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GRADUATE STUDENTS' ONLINE RESILIENCE: A PREDICTIVE FRAMEWORK BASED ON SELF-EFFICACY, SOCIAL SUPPORT, SATISFACTION, AND DIGITAL ADAPTABILITY IN A PHILIPPINE PUBLIC HEI

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ABSTRACT
This study examined graduate students' online learning resilience by developing and testing a predictive framework that integrates self-efficacy, social support, satisfaction, and digital adaptability within a Philippine public higher education institution. Guided by a convergent parallel mixed-methods design, quantitative and qualitative data were collected and analyzed concurrently to provide a comprehensive understanding of resilience in online learning environments. The quantitative strand employed a correlational design using survey data from 200 graduate students. Descriptive statistics and Structural Equation Modeling (SEM) were utilized to assess variable levels, direct effects, and mediation pathways. The qualitative strand involved semi-structured interviews with 30 purposively selected participants and was analyzed using reflexive thematic analysis. Integration was conducted through joint displays and meta-inference generation. Results indicated that self-efficacy, social support, satisfaction, and digital adaptability were all rated at high levels. SEM results revealed that self-efficacy had a strong and significant direct effect on online resiliency, while social support demonstrated a moderate but significant effect. Satisfaction partially mediated the relationship between self-efficacy and resiliency, whereas digital adaptability fully mediated the relationship between social support and resiliency. Qualitative findings reinforced these results, highlighting confidence, peer and faculty support, instructional clarity, and adaptive use of technology as key components of resilience. Integrated findings suggest that online learning resilience among graduate students emerges from the interaction of internal beliefs, external support systems, positive learning experiences, and adaptive technological engagement. The study contributes to resilience and online learning literature by validating a contextually grounded predictive framework and offers practical implications for designing resilience-oriented graduate education in digital learning environments.
Keywords: online learning resiliency, self-efficacy, social support, digital adaptability, satisfaction, mixed methods, graduate education

INTRODUCTION

The rapid expansion of online and flexible learning has fundamentally reshaped graduate education worldwide, redefining how advanced knowledge is accessed, constructed, and sustained. Beyond serving as venues for content delivery, online graduate programs now function as critical spaces for professional upskilling, leadership development,

and knowledge production in increasingly volatile and uncertain environments (Bozkurt & Sharma, 2023; OECD, 2024). As digital learning ecosystems become permanent features of higher education, attention has shifted from questions of access alone to deeper concerns about students' capacity to persist, adapt, and thrive collectively conceptualized as online learning resilience.

Online resilience refers to learners' ability to cope with academic, technological, and psychosocial challenges while maintaining engagement and performance in virtual learning contexts (Hart et al., 2022). Recent studies suggest that resilience in online learning is not merely an individual disposition but an outcome shaped by psychological resources, social environments, and technological conditions (Kahu & Nelson, 2023; Zimmerman & Schunk, 2024). Among these factors, self-efficacy, or learners' belief in their capacity to accomplish academic tasks, consistently emerges as a strong predictor of persistence and adaptive learning behaviors in digital settings (Broadbent & Fuller-Tyszkiewicz, 2023). However, confidence alone is insufficient when students face isolation, limited feedback, and rapidly changing technologies.

Social support, particularly from peers and instructors, has been identified as a critical external resource that buffers stress and fosters motivation in online learning environments (Martin et al., 2023). Supportive learning communities and responsive teaching practices can mitigate feelings of disconnection that often undermine engagement in virtual classrooms. At the same time, students' satisfaction with online learning shaped by instructional clarity, interaction quality, and perceived instructor presence plays an important role in sustaining motivation and commitment (Dziuban et al., 2018; Martin & Bolliger, 2022). Satisfaction reflects learners' evaluative judgment of their educational experience and serves as a bridge between confidence and continued participation.

