



Blended Learning in Nursing Education: A Pilot Study on the Role of Resilience and Self-Confidence in Achieving Learning Outcomes

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ABSTRACT

This cross-sectional study examined the roles of resilience and self-confidence in supporting academic success within blended learning environments in undergraduate nursing education. Blended learning combines face-to-face instruction with digital delivery, demanding high levels of adaptability and self-regulated learning from students. Data were collected from 146 nursing undergraduates enrolled in blended courses across multiple universities. Validated instruments—the Resilience Assessment Questionnaire (RAQ-8) and the Trait Measure of Robustness of Self-Confidence—were culturally adapted and administered. Grade Point Average (GPA) was used as an indicator of academic achievement. Descriptive statistics, Mann–Whitney U tests, and correlation analyses were conducted to evaluate associations among key variables. Results showed a robust positive correlation between resilience and GPA ($p < .001$), underscoring the importance of persistence and adaptability for learning outcomes. Self-confidence likewise demonstrated a significant, beneficial association with academic performance, supporting proactive engagement and buffering the effects of setbacks. A complementary relationship between resilience and self-confidence was also observed, suggesting that these attributes, when combined, may enhance their collective contribution to academic success. These findings underscore the importance of targeted educational strategies—such as mentoring, structured feedback, and guided reflection—to enhance psychological resilience and self-assurance. Integrating such supports into blended curricula may better equip nursing students to navigate academic and clinical demands and enhance their readiness for professional practice.

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1. INTRODUCTION

Higher education has undergone a profound transformation in recent years, driven by rapid developments in digital technology and changing learner expectations (Mohamed Hashim et al., 2022). Among the most influential innovations is blended learning, which deliberately integrates face-to-face instruction with online activities to expand flexibility and access. This hybrid model has diffused across disciplines because it promises individualized pacing, multimodal resources, and data-informed feedback that are difficult to achieve in purely traditional formats (Geng et al., 2021). By bridging classroom and digital spaces, blended learning aligns with the competencies and logistics of twenty-first-century education, including anytime-anywhere engagement. At the same time, it introduces new demands for self-regulation, media literacy, and sustained motivation that not all students possess at the outset. These tensions are especially pronounced in programs where professional competence relies on integrating theory with practice and ethical judgment. Consequently, the promise of blended learning must be examined alongside its constraints, particularly in applied fields with high stakes for performance and safety (Ngoasong, 2022).

Nursing education occupies a distinctive niche because it must cultivate rigorous conceptual understanding while developing patient-centered clinical skills under the supervision of experienced professionals. In this context, blended learning can mitigate logistical constraints—such as limited classroom time, shifting clinical schedules, and competing personal responsibilities—by distributing learning across both

synchronous and asynchronous modalities. Self-paced modules can reinforce foundational concepts before labs, while virtual simulations can model clinical scenarios that are otherwise difficult to arrange frequently (Ropero-Padilla et al., 2021). Carefully designed online activities can also prepare students for more enriching and targeted practice during in-person sessions. Moreover, digital tracking of progression allows instructors to identify misconceptions early and personalize remediation without sacrificing cohort cohesion. These affordances position blended learning as a viable complement to, rather than a substitute for, supervised clinical experiences. Nevertheless, such benefits are realized only when the curricular design explicitly connects online preparation to face-to-face application, assessment, and reflection.

Implementation challenges temper these advantages and require deliberate institutional responses. Effective participation in hybrid environments presupposes technological proficiency, reliable connectivity, and familiarity with learning platforms—conditions that are unevenly distributed across student populations (Divaharan & Chia, 2022). Students with limited prior exposure to digital tools may expend cognitive resources on navigation rather than on disciplinary reasoning, thereby depressing learning gains. A reduced frequency of in-person contact can also narrow opportunities for apprenticeship-style mentorship, spontaneous peer explanations, and professional socialization. In parallel, a heavier emphasis on independent learning can overwhelm students who rely on structured guidance and immediate instructor feedback. Without clear expectations, timely support, and scaffolds for time management, some learners experience fragmentation of effort across modalities. These risks underscore the importance of designing interactional routines—such as office hours, discussion protocols, and feedback cycles—that preserve social presence and instructional clarity. Institutions must therefore couple technology adoption with robust pedagogical and student-support infrastructures to prevent avoidable inequities.

