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Developing a Blended Learning Model Through Collaborative and Case-Based Learning to Enhance Academic Achievement and Professional Skills of Nursing Students in the Tak Special Economic Zone

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Abstract
This study aimed to develop and evaluate a blended learning model integrating collaborative and case-based learning to enhance academic achievement and professional skills among nursing students in the Tak Special Economic Zone. Employing a research and development (R&D) design, the study proceeded through four phases: (1) developing the instructional model, (2) constructing and validating research instruments, (3) implementing the model with nursing students, and (4) evaluating and refining the model. The instructional design, based on a 70% online and 30% face-to-face structure, incorporated seven collaborative case-based steps (SDSSESP) to foster problem-solving, teamwork, and professional attitudes. A purposive sample of 35 second-year nursing students enrolled in Adult Nursing I participated in a one-group pretest-posttest experiment. Data were collected using achievement tests, problem-solving measures, teamwork skill assessments, professional attitude scales, and satisfaction questionnaires. Results demonstrated significant improvements in students' academic achievement, problem-solving abilities, teamwork skills, and professional attitudes after participation ($p < .01$). Expert validation confirmed the model's appropriateness at a high level, while students expressed strong satisfaction with its implementation. The findings indicate that blended learning, when systematically integrated with collaborative and case-based approaches, effectively enhances both cognitive and professional competencies essential for 21st-century nursing. This model is particularly suitable for resource-constrained and diverse learning contexts, such as border and special economic zones. Practical implications suggest broader adoption of blended, collaborative, and case-based strategies across nursing curricula, while future research should employ comparative, longitudinal, and technology-enhanced designs to further refine and validate the model.

Keywords: *Blended Learning, Case-Based Learning, Nursing Education*

INTRODUCTION

The rapid evolution of information and communication technologies (ICT) has accelerated the mainstreaming of blended learning across higher education, shifting instructional design from transmission-oriented lectures to intentional integrations of online and face-to-face learning that promote deeper engagement and flexibility. Blended learning is best understood as the "thoughtful integration of classroom face-to-face learning experiences with online learning experiences," a design choice associated with more meaningful learning and the rethinking of course structures to support active knowledge construction (Garrison & Kanuka, 2004). Reviews of emerging practice similarly highlight blended learning's effectiveness for access, flexibility, learner satisfaction, and cost-effectiveness when implemented with clear pedagogical rationales and aligned assessment (Graham, 2013). In post-pandemic educational ecosystems and resource-variable settings, these affordances make blended approaches particularly salient for health professions education. Within nursing education, global policy directions underscore the need for curricula that develop practice-ready graduates with strong problem-solving, communication, and teamwork competencies. The World Health Organization's Global Strategic Directions for Nursing and Midwifery (2021–2025) calls for strengthening initial education so nurses can contribute effectively to universal health coverage, emphasizing competency-based, digitally enabled, and context-responsive learning designs (WHO, 2021–2025). Such guidance is consistent with earlier WHO standards for initial nursing education, which advocate educational quality and relevance to practice. In geographically diverse service areas—such as Thailand's Tak Special Economic Zone, where health needs intersect with mobility, multicultural populations, and service delivery complexity programs must prepare students to transfer classroom knowledge to varied clinical realities. Blended models, when purposefully