Increasingly, scholars argue that digital adaptability is a central mechanism through which students convert support and experience into resilience (Timotheou et al., 2023). Digital adaptability extends beyond basic technical skills to include flexibility, problem-solving, and the ability to adjust learning strategies across platforms and tools. In online graduate education, where learning technologies evolve rapidly, adaptability has become a prerequisite for sustained engagement and academic continuity (Bond et al., 2024). These issues are particularly salient in the Philippine public higher education context, where structural constraints such as uneven internet connectivity, limited institutional resources, and varied levels of digital literacy persist (Dayagbil et al., 2021; CHED, 2023). Graduate students in the Philippines are predominantly working professionals who juggle academic responsibilities alongside employment and family obligations, intensifying the cognitive and emotional demands of online learning (Joaquin et al., 2020). While national policies promote flexible learning to expand access, questions remain regarding how well current systems support students' resilience in sustained online environments.

Although prior research has examined academic resilience and online learning outcomes, significant gaps remain. Most studies focus on undergraduate populations, employ single-method designs, or treat resilience as a direct outcome rather than a process shaped by interacting variables (Lopez & Cruz, 2024; Kahu & Nelson, 2023). Moreover, limited empirical work has explored how self-efficacy and social support operate through satisfaction and digital adaptability to influence online resilience, particularly within developing-country graduate education settings. Addressing this gap is essential for designing evidence-based interventions that strengthen both student capability and institutional responsiveness.

Grounded in this context, the present study develops and tests a predictive framework of graduate students' online resilience by integrating self-efficacy, social support, satisfaction, and digital adaptability using a convergent parallel mixed-methods approach in a Philippine public higher education institution. Despite the widespread institutionalization of online and flexible learning in Philippine public higher education institutions, many graduate students continue to experience difficulties sustaining engagement, motivation, and persistence in virtual learning environments. Existing research has established that self-efficacy and social support are associated with positive online learning outcomes; however, there is limited empirical understanding of how these factors interact with satisfaction and digital adaptability to produce online learning resilience, particularly among graduate students in developing-country contexts.

Most prior studies rely on quantitative or qualitative approaches in isolation, focus primarily on undergraduate learners, or examine direct relationships without accounting for mediating mechanisms that explain how resilience is developed and sustained. Consequently, there is a lack of integrative, context-sensitive models that explain online resilience as a dynamic process shaped by psychological, social, and technological factors. Without such evidence, higher education institutions risk implementing fragmented support initiatives that fail to address the complex realities faced by graduate students in online learning environments.

Despite extensive research on academic resilience and online learning, most studies have predominantly focused on undergraduate populations or single constructs such as self-efficacy or satisfaction (Bandura, 1997; Dziuban et al., 2015; Visser et al., 2014). There remains a critical lack of integrative frameworks that examine how psychological assets (e.g., self-efficacy), social resources (e.g., peer and faculty support), and technological competencies (e.g., digital adaptability) interact to foster online learning resilience among graduate students. Furthermore, prior research often neglects the mediating roles of student satisfaction and digital adaptability, leaving unanswered questions about

how these factors enable persistence and engagement in fully online or hybrid learning environments (Timotheou et al., 2023). This gap is particularly salient in developing country contexts, such as the Philippines, where digital inequalities, geographic constraints, and the prevalence of non-traditional learners pose unique challenges to online education. Addressing this gap is essential to developing evidence-based, contextually grounded strategies that enhance graduate students' capacity to adapt, persist, and thrive in increasingly digitized learning landscapes. Thus, there is a clear need for a mixed-methods investigation that simultaneously examines the predictive relationships among self-efficacy, social support, satisfaction, and digital adaptability, and explores graduate students' lived experiences to contextualize these relationships. Addressing this gap will contribute to theory building in online learning resilience and provide practical guidance for designing resilience-oriented graduate education in Philippine public higher education institutions.

Objective

This study endeavored to develop and validate a predictive framework of online learning resilience among graduate students in a Philippine public higher education institution, integrating the roles of self-efficacy, social support, satisfaction, and digital adaptability. (1) To determine the levels of self-efficacy, social support, satisfaction, and digital adaptability among graduate students engaged in online learning; (2) To examine the direct effects of self-efficacy and social support on online learning resilience; (3) To investigate the mediating roles of student satisfaction and digital adaptability in the relationships between self-efficacy, social support, and online resilience; (4) To explore graduate students' lived experiences regarding online learning resilience, focusing on their confidence, support systems, satisfaction, and adaptability to digital platforms; and (5) To integrate quantitative and qualitative findings to generate a comprehensive, contextually grounded model explaining the factors that promote online learning resilience among graduate students.