Against this backdrop, psychological attributes that enable students to persist and adapt become central to success in blended nursing curricula. Resilience, understood as the capacity to recover from setbacks and sustain effort under stress, is directly relevant to navigating demanding academic tasks and clinical uncertainty (Aryuwat et al., 2024). Self-confidence, defined as a realistic belief in one's capacity to perform effectively, supports the transfer of theoretical knowledge to patient care decisions and professional communication. The COVID-19 pandemic heightened awareness of these traits by compressing timelines, disrupting clinical placements, and increasing reliance on independent study, thereby underscoring the need for adaptive coping and self-efficacy (Hensley et al., 2022). Empirical work suggests that resilient students are more likely to reframe difficulties as learning opportunities and to persist through complex simulations and assessments. Likewise, self-confident students participate more actively, seek feedback strategically, and tolerate ambiguity inherent in clinical reasoning (Ramezanzade Tabriz et al., 2024). Importantly, resilience and self-confidence appear mutually reinforcing, with growth in one often catalyzing gains in the other (Amsrud et al., 2019; Mayor-Silva et al., 2024). Clarifying their interplay within blended environments can therefore inform both pedagogical design and learner support.

Building on these considerations, the present pilot study examines the relationships among resilience, self-confidence, and academic outcomes for nursing students engaged in blended learning. The study aims to identify which aspects of these psychological traits most strongly align with achievement indicators and how they may compensate for or amplify modality-specific challenges. It also aims to surface resources and instructional strategies—such as mentoring, formative feedback, and guided reflection—that strengthen students' adaptive capacities. By focusing on resilience and self-confidence, the research complements prior work that has primarily focused on platform features and course structures. The intended contribution is to connect psychological readiness with instructional design choices in a way that is actionable for educators and program leaders. Ultimately, the study aspires to inform targeted interventions that enhance both academic performance and professional preparation in complex healthcare settings. In doing so, it responds to an urgent need for evidence-based guidance on cultivating the dispositions that enable learners to thrive in hybrid educational ecosystems.

2. MATERIAL AND METHOD

Study Design and Sampling

This study adopted a cross-sectional design conducted over a three-month period from November 2024 to January 2025. The target population comprised undergraduate nursing students enrolled in programs that had formally implemented blended learning methodologies. A total of 146 participants were recruited using a

convenience sampling approach to ensure timely and feasible access to respondents within the study window. Convenience sampling was selected because program schedules and clinical placements varied considerably, making probability sampling impractical in the available timeframe. Eligibility centered on current enrollment in blended courses and willingness to provide informed consent, thereby aligning the sample with the study focus on hybrid learning experiences. While convenience sampling supports operational feasibility, it may constrain population representativeness and should be interpreted as an exploratory strategy. To mitigate bias, recruitment invitations were disseminated across multiple universities to diversify institutional contexts and curricular emphases. The study design and sampling plan together enabled efficient data capture on psychological attributes and academic outcomes within authentic blended learning settings.

Instruments and Measures

Study variables were measured using validated instruments selected for reliability and conceptual fit with the research aims. Academic resilience was assessed with the Resilience Assessment Questionnaire (RAQ-8) (Vijayan, 2023), which captures persistence and adaptive responses to academic stressors. Self-confidence was measured using the Trait Measure of Robustness of Self-Confidence (Beattie et al., 2011), which reflects students' stable beliefs about their ability to perform effectively. Both instruments underwent forward translation into Indonesian and expert review for cultural and educational appropriateness in the nursing context. A back-translation procedure and reconciliation meeting were used to resolve semantic discrepancies and preserve construct meaning across languages. Prior to the main data collection, a pilot administration was conducted with 30 students (excluded from the final sample) to test clarity, response time, and item functioning, informing minor linguistic refinements. Learning outcomes were operationalized as Grade Point Average (GPA) from semesters delivered in blended formats, offering a standardized indicator of academic achievement across courses. Together, this multi-method measurement strategy enabled triangulation between psychosocial attributes and objective performance indicators.

Procedure and Ethics

Recruitment was conducted through university communication channels, including program announcements and digital bulletin boards, to efficiently reach eligible students. Interested students received an information sheet detailing the study objectives, procedures, anticipated time burden, risks, and potential benefits. After reviewing the information, written informed consent was obtained. Data collection was conducted in two modes—online (using Google Forms) and paper-based questionnaires—to accommodate diverse access preferences and reduce participation barriers. Participants completed demographic items followed by the adapted RAQ-8 and self-confidence scale, and they authorized the retrieval or self-report of GPA from the relevant blended-learning semester. All responses were de-identified at the point of entry, stored on secure, access-restricted drives, and analyzed only in aggregate to protect confidentiality. Ethical approval was granted by the Ethics Committee of the Faculty of Health Sciences, Universitas Brawijaya, and the study adhered to the principles of the Declaration of Helsinki. Participation was voluntary, with explicit assurance that non-participation or withdrawal would not affect academic standing or access to services. The procedural and ethical safeguards were designed to promote autonomy, minimize risk, and uphold data integrity throughout the research process.

