mode	Shift toward combining face-to-face, modular, and online instruction; need to acquire skills for diverse delivery formats; blended mode as response to global educational demands	Blended learning theory (Bloom, 1968; Saikat et al., 2022)
2. Learning Management Systems (LMS)	Adoption of LMS for managing instruction and assessment; LMS as learning support scaffold; importance of learning theories (behaviorism, cognitivism, constructivism, connectivism) for LMS design	Learning theories (Oyarzun & Conklin, 2023)
3. Coping with Modern Instructional Demands	Struggle to meet demands of technology instruction; adaptive coping strategies to maintain professional capability; personal persistence as a management strategy; concern about turnover intentions from technology overload	Adaptive learning theory (Smart Sparrow, 2023)
4. Convenience and Efficiency of Online Tools	Positive experience of online tool efficiency for instruction preparation and delivery; appreciation for time-saving aspects of platforms like Google Classroom; proactive tool identification under resource scarcity	Management theory of resource and time optimization (Brooks, 1995)
5. Access to Resources and Research	Enhanced access to instructional materials through online platforms; broader research opportunities available in online environments; ability to connect learning to students' daily lives	Instructional theory (Reigeluth, 2013)
6. Technology's Role in the Learning Process	Technology as a driver of innovation in teaching; gadgets and LMS as significant enablers of teaching and learning quality; technology-mediated outputs as markers of modern professional practice	LMS learning theory



Theme 3: Coping with Modern Instructional Demands

The third theme introduced a productive tension into the overall picture: while the quantitative data depicted uniformly high instructional performance and high self-efficacy, the qualitative accounts revealed that this performance was often achieved through active, effortful coping rather than effortless mastery. Teachers described adapting to constantly evolving technology demands as an ongoing personal and professional challenge, with some participants expressing concerns about turnover intentions arising from the accumulated burden of technology integration demands. This theme is the clearest qualitative marker of the technostress experience documented in the quantitative data: the specific stressors most frequently described—rapid technology change, time pressure for skill updating, feeling outpaced by institutional technology expectations—correspond precisely to the techno-uncertainty ($M = 3.81$) and techno-overload ($M = 3.56$) dimensions that received the highest technostress ratings. The adaptive teaching framework (Smart Sparrow, 2023) provides a constructive re-framing of this experience: teachers who develop and deploy just-in-time learning strategies in response to technological demands are, in effect, practicing the adaptive professional learning that techno-complexity ultimately demands.

Themes 4–6: Convenience, Resources, and Technology's Role

The fourth, fifth, and sixth themes—convenience and efficiency of online tools, access to resources and research, and technology's role in the learning process—collectively present the positive dimensions of teachers' online instructional experience. Teachers described online platforms as fundamentally enabling their professional practice in ways that could not be easily reversed: faster access to materials, expanded research capacity, efficient student communication channels, and the ability to reach students across geographic barriers were cited as genuine professional quality-of-life improvements rather than merely compensatory adaptations to pandemic constraints. These themes converge with the high online self-efficacy profile in the quantitative data—teachers who experience digital tools as convenient and enabling are precisely those whose accumulated competence generates the positive self-efficacy beliefs that the instrument captures. The resource access and technology role themes also anticipate the implications for post-pandemic educational policy: teachers' positive assessments of technology's enabling functions suggest that a wholesale retreat to pre-digital instructional practice would now be perceived as a professional regression rather than a welcome simplification.

Convergence of Quantitative and Qualitative Findings

The convergent design of this study requires explicit integration of the quantitative and qualitative findings to assess the degree to which they corroborate, extend, or challenge each other. On the central finding—that online self-efficacy is a significant predictor of instructional performance while technostress is not—the qualitative evidence provides strong convergent support through a specific and interpretively rich mechanism. The themes of Learning Management Systems, Convenience and Efficiency of Online Tools, and Access to Resources and Research all describe the concrete positive technological experiences through which high online self-efficacy is both built and expressed: teachers who have mastered LMS platforms, found online tools genuinely enabling, and developed research access capabilities are, by



definition, teachers with high online self-efficacy—and these same teachers are those who, across the quantitative data, report the highest instructional performance.

The technostress non-significance finding is also qualitatively corroborated, though the mechanism is more nuanced. Theme 3 (Coping with Modern Instructional Demands) confirms the presence of meaningful technostress experience in teachers' professional lives—the pressure of rapid technology change and the cognitive-emotional demands of continuous adaptation are real and recognized. However, the coping theme simultaneously reveals that teachers have developed adaptive responses that prevent this stress from materially suppressing their instructional practice. The moderate technostress levels observed quantitatively ($M = 3.31$, Undecided) are thus not explained by the absence of technological challenge but by the presence of coping resources—individual resilience, collegial support, and developing competence—that contain technostress within manageable bounds. This interpretation provides a more complete account of the null technostress finding than the regression coefficients alone could offer, illustrating the specific methodological value of convergent mixed-methods design for this type of research question.

CONCLUSION

This study has provided a convergent mixed-methods analysis of online self-efficacy and technostress as predictors of instructional performance among teachers engaged in online education. The central empirical finding—that online self-efficacy significantly and positively predicts instructional performance while technostress does not—has important theoretical and practical implications that extend beyond the immediate findings of the regression analysis.

Theoretically, the study confirms social cognitive theory's prediction that self-efficacy beliefs are consequential determinants of professional performance outcomes, and extends this confirmation specifically to the online instructional competency domain. The null finding for technostress contributes to the emerging nuanced literature on this construct by suggesting that the technostress-performance relationship is not uniformly negative but is mediated by the individual's competence and coping resources—with high self-efficacy potentially functioning as a stress buffer that prevents moderate technostress from suppressing instructional quality. The qualitative findings add a phenomenological dimension to these theoretical contributions, revealing the specific mechanisms through which high self-efficacy (LMS mastery, tool convenience, resource access) and manageable technostress (adaptive coping, institutional support) jointly produce the high instructional performance profile observed across the sample.

Practically, the study points toward three specific institutional priorities. First, professional development programs focused on building online teaching self-efficacy should be treated as a primary rather than supplementary investment, given self-efficacy's demonstrated predictive role—and should address all five dimensions of the construct (content migration, virtual interaction, course alignment, technology selection, and web-based design) rather than focusing narrowly on technical tool training. Second, technostress management programs—while not shown to be critical for performance in this sample—should remain an institutional concern for the specific dimensions of techno-uncertainty and techno-overload



that teachers most commonly experience, and that could reach performance-suppressing thresholds in higher-intensity technology transition contexts. Third, the consistently strong qualitative endorsement of online tools' convenience and enabling functions—and the coherent adaptation narrative that emerges across the qualitative themes—suggests that institutional policy should be directed toward optimizing the technology environments in which teachers work, rather than retreating from technology integration in response to the coping challenges that some teachers experience.

Limitations include the cross-sectional design, which precludes causal inference about the direction of effects between self-efficacy and performance; the reliance on self-report data for all three constructs, which introduces shared method variance concerns; and the restriction to a single institutional context, which may limit generalizability to teachers with different digital infrastructure, training support, or subject area profiles. Future research should employ longitudinal designs capable of tracking the development of online self-efficacy and its performance consequences over time, include objective or student-rated performance measures alongside teacher self-reports to address common method variance, and extend the multivariate model to include additional established performance predictors—particularly subject matter expertise, institutional support quality, and professional development access—that the present two-predictor model leaves unaccounted.

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