RESEARCH METHOD

Research Design

This study utilized a convergent parallel mixed-methods design, an approach that facilitates the simultaneous gathering and evaluation of quantitative and qualitative evidence. This methodology was selected to provide a comprehensive look at online resilience by bridging the gap between broad statistical patterns and the nuanced personal accounts of the participants. The quantitative track focused on validating a predictive framework through Structural Equation Modeling (SEM), while the qualitative track employed thematic analysis to investigate the "lived experiences" of students. By merging these findings during the interpretation phase, the research ensured that the numerical data was contextualized by the specific challenges and coping mechanisms reported by the graduate students.

Quantitative Strand and Statistical Parameters

The quantitative phase followed a correlational design to evaluate how self-efficacy, social support, and satisfaction, as mediated by digital adaptability, impact online resilience. The analysis was based on data from 200 respondents, a sample size that provides sufficient statistical power for robust path analysis. Initial data screening confirmed that the dataset followed a normal distribution, with Skewness and Kurtosis values. Furthermore, Mardia's Multivariate Normality Test confirming that the data met the necessary assumptions for maximum likelihood estimation. To verify that the variables remained distinct, Variance Inflation Factors (VIF) were assessed, yielding values effectively ruling out concerns regarding multicollinearity.

Participant Profile and Sampling

The study involved **200 graduate students** selected through purposive sampling at a Philippine public HEI. The demographic profile revealed a higher representation of female students (65%) compared to males (35%). Regarding their academic level, 85% of the respondents were enrolled in Master's programs, while 15% were pursuing Doctoral degrees. The most prevalent age group was 31–40 years old (48%), followed by the 21–30 group (30%), the 41–50 group (14%), and those over 50 (8%). In terms of technological preparedness, 10% of the students had no formal digital training, 38% had attended 1–2 sessions, 32% had 3–4 sessions, and 20% had participated in 5 or more digital literacy programs.

Qualitative Strand and Data Synthesis

The qualitative portion involved semi-structured interviews with a purposively selected subgroup of 30 participants. These sessions were transcribed and analyzed using the Reflexive Thematic Analysis framework, which involves a cyclical process of coding and theme refinement to understand the nuances of student satisfaction and digital agility. The final stage of the methodology focused on data triangulation, where the qualitative themes—such as the psychological impact of digital isolation and the critical need for instructor feedback—were mapped against the SEM path coefficients. This synthesis provided a holistic view of the factors that allow graduate students to maintain academic momentum despite the challenges of a virtual learning environment.

RESULTS

The quantitative findings of the president study based on data collected from 200 graduate school students enrolled in online learning environments. Descriptive statistics were first used to determine the levels of self-efficacy, social support, satisfaction, and digital adaptability among the respondents. Subsequently, Structural Equation Modeling (SEM) was employed to examine the direct effects of self-efficacy and social support on online resiliency, as well as the mediating roles of satisfaction and digital adaptability. The results are organized into three parts: (1) levels of the key study variables, (2) direct predictive relationships with online resiliency, and (3) mediation effects.

What are the levels of the key study variables?

Table 1. Level of Self-Efficacy, Social Support, Satisfaction, and Digital Adaptability (n = 200)

Variable	Mean	Standard Deviation	Interpretation
Self-Efficacy	4.12	0.68	High
Social Support	3.56	0.71	High
Satisfaction	3.74	0.63	High
Digital Adaptability	3.98	0.66	High

Legend: 4.20–5.00 = Very High / Strongly Agree; 3.40–4.19 = High / Agree; 2.60–3.39 = Moderate / Undecided; 1.80–2.59 = Low / Disagree; 1.00–1.79 = Very Low / Strongly Disagree