Data Analysis and Psychometric Evaluation

Data analysis was conducted using SPSS version 25 following a pre-specified statistical plan. Descriptive statistics summarized demographic characteristics and produced central tendency and dispersion indices for resilience and self-confidence scores, with medians reported due to the distributional properties. Univariate analyses described categorical variables using frequencies and percentages to provide context for the sample. Normality checks indicated non-normal distributions; therefore, Mann–Whitney U tests were used to examine between-group differences where relevant. Statistical significance was set at $p < .05$, and two-tailed tests were employed to avoid directional bias. Instrument reliability was assessed with Cronbach's alpha, with all scales exceeding the .70 criterion for acceptable internal consistency in this context. Construct validity was examined through an Exploratory Factor Analysis (EFA) to verify the factor structure's compatibility after cultural

adaptation, while content validity was established through a review by five nursing education experts. This integrated analytic and psychometric approach strengthened confidence in the inferences linking psychological attributes to academic outcomes within blended learning environments.

3. RESULTS

Participant Characteristics and Academic Performance

The respondent profile reveals a notable gender imbalance, typical of nursing cohorts, with 124 of 146 participants identifying as female and 22 as male (Table 1). The age distribution was concentrated in the 19–20 range, which constituted half of the sample, followed by the 21–22 and 17–18 age ranges, indicating a predominantly early undergraduate cohort (Table 1). The semester distribution was bimodal, with equal proportions in the first and fifth semesters, and fewer students in the third and seventh semesters, suggesting varied exposure to clinical coursework (Table 1). Overall academic performance appeared strong, with a cumulative GPA mean of 3.477 (SD = 0.2338) that reflects high achievement norms in the participating programs (Table 1). Notably, the last-semester GPA averaged 3.337 (SD = 0.2966), which is lower than the cumulative GPA and may reflect the specific demands of blended delivery during that term (Table 1). This divergence between cumulative and last-semester indicators warrants attention because it may capture transitional costs of hybrid modalities or shifts in assessment emphasis. Although demographic patterns do not establish causality, they contextualize the performance data and help frame comparisons across psychological attributes.

Table 1. Characteristics of Nursing Student Respondents.

Characteristic	N = 146	Percentage
Gender		
Male	22	15.06%
Female	124	84.94%
Age		
17-18 tahun	32	22%
19-20 tahun	73	50%
21-22 tahun	41	28%
Semester		
1 st semester	50	34.25%
3 rd semester	37	25.34%
5 th semester	50	34.25%
7 th semester	9	6.16%
Last Semester GPA	3.337 (0.2966)	
GPA (Grade Point Average)	3.477 (0.2338)	

Interpreting these descriptive data requires attention to cohort composition and program structure so that performance differences are not over-attributed to a single factor. The predominance of early-semester students may amplify sensitivity to workload changes, platform unfamiliarity, and evolving expectations in hybrid environments. Conversely, students in advanced semesters may experience heavier clinical and assessment demands, which can depress short-term grades relative to their cumulative averages. The lower last-semester GPA could therefore reflect steeper task complexity, compressed timelines, or reduced face-to-face support during blended cycles. These context features argue for triangulating GPA with psychosocial measures to separate persistent ability from situational strain. Demographic heterogeneity across age and semester also suggests that supports should be tiered to developmental stage and clinical exposure. Together, the profiles set the stage for examining how self-confidence and resilience relate to achievement under blended conditions. Finally, the descriptive baseline motivates targeted analyses that test whether psychological resources buffer performance during modality transitions.