structured, can widen access to learning resources while maintaining the professional socialization and hands-on components that are essential in nursing. Evidence also supports coupling blended delivery with collaborative learning to develop the higher-order skills needed in contemporary clinical practice. Meta-analytic syntheses show cooperative/collaborative learning yields significant gains in academic achievement across methods and contexts, outperforming competitive and individualistic approaches when positive interdependence, individual accountability, and promotive interaction are designed into activities (Johnson & Johnson). In health professions education specifically, team-based learning (TBL) a structured form of collaborative learning has been shown to transform passive coursework into active, feedback-rich environments that strengthen problem solving, critical thinking, and professional behaviors, aligning with outcomes valued by nursing programs. These approaches are scalable for large classes and conducive to blended formats, where readiness assurance, application exercises, and peer collaboration can be orchestrated across online and in-person sessions. Case-based learning (CBL) provides a complementary pedagogy that situates theory in authentic, often complex scenarios, prompting students to analyze data, prioritize problems, and justify decisions core competencies for safe, holistic nursing care. Reviews in medical and health-care education document that CBL enhances knowledge retention, clinical reasoning, and learner engagement, and compares favorably with lecture-dominant formats when cases are aligned to course outcomes and assessment (McLean, 2016). In blended environments, digital case repositories, online discussion, and simulation media extend exposure to diverse conditions while preserving in-class time for facilitated debriefs and skill integration. For courses like adult health nursing where content volume is high and conditions span acute, critical, and chronic states systematic integration of CBL within a collaborative, blended design can help students surface misconceptions, practice clinical judgment, and link pathophysiology to nursing interventions. Guided by this literature and policy context, the present study develops and examines a blended learning model that purposefully integrates collaborative learning (including structured team activities) and case-based learning to enhance academic achievement and professional skills among nursing students in the Tak Special Economic Zone. The model operationalizes active learning principles in both online and face-to-face components, emphasizing readiness preparation, peer interaction, and application tasks anchored in authentic nursing cases. We hypothesize that this design will (a) improve course achievement; (b) strengthen problem-solving and teamwork skills; and (c) foster positive professional attitudes by engaging students in clinically relevant, socially situated learning. By addressing documented limitations of lecture-dominant instruction and aligning with international directions for nursing education, the study aims to generate a feasible, context-responsive approach for programs serving diverse learner and service environments.

Research Objectives

1. To develop a blended learning model based on the concepts of collaborative learning and case-based learning in order to enhance academic achievement, problem-solving ability, teamwork skills, and professional attitudes among nursing students in the Tak Special Economic Zone.
2. To compare the academic achievement of nursing students in the Tak Special Economic Zone before and after receiving instruction in the Adult Nursing I course using the developed blended learning model.

LITERATURE REVIEWS

Blended learning has increasingly been recognized as a transformative model for higher education, particularly in professional fields such as nursing where the integration of theoretical knowledge and clinical practice is essential. According to Garrison and Kanuka (2004), blended learning combines the strengths of face-to-face interaction with the flexibility of online learning, thereby promoting deeper engagement and knowledge construction. Graham (2013) further emphasizes that blended learning is not merely a technological add-on but a pedagogical innovation that, when thoughtfully designed, can improve learning outcomes and learner satisfaction. In the context of nursing education, blended learning allows for simulation-based practice, interactive discussions, and access to resources beyond classroom constraints, which supports the development of 21st-century competencies such as critical thinking, collaboration, and adaptability. Collaborative learning is a key pedagogical approach that complements blended learning by fostering teamwork, peer interaction, and shared responsibility in the learning process. Johnson, Johnson, and Stanne (2000) highlight in their meta-analysis that collaborative learning environments consistently outperform competitive and individualistic approaches in terms of academic achievement, motivation, and interpersonal skill development. Within nursing education, collaboration is not only an instructional

strategy but also a professional requirement, as effective nursing practice depends on interprofessional teamwork and communication. Team-based learning (TBL), a structured form of collaborative learning, has demonstrated positive impacts on problem-solving, leadership, and accountability among nursing students (Michaelsen et al., 2007). Case-based learning (CBL) provides another dimension to blended and collaborative designs by situating learning within authentic clinical scenarios. McLean (2016) reports that CBL enhances critical thinking, decision-making, and knowledge retention in health professions education. By analyzing complex cases, students engage in clinical reasoning processes that mirror real-world practice, bridging the gap between classroom theory and professional application. In a blended environment, digital case repositories and online discussions extend opportunities for exposure, while in-class sessions allow for debriefing and reflection. This dual modality provides both flexibility and depth in nursing curricula. Recent global frameworks also support these pedagogical innovations. The World Health Organization (2021) underscores the need for digitally enabled, competency-based nursing education that equips graduates with problem-solving skills, leadership, and a positive professional identity. Blended learning models that incorporate collaborative and case-based strategies align well with these global priorities, especially in diverse and resource-sensitive regions such as the Tak Special Economic Zone. By integrating technology, teamwork, and clinical reasoning through authentic case analysis, nursing programs can better prepare students for contemporary healthcare demands, while simultaneously enhancing academic achievement, problem-solving ability, teamwork skills, and professional attitudes and as shown in Figure 1 Conceptual Framework.