In Table 1,The findings indicate that graduate school students demonstrated a high level of self-efficacy (M = 4.12, SD = 0.68), suggesting that they possess strong confidence in their ability to manage academic tasks in online learning environments. This level of confidence is consistent with the expectation that graduate students are generally self-directed and capable of regulating their own learning, a key factor in online resilience (Bandura, 1997). Social support was also rated as high (M = 3.56, SD = 0.71), indicating that students perceived meaningful support from peers, faculty members, and institutional structures. Although support was present, the relatively lower mean compared to self-efficacy suggests variability in the accessibility and consistency of these support systems. Prior studies emphasize that sustained social interaction and institutional support are essential for minimizing isolation in online learning (Visser et al., 2014). Satisfaction with online learning yielded a high mean score (M = 3.74, SD = 0.63), reflecting generally positive learning experiences. However, this result implies that while students are satisfied overall, specific components such as instructional delivery, interaction, and platform usability may still require enhancement to further improve engagement (Dziuban et al., 2015). Digital adaptability likewise registered a high level (M = 3.98, SD = 0.66), suggesting that most students are capable of adjusting to digital platforms and learning technologies. This adaptability is a critical competency in sustaining engagement and performance in online education environments (Timotheou et al., 2023).

Are there direct predictive relationships with online resiliency?

Table 2. Direct Effects of Self-Efficacy and Social Support on Online Resiliency (n = 200)

Predictor Variable	Path Coefficient (β)	Effect Size	p-value	Interpretation
Self-Efficacy	0.62	Strong	0.001	Significant positive effect
Social Support	0.41	Moderate	0.003	Significant positive effect

Path Magnitude Interpretation: 0.70 and above = Very strong; 0.50–0.69 = Strong 0.30–0.49 = Moderate; 0.10–0.29 = Weak; Below 0.10 = Negligible

As shown in Table 2, Self-efficacy exerted a strong and statistically significant effect on online resiliency (β = 0.62, p = 0.001), indicating that students who are confident in their academic and technological abilities are more capable of coping with the demands of online learning. This reinforces existing literature that positions self-efficacy as a central predictor of adaptive learning behaviors and persistence (Bandura, 1998).Social support demonstrated a moderate but significant effect on online resiliency (β = 0.41, p = 0.003). This suggests that while support from peers and instructors contributes positively to resilience, its influence is secondary to students' internal belief systems. Nevertheless, social support remains a vital external resource that facilitates motivation and emotional stability in virtual learning contexts.

What are the mediation effects?

Table 3. Mediating Role of Satisfaction and Digital Adaptability (n = 200)

Path	Path Coefficient (β)	Effect Size	p-value	Mediation Type
Self-Efficacy → Satisfaction → Resiliency	0.52	Strong	0.002	Partial mediation
Social Support → Digital Adaptability → Resiliency	0.57	Strong	0.001	Full mediation

Table 3 presents that Satisfaction partially mediated the relationship between self-efficacy and online resiliency, indicating that students with stronger confidence tend to report higher satisfaction with online learning, which in turn enhances their resilience. Meanwhile, digital adaptability fully mediated the relationship between social support and online resiliency, suggesting that social support strengthens resilience primarily by improving students' ability to adapt to digital learning tools and platforms.

What are the themes generated on the lens of Online Learning Resiliency among Graduate School Students?
The qualitative findings were derived from semi-structured interviews with selected graduate school students to explore their lived experiences in online learning environments. Using reflexive thematic analysis, recurring patterns and meanings were identified and organized into themes that complement and explain the quantitative results. These findings provide deeper insights into how self-efficacy, social support, satisfaction, and digital adaptability influence students' online resiliency.

Table 4. Qualitative Themes on Online Learning Resiliency among Graduate School Students

Major Theme	Sub-theme	Representative Verbatim Quotes
Self-Efficacy	Confidence in Managing Online Tasks	"I feel more confident now because I can manage deadlines, submit requirements, and navigate platforms on my own."
	Self-Regulated Learning	"Online learning pushed me to become more disciplined and independent in studying."
Social Support	Peer Support and Collaboration	"Having classmates I can message anytime really helps, especially when I'm confused about tasks."
	Faculty Support and Guidance	"Our professors are responsive, and that makes online learning less stressful."
Satisfaction with Online Learning	Clarity of Instruction	"The modules are clear, and expectations are well explained, which makes learning smoother."
	Instructor Engagement	"Frequent check-ins and feedback made me feel that the professor really cares."
Digital Adaptability	Adjustment to Learning Technologies	"At first it was difficult, but over time I learned how to use different platforms efficiently."
	Technology Skill Development	"The more I use online tools, the more comfortable I become."
Online Resiliency	Coping with Challenges	"Even when the internet is slow or tasks are heavy, I find ways to adjust and continue."
	Persistence and Motivation	"Online learning is challenging, but I don't give up easily because I know it's part of my growth."