Robustness of Self-Confidence (Trait Measure)**Table 2.** Frequency distribution for the Trait Robustness of Self-Confidence inventory (N = 146)

Item	Strongly Agree n (%)	Agree n (%)	Neutral n (%)	Disagree n (%)	Strongly Disagree n (%)	Mean	SD
1. A bad result has a very negative effect on my self-confidence.	52 (35.61)	55 (37.67)	36 (24.66)	2 (1.37)	1 (0.69)	4.06	0.84
2. My self-confidence goes up and down a lot.	26 (17.80)	58 (39.73)	57 (39.04)	4 (2.74)	1 (0.69)	3.71	0.80
3. Negative feedback from others does not affect my self-confidence.	26 (17.80)	56 (38.36)	48 (32.88)	14 (9.59)	2 (1.37)	3.61	0.92
4. Mistakes have very little effect on my self-confidence.	43 (29.45)	56 (38.36)	34 (23.29)	11 (7.53)	2 (1.37)	3.86	0.96
5. My self-confidence recovers very quickly after negative feedback.	38 (26.03)	69 (47.26)	34 (23.28)	4 (2.74)	1 (0.69)	3.95	0.81
6. I recover my self-confidence quickly after a bad result.	42 (28.77)	57 (39.04)	37 (25.34)	9 (6.16)	1 (0.69)	3.89	0.91
7. If I perform poorly, my confidence is not badly affected.	30 (20.54)	54 (36.99)	48 (32.88)	12 (8.22)	2 (1.37)	3.67	0.93
8. My self-confidence is stable; it does not vary much.	38 (26.03)	65 (44.52)	41 (28.08)	2 (1.37)	0 (0.00)	3.95	0.76
9. My self-confidence is not greatly affected by outcomes.	46 (31.50)	68 (46.58)	27 (18.50)	3 (2.05)	2 (1.37)	4.04	0.83
10. If I make a mistake, it has a large detrimental effect on my self-confidence.	37 (25.34)	62 (42.47)	44 (30.14)	3 (2.05)	0 (0.00)	3.91	0.78
11. My self-confidence remains stable regardless of fitness fluctuations.	28 (19.18)	53 (36.30)	49 (33.56)	12 (8.22)	4 (2.74)	3.60	0.97
12. I recover my self-confidence very quickly if I make a mistake.	36 (24.66)	67 (45.90)	38 (26.02)	5 (3.42)	0 (0.00)	3.91	0.79

Patterns from the Trait Robustness of Self-Confidence inventory indicate moderate-to-strong robustness across items, with several means near or above 3.9 (Table 2). Students frequently reported rapid confidence recovery after negative events, including criticism from instructors and unsatisfactory results, indicating an adaptive response to feedback (items 5 and 6; Table 2). At the same time, many respondents acknowledged that confidence “goes up and down,” reflecting the dynamic nature of academic self-beliefs in demanding courses (item 2; Table 2). Items capturing the dampening effect of mistakes or poor performance showed mixed responses, implying that some learners are more buffered against performance dips than others

(items 4, 7, 10; Table 2). The stability of self-confidence, regardless of fitness changes, drew more varied endorsements and a larger dispersion, suggesting that well-being can modulate academic confidence (item 11; Table 2). Endorsement that outcomes do not greatly affect confidence co-occurred with recovery items, hinting at protective appraisals that limit over-generalization from single setbacks (item 9; Table 2). Standard deviations ranged roughly 0.76–0.97, indicating dispersion that is informative without being erratic (Table 2).

A closer reading of the profile emphasizes the interplay between vulnerability to setbacks and capacity for recalibration, which together define functional robustness. High agreement with “quick recovery” statements suggests that many students already possess coping scripts that can be strengthened through deliberate practice and reflective prompts. Simultaneous acknowledgement of variability normalizes fluctuations and reduces stigma, which may improve help-seeking and engagement during difficult weeks. Pedagogically, these patterns suggest the need for rapid, specific feedforward that converts critique into actionable revisions rather than broad judgments. Because asynchronous exchanges can delay or dilute social cues, instructors should establish clear turnaround times and tone guidelines to maintain encouragement and clarity in digital channels. Programs might also require short revision memos in which students justify accepted and rejected AI or instructor suggestions, thereby reinforcing authorship and metacognition. For learners who exhibit greater volatility, brief attribution coaching and goal-setting routines can help prevent minor setbacks from escalating into disengagement. Together, these strategies leverage malleable confidence to stabilize performance across blended cycles while preserving academic integrity.