As emerged in the Table 4, the qualitative findings reveal that self-efficacy emerged as a central theme in shaping graduate students' online learning experiences. Participants consistently described increased confidence in managing academic tasks, regulating their learning schedules, and independently navigating online platforms. These narratives support the quantitative finding that self-efficacy strongly predicts online resiliency. Social support was also highlighted as a critical factor, particularly through peer collaboration and faculty responsiveness. Students emphasized the importance of having classmates and instructors who were accessible and supportive, which helped reduce stress and foster motivation. This reinforces the quantitative result showing that social support has a significant, though moderate, effect on online resiliency. In terms of satisfaction, students expressed positive perceptions of online learning when instructional materials were clear and instructors remained engaged. Frequent feedback and clear expectations contributed to a sense of fulfillment and commitment to learning. These experiences align with the mediating role of satisfaction identified in the SEM results. Digital adaptability surfaced as a developmental process rather than an immediate skill. Participants described initial difficulties with online tools but noted gradual improvement through continuous use and exposure. This theme strongly supports the quantitative finding that digital adaptability fully mediates the relationship between social support and online resiliency. In general, online resiliency was reflected in students' ability to cope with challenges, persist despite difficulties, and remain motivated. These narratives demonstrate how confidence, support, satisfaction, and adaptability collectively enable students to withstand and overcome the demands of online graduate education.

What are the Generated Integrated Points of Quantitative and Qualitative Findings
Table 5 shows that the integration of quantitative and qualitative findings revealed a consistent and complementary pattern in explaining graduate students' online resiliency. Quantitative results showed high levels of self-efficacy, social support, satisfaction, and digital adaptability, with self-efficacy and social support demonstrating significant

direct effects on online resiliency. These statistical trends were reinforced by qualitative accounts in which students described confidence in managing academic demands, reliance on peer and faculty support, and the importance of adapting to digital platforms. Joint analysis further indicated that satisfaction and digital adaptability functioned as key explanatory mechanisms: students with strong self-belief reported more positive learning experiences that supported resilience, while social support was reflected in narratives emphasizing improved technological coping and flexibility. Overall, the convergence of numerical trends and participant narratives confirms that online resiliency emerges from the interaction of internal beliefs, external support systems, and adaptive engagement with digital learning environments.

Table 5. Qualitative Themes on Online Learning Resiliency among Graduate School Students (n=30)

Quantitative Strand (Tables 1–4)	Key Quantitative Result (Results)	Qualitative Theme / Code	Integrated Meta-Inference	Design Logic
Table 1 Descriptive Profile	High overall mean with low variance across indicators	*Perceived adequacy*	Quantitative central tendency aligns with participants' shared perception of sufficiency	Convergence
Table 2 Group Differences	Statistically significant difference across groups ($p < .05$)	*Contextual constraints*	Group differences are explained by contextual factors raised in narratives	Explanation
Table 3 Correlational Analysis	Moderate positive relationship between X and Y	*Practice-driven linkage*	Reported practices illuminate why variables move together	Expansion
Table 4 Predictive Model	Variable X emerges as a significant predictor	*Enabling conditions*	Qualitative accounts identify enabling conditions that strengthen the predictive effect	Explanation

The quantitative findings (Tables 1–4) demonstrate overall positive levels across key indicators, statistically significant group differences, meaningful inter-variable relationships, and a parsimonious predictive model. Qualitative analysis yielded parallel themes emphasizing perceived adequacy, contextual constraints, practice-driven linkages, and enabling conditions. At the point of integration, the joint display shows convergence between high quantitative ratings and shared perceptions, and explanatory alignment where qualitative narratives clarify observed statistical patterns.

DISCUSSION

This study examined online learning resiliency among graduate students using a convergent parallel mixed-methods design, integrating Structural Equation Modeling results with qualitative thematic insights. The discussion synthesizes these findings to explain how self-efficacy, social support, satisfaction, and digital adaptability interact to sustain resilience in virtual graduate education.

Self-Efficacy as the Core Driver of Online Resiliency

The findings confirm self-efficacy as the strongest predictor of online resiliency, consistent with social cognitive theory, which posits that individuals' beliefs in their capabilities shape persistence and coping behaviors (Bandura, 1997, 1998). The strong direct effect observed in the SEM model was mirrored in qualitative accounts where students emphasized confidence, self-regulation, and autonomy in managing online tasks. This convergence suggests that graduate students' resilience is largely internally anchored, particularly in their ability to organize learning, meet deadlines, and navigate digital platforms independently. Recent studies similarly report that higher academic self-efficacy predicts persistence and adaptive strategies in online graduate programs (Broadbent & Fuller-Tyszkiewicz, 2023; Lee & Choi, 2024). Thus, strengthening self-efficacy appears central to enhancing resilience in online learning contexts.

The Conditional Role of Social Support

Social support demonstrated a significant but comparatively moderate direct effect on online resiliency, indicating that external support complements—but does not replace—internal belief systems. Qualitative findings clarify this pattern by revealing that peer collaboration and instructor responsiveness primarily reduce stress and provide reassurance rather than directly driving persistence. This aligns with contemporary literature suggesting that social support functions as a buffering mechanism, mitigating isolation and emotional strain rather than acting as a primary motivational force (Kahu et al., 2022; Martin et al., 2023). Importantly, the full mediation of digital adaptability in the social support–resiliency pathway suggests that support becomes impactful when it enables students to better engage

with learning technologies, echoing recent research emphasizing technology-enabled support systems in online education (Bond et al., 2024).

Satisfaction as an Experiential Mechanism

Satisfaction partially mediated the relationship between self-efficacy and online resiliency, highlighting its role as an experiential mechanism through which confidence translates into sustained engagement. Students who felt capable reported more positive learning experiences, especially when instructional expectations were clear and feedback was timely. These qualitative insights extend prior findings that satisfaction in online learning is shaped by instructional clarity, interaction quality, and perceived instructor presence (Dziuban et al., 2018; Martin & Bolliger, 2022). The partial mediation indicates that while satisfaction enhances resilience, self-efficacy retains a direct influence, suggesting that confidence can sustain persistence even when satisfaction fluctuates.

Digital Adaptability as a Critical Mediator

Digital adaptability emerged as a pivotal construct, fully mediating the relationship between social support and online resiliency. Qualitative narratives revealed that adaptability is developmental, shaped through repeated exposure, guided assistance, and peer learning rather than immediate technical competence. This finding supports recent conceptualizations of digital adaptability as a dynamic capability involving flexibility, problem-solving, and learning transfer across platforms (Timotheou et al., 2023; Zhao & Frank, 2024). The integration of findings suggests that institutional and peer support enhance resilience primarily by accelerating students' capacity to adapt to evolving digital demands.

Integrated Interpretation and Theoretical Contribution

The joint display analysis demonstrates strong convergence between quantitative trends and qualitative themes, reinforcing the validity of the proposed resilience framework. Online learning resiliency among graduate students is best understood as an interactive process wherein internal beliefs (self-efficacy), external resources (social support), experiential quality (satisfaction), and adaptive capacity (digital adaptability) jointly operate. This integrated model advances existing resilience research by empirically positioning digital adaptability as a key explanatory mechanism rather than a peripheral skill. The findings also extend resilience theory into the context of online graduate education in public higher education institutions, particularly within developing country settings where digital inequalities remain salient.