Resilience Profile (RAQ-8) and Curricular Implications

Table 3. Frequency distribution for the Resilience Assessment Questionnaire (RAQ-8) (N = 146)

Domain & item (abbrev.)	1 Never n (%)	2 n (%)	3 n (%)	4 n (%)	5 Always n (%)	Mean	SD
Self-awareness – I usually know how others perceive me.	4 (2.74)	6 (4.11)	41 (28.08)	65 (44.52)	30 (20.55)	3.76	0.91
Determination – I am determined to achieve my lifetime ambitions.	0 (0.00)	3 (2.05)	31 (21.23)	62 (42.47)	50 (34.25)	4.08	0.79
Vision – I can see my future clearly.	4 (2.74)	14 (9.59)	65 (44.52)	46 (31.50)	17 (11.65)	3.39	0.90
Self-confidence – I normally feel comfortable in new situations.	3 (2.05)	15 (10.28)	54 (36.99)	52 (35.61)	22 (15.07)	3.51	0.93
Organisation – I plan my next day in advance.	2 (1.37)	8 (5.48)	47 (32.19)	61 (41.78)	28 (19.18)	3.71	0.88
Problem-solving – I enjoy the challenge of unravelling puzzles and solving problems.	1 (0.69)	7 (4.79)	54 (36.99)	59 (40.41)	25 (17.12)	3.68	0.83
Interaction – In general, I like people.	0 (0.00)	6 (4.11)	53 (36.30)	59 (40.41)	28 (19.18)	3.74	0.80
Relationships – My most important relationships are my strongest.	1 (0.69)	2 (1.37)	51 (34.93)	57 (39.04)	35 (23.97)	3.84	0.82

RAQ-8 responses consistently show positive appraisals, with the highest means for determination and strength of key relationships, underscoring social support and long-term drive (items 2 and 8; Table 3). Self-awareness and organization scored in the moderate-to-high range, indicating that many students track how they are perceived and plan their days in advance—skills aligned with hybrid time-management demands (items 1 and 5; Table 3). Comfort in new situations and enjoyment of problem-solving also registered moderate means, signaling readiness for novel platforms, case simulations, and branching tasks (items 4 and 6; Table 3). By

contrast, future vision was comparatively lower, which may reflect uncertainty about clinical placements, employment prospects, or evolving health-system dynamics (item 3; Table 3). The pattern suggests a cohort with strong present-oriented coping but uneven long-range anchoring during program volatility. Standard deviations were modest, indicating stable perceptions with some room for improvement. Overall, the resilience profile reveals assets to leverage and a specific gap—clarity of future trajectory—that warrants targeted support.

Curricular responses can translate these data into support structures that are both preventive and developmental. Given strong relationships, programs can formalize peer-learning communities, near-peer mentorships, and scheduled mentor check-ins that convert social capital into persistence. Organization strengths can be enhanced through the use of weekly planning templates, milestone calendars, and time-on-task dashboards within learning management systems. Moderate comfort with novelty and problem-solving supports the use of case-based simulations, branching scenarios, and reflective debriefs that reward exploration and evidence-based decisions. Self-awareness scores justify guided self-assessment, including learning journals and rubric-aligned checklists that surface misunderstandings early. To address lower future vision, schools should integrate career panels, advisor meetings, and portfolio workshops that link current competencies to emerging roles. These interventions align with blended demands by scaffolding autonomy while preserving social presence and accountability. By mapping supports to measured domains, curricula can enhance resilience in ways that are data-informed, staged, and transferable across courses.

Associations Among Constructs and Pedagogical Implications

Correlational analyses demonstrate statistically significant associations among resilience, self-confidence, and GPA, reinforcing the psychological underpinnings of success in blended nursing education (Table 4). Resilience correlated with GPA at $p = .001$, suggesting that students reporting higher adaptive capacities tend to achieve higher grades under hybrid delivery (Table 4). Self-confidence likewise showed a significant association with GPA at $p = .001$, underscoring the contribution of stable self-beliefs to performance on tasks requiring independent preparation and clinical reasoning (Table 4). The significant link between resilience and self-confidence indicates **mutual reinforcement**, where coping skills and positive self-appraisal co-develop and sustain persistence (Table 4). Mechanistically, resilience may **buffer** confidence from episodic failures, while confidence may **embolden** students to attempt challenging tasks that further build resilience through mastery. Although effect sizes were not reported, consistent significance across links points to a **coherent psychological network** consistent with the descriptive profiles. The pattern also aligns with high endorsement of quick recovery and strong relationships, which likely act as resources during demanding terms.

Table 4. Statistical analysis of the relationship between academic resilience, self-confidence, and learning outcomes in blended learning nursing education.

Variable Relationship	Variable	Mean (SD)	p-value
Resilience ↔ GPA	Resilience	29.76 (5.037)	0.001*
	GPA	3.337 (0.2966)	
Self-Confidence ↔ GPA	Self-Confidence	46.21 (8.223)	0.001*
	GPA	3.337 (0.2966)	
Resilience ↔ Self-Confidence	Resilience	29.76 (5.037)	0.001*
	Self-Confidence	46.21 (8.223)	

Remarks : (*) Significant result

Pedagogically, the joint pattern suggests a dual-lever strategy that cultivates resilience and self-confidence in tandem rather than in isolation. Instructors can sequence assignments from low-stakes practice to authentic assessments with structured revision, stabilizing confidence while building coping capacity through iterative success. Feedback protocols should require annotation of changes and rationale, transforming critique into playful action and reinforcing agency. To sustain relational buffers, programs can schedule peer accountability circles tied to course milestones and embed mentor outreach during assessment peaks. Because confidence can fluctuate, analytics dashboards that visualize progress and normalize temporary dips may reduce over-generalization from isolated setbacks. At the same time, AI-off checkpoints should be retained to monitor

independent performance and prevent over-reliance on automated support. Finally, future work should include longitudinal designs and multi-source performance indicators to test directionality and durability of these associations across cohorts and clinical exposure. Taken together, these implications translate the statistical pattern into actionable pedagogies that sustain achievement in blended nursing education.

4. DISCUSSION

Resilience and Self-Confidence in Blended Nursing Education

Blended learning reshapes how nursing students allocate their attention, regulate their effort, and integrate online study with face-to-face clinical preparation, making psychological resources central rather than peripheral to success. Within this ecology, resilience and self-confidence operate as enabling conditions that help learners sustain engagement when schedules shift, feedback is asynchronous, and clinical exposure varies week to week. Evidence from AI-supported and hybrid learning shows that digital environments can enhance productive engagement while also increasing demands on self-regulation, thereby raising the premium on adaptive coping and efficacy beliefs (Hew & Lo, 2018). When learners perceive challenges as informative rather than threatening, they are more likely to persist through iterative tasks and capitalize on the affordances of technology-enhanced practice (Carey et al., 2018). By contrast, uncertainty about expectations or minimal social presence can destabilize effort, especially in early semesters, unless programs deliberately scaffold both psychological and academic needs (Plathe et al., 2021). Self-confidence fosters the willingness to undertake complex or public tasks, such as simulation debriefs or case presentations, which are crucial for professional development in nursing (Yarbrough & Phillips, 2022). Resilience then restores momentum after setbacks, converting critique and minor failures into cues for strategy adjustment rather than withdrawal (Tsyrlunik et al., 2023). Together, these attributes mitigate the risk that temporary performance dips will cascade into disengagement, a dynamic that is particularly salient in hybrid formats where cognitive load fluctuates across modalities.

Because interactional design acts as a contextual amplifier, routine features of blended courses can strengthen or weaken resilience and confidence depending on how they are implemented. Timely, specific, and forward-looking feedback communicates that competence is improvable and that effort has direction, whereas delayed or opaque critique invites maladaptive inferences about ability and belonging (Carroll et al., 2024; Porteous & Machin, 2018). Social presence, via peer dialogue, mentoring, and instructor accessibility, normalizes struggle and models constructive responses to error, which supports both persistence and strategic revision (Nouri et al., 2018). When online preparation is explicitly connected to in-person application, students can see how micro-skills practiced asynchronously accumulate into clinical reasoning, thereby stabilizing efficacy beliefs (Carey et al., 2018). Analytics-informed check-ins and discussion protocols can further reduce uncertainty by clarifying progress and next steps, aligning with evidence that structured supports enhance motivation and engagement in technology-rich environments (Plathe et al., 2021). In parallel, transparent expectations for tool use and authorship keep cognitive work centered on analysis and decision making rather than on mere completion (Kenwright et al., 2025). In sum, aligning pedagogical routines with psychological needs is a strategic imperative in blended nursing education, not a discretionary add-on (Shahzeydi et al., 2023). Programs designed to foster resilience and confidence from the outset are better positioned to convert hybrid complexity into opportunities for deliberate practice and growth.