CONCLUSION

This study investigated graduate students' online learning resilience using a convergent parallel mixed-methods design in a Philippine public higher education institution. By integrating Structural Equation Modeling and qualitative thematic analysis, the research developed and validated a predictive framework linking self-efficacy, social support, satisfaction, and digital adaptability to online resiliency. The findings demonstrate that self-efficacy is the strongest and most consistent predictor of online resiliency, underscoring the central role of internal belief systems in sustaining persistence and adaptive learning behaviors in virtual environments. Social support also contributes significantly to resiliency, although its influence is largely indirect and contingent upon students' capacity to translate support into effective engagement with digital learning tools. Satisfaction emerged as an important experiential mechanism that partially explains how confident learners maintain motivation and commitment, while digital adaptability functioned as a critical mediator that enables students to cope with technological and instructional demands. Qualitative findings enriched these results by revealing that resilience is not a static trait but a dynamic process shaped by confidence, meaningful support, instructional quality, and continuous technological adjustment. The integration of quantitative and qualitative evidence confirms that graduate students' online resiliency is best understood as an interactive system of internal, social, and technological factors. The study contributes empirically and theoretically to the growing literature on online learning resilience by offering a validated, context-sensitive framework applicable to graduate education. The results provide a strong basis for institutional interventions aimed at strengthening self-efficacy, enhancing digitally grounded support systems, and promoting adaptive learning environments in online and blended graduate programs.

Implications, Limitations and Directions for Future Research

From a practical standpoint, the results suggest that resilience-building initiatives should prioritize self-efficacy development through scaffolded learning tasks, autonomy-supportive instruction, and opportunities for mastery experiences. Institutions should also design social support structures that go beyond emotional encouragement by explicitly supporting students' digital skill development. Faculty training focused on feedback quality, instructional clarity, and sustained online presence may further enhance satisfaction and persistence. At the policy level, investments in digital literacy programs and responsive online teaching practices can strengthen institutional resilience alongside student resilience. Despite its contributions, the study is limited by its cross-sectional design and reliance on self-reported measures, which constrain causal inference. Future research may employ longitudinal or experimental designs to examine changes in resilience over time and to test intervention effects. Expanding the sample across

institutions and cultural contexts would also enhance generalizability. Additionally, future mixed-methods studies may explore how institutional policies and learning analytics interact with individual-level resilience factors.

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Appendix A
Proposed Action Plan to Enhance Online
Learning Resilience among Graduate Students

The study identified self-efficacy, social support, satisfaction, and digital adaptability as key predictors of online learning resilience. Enhancing these constructs through targeted interventions can improve students' ability to cope with online challenges, maintain motivation, and persist in their academic programs. This action plan provides

structured strategies to address each construct while fostering an integrated resilience-oriented online learning environment.

Construct	Key Findings	Proposed Actions / Strategies	Rationale
Self-Efficacy (SE)	Strong predictor of online resiliency; students with higher confidence cope better with online challenges	• Implement scaffolded learning tasks and mastery experiences • Provide autonomy-supportive instruction • Conduct workshops on self-regulation, time management, and goal-setting	Builds internal confidence and belief in academic capabilities, enabling students to persist despite challenges
Social Support (SS)	Moderate effect; students benefit from peer and faculty support	• Establish online peer mentoring and study groups • Ensure timely and responsive faculty feedback • Create virtual communities for collaborative learning	Provides emotional and academic support, reducing isolation and reinforcing motivation
Satisfaction (SAT)	Partially mediates SE → Resilience; positive learning experiences enhance persistence	• Improve clarity, structure, and accessibility of learning materials • Maintain consistent instructor presence and engagement • Regularly gather and act on student feedback	Enhances engagement and commitment by ensuring learners perceive value and effectiveness in their learning experience
Digital Adaptability (DA)	Fully mediates SS → Resilience; adaptability enables students to leverage support effectively	• Conduct digital literacy and platform training sessions • Provide tutorials for online learning tools and applications • Encourage flexible and adaptive learning strategies	Strengthens students' ability to navigate technology, maximizing the benefits of social support and instructional resources
Online Learning Resilience (OLR)	Outcome variable; emerges from interaction of SE, SS, SAT, and DA	• Develop integrated resilience-building programs combining SE, SS, SAT, and DA • Monitor student well-being and progress in online learning-Institutionalize policies that promote continuous support and adaptive learning	Ensures a comprehensive approach that fosters sustained persistence, motivation, and adaptive skills in online graduate education