Resilience as a Foundation for Academic Success

Resilience supports achievement by sustaining goal-directed behavior under stress and enabling faster recovery after disappointing evaluations or challenging simulations (Keener et al., 2021). Students with higher resilience tend to persist through complex tasks, treat setbacks as diagnostic information, and shift effort toward identified weaknesses, which mirrors effective self-regulation in higher education (Cao et al., 2021). In hybrid contexts where autonomy demands are high and instructional pacing varies, resilient learners are better able to maintain progress despite intermittent disruptions or modality switches (Hew & Lo, 2018; Eom et al., 2021). Studies of technology-integrated professional learning similarly indicate that adaptive coping helps learners remain engaged during peak assessment periods and heavy feedback cycles (Cao et al., 2021). Our findings align with this pattern, showing that resilience moves in tandem with academic indicators and that persistence and reflective adjustment are central to mastering complex competencies. Because resilience

channels emotion into strategy rather than avoidance, it preserves cognitive resources for reasoning, documentation, and evidence appraisal, all of which underpin success in clinically oriented curricula (Dimunová et al., 2021). Resilience also appears to interact with contextual supports. Students who receive structured guidance and social backing are more likely to translate coping intentions into sustained behavior (Nouri et al., 2018). Taken together, these insights justify treating resilience as both a predictor and a malleable target of instructional design in blended nursing education (Mohammad et al., 2023).

Translating the resilience profile into the curriculum requires leveraging assets while addressing gaps revealed by learner data. Strong relational resources can be formalized through peer-learning communities, near-peer mentoring, and scheduled mentor check-ins that convert social capital into persistence during demanding weeks (Yarbrough & Phillips, 2022; Nouri et al., 2018). Organizational strengths can be extended with milestone calendars, weekly planning templates, and time-on-task dashboards in learning management systems, which lower the cognitive cost of task switching and provide clear progress cues (Poku et al., 2023). Enjoyment of problem-solving and comfort with novelty support the use of case-based simulations and branching scenarios, followed by reflective debriefs that reward exploration and evidence-based decision-making (Eom et al., 2021; Chaabane et al., 2021). When future orientation is weak, career panels, advisor conferences, and portfolio workshops can help students connect present competencies to evolving roles and stabilize long-range motivation (Nouri et al., 2018). These designs should be paired with explicit reflection on coping strategies so that resilience becomes an outcome of practice rather than a trait assumed at entry (Betke et al., 2021). Brief pulse surveys can be used to monitor strain and trigger targeted supports before minor difficulties escalate, aligning day-to-day teaching with formative analytics (Plathe et al., 2021). In aggregate, resilience-informed design makes hybrid complexity manageable and turns periodic stress into structured opportunities for growth (Porteous & Machin, 2018).

Self-Confidence and Its Role in Learning

Self-confidence, understood as a realistic belief in one's capacity to succeed, shapes the initiation, intensity, and persistence of academic effort across modalities. Confident students volunteer answers, request clarification, and attempt higher-level tasks that stretch competence, all of which are rewarded in nursing curricula that value clinical reasoning and communication (Parker et al., 2017). In blended settings, this disposition is pivotal because independent study blocks require learners to choose challenge over minimal compliance, especially when guidance is asynchronous (Lutfi et al., 2022). Research across higher education consistently links confidence with motivation and achievement, including in contexts that emphasize problem-solving and applied reasoning similar to clinical training (Chen, 2023; Cook et al., 2013). Well-scaffolded use of learning tools can bolster self-beliefs by providing timely exemplars and actionable feedback (Dankers et al., 2022; Barsuk et al., 2010). At the same time, confidence is sensitive to external pressures such as high-stakes assessments or peer comparison, which can magnify variability when feedback is unclear or untimely (Lineberry et al., 2015). Patterns commonly observed in hybrid courses include moderate to high confidence with within-person fluctuation, especially as learners navigate new platforms and evaluative conventions (Lutfi et al., 2022). This variability underscores the need for instructional strategies that stabilize how students interpret setbacks so temporary difficulties do not escalate into pervasive self-doubt.

Pedagogical tactics to cultivate durable confidence should prioritize mastery experiences, credible models, and informational feedback rather than generic praise. Sequencing assignments from low-stakes rehearsal to authentic performance creates opportunities for success that accumulate into stronger efficacy beliefs, particularly when criteria and exemplars are transparent (Cook et al., 2013; Barsuk et al., 2010; Lineberry et al., 2015). Instructor think-alouds and peer exemplars can demystify expert reasoning, narrowing the gap between novice and competent performance in clinical and documentation tasks (Ramm et al., 2015; Park et al., 2016). Feedback should focus on process and strategy, linking observed errors to concrete adjustments, so guidance improves both motivation and outcomes (Tsyrlunik et al., 2023). Requiring brief revision memos in which students justify accepted and rejected suggestions, whether from instructors, peers, or AI, anchors improvement in controllable actions and supports transfer (Blumenfeld et al., 2020). Because recent failures can loom larger than prior gains, progress dashboards that visualize cumulative improvement help counter pessimistic appraisals during difficult weeks (Lutfi et al., 2022). When volatility is pronounced, short coaching on attribution and goal-setting can prevent isolated disappointments from cascading into disengagement while

preserving academic integrity. Taken together, a design that treats confidence as malleable more reliably translates effort into measurable gains across blended learning cycles (Chen, 2023).

Synergy, Practical Implications, and Study Limitations

Resilience and self-confidence operate synergistically, each reinforcing the other's most adaptive features in blended education. Resilience tempers the emotional impact of failure and protects the motivational base on which confidence depends, particularly during complex simulations and public evaluations (Keener et al., 2021). Confidence energizes engagement with challenging tasks, creating mastery experiences that feed back into resilience through successful coping and strategy refinement (Parker et al., 2017). This reciprocal loop is strengthened by environments that combine learner autonomy with timely, actionable feedback and reliable social presence (Plathe et al., 2021). Institutional supports, such as peer learning communities, near-peer mentorship, and structured office hours, translate existing relational strengths into persistence behaviors that buffer stress during peak assessment periods (Yarbrough & Phillips, 2022). Clear norms for AI use, disclosure, and authorship keep cognitive work focused on reasoning and evidence rather than shortcuts (Dankers et al., 2022). Because blended formats can magnify both opportunity and strain, a dual-lever strategy that cultivates resilience and confidence simultaneously is more likely to yield sustained gains in reasoning, documentation, and clinical preparation (Hew & Lo, 2018; Cook et al., 2013). Such an approach links psychological readiness with curricular architecture, turning hybrid complexity into a structured pathway for professional growth.

Several limitations qualify these conclusions and point to priorities for future research. Convenience sampling, although practical, constrains generalizability by over-representing readily available volunteers and under-representing learners with competing obligations or limited connectivity (Ramm et al., 2015). A cross-sectional design captures associations at one time point and cannot establish causal ordering among resilience, confidence, and achievement (Keener et al., 2021). Self-report measures, even when validated and culturally adapted, invite social desirability and recall bias that may inflate positive attributes or compress variance (Nouri et al., 2018). Mixed-mode data collection can introduce inequivalences in testing conditions despite standardized instructions, suggesting the value of more uniform administration (Plathe et al., 2021). Grade point averages, while common, only imperfectly index complex clinical competencies that develop over time and across contexts; performance-based assessments and rubric-anchored artifacts can provide a fuller picture (Cook et al., 2013). Comparative trials that contrast AI-supported feedback with alternatives, such as human tutoring or discipline-specific tools, would clarify unique and overlapping effects on confidence, resilience, and learning (Park et al., 2016; Tsyrlunik et al., 2023). Finally, stratified sampling across institutions and cohorts, paired with delayed posttests and learning-analytics traces, would strengthen causal claims and ecological validity and provide clearer guidance for program design at scale.

5. CONCLUSION

The findings of this study highlight the integral role of resilience and self-confidence in shaping academic achievement among nursing students, particularly within blended learning environments. Resilience emerges as a critical determinant of persistence and adaptability, enabling students to navigate academic complexity and sustain focus on overarching objectives, while self-confidence complements this capacity by fostering proactive engagement and encouraging students to approach learning challenges with assurance and resolve. The synergistic interaction between these traits underscores their collective importance, especially when cultivated in learning ecosystems that balance autonomy with structured support through timely, process-focused feedback and collaborative learning opportunities. Interpersonal relationships and support networks further amplify these effects by providing emotional buffering and practical assistance that sustain effort through academic and personal obstacles. Although fluctuations in self-confidence point to the need for targeted strategies to stabilize self-perception, the overall pattern indicates that resilience and self-confidence mutually reinforce one another to create a durable foundation for consistent progress. Accordingly, tailored interventions—such as mentorship programs, guided reflection, and feedback routines that translate critique into actionable revision—can systematically strengthen these attributes. In turn, such design choices equip nursing students to meet academic demands and professional responsibilities with greater confidence, adaptability, and readiness for practice.

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