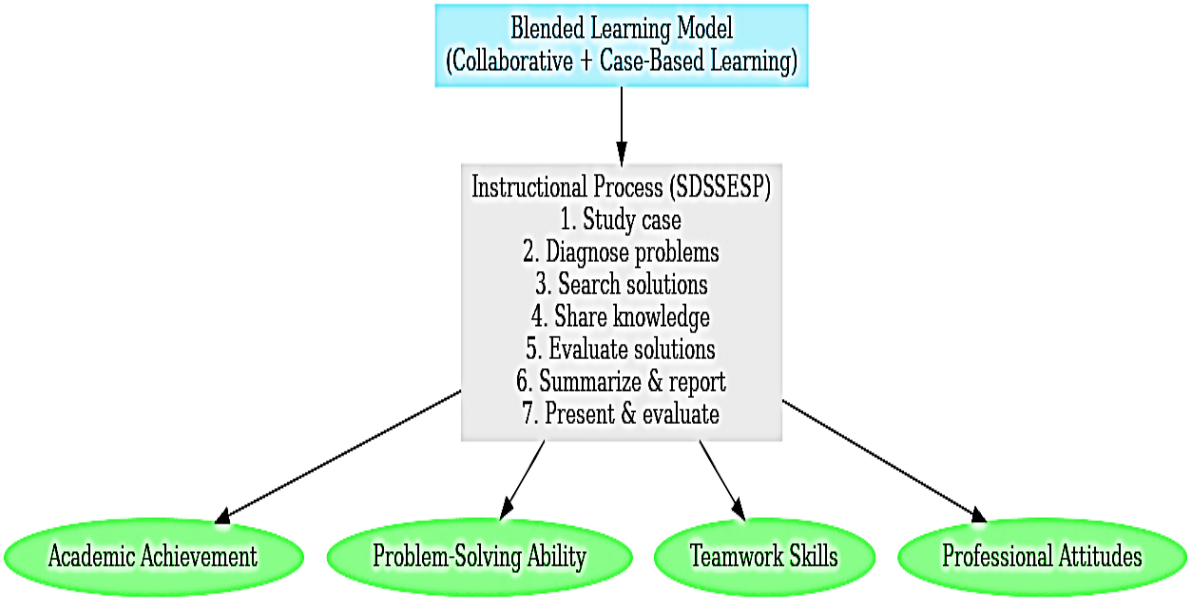

Figure 1 Conceptual framework of

RESEARCH METHODOLOGY

This study adopted a research and development (R&D) approach comprising four phases to design, implement, and evaluate a blended learning model that integrates collaborative learning and case-based learning for nursing students enrolled in Adult Nursing I in the Tak Special Economic Zone. Phase 1: Model development. Contextual analysis was conducted through a review of existing instructional practices at the participating institutions and of theoretical and empirical literature on blended, collaborative, and case-based learning to inform model specifications and pedagogical alignment (Creswell & Creswell, 2018; McLean, 2016; Michaelsen et al., 2007). A draft instructional model and user manual were produced, detailing goals, content mapping, and the seven-step SDSSESP process (Study–Diagnose–Search/Solve–Share–Evaluate–Summarize/Report–Present/Evaluate). Expert review (five content and pedagogy specialists) established content validity for the model and manual; feedback informed iterative refinements (Polit & Beck, 2021). Phase 2: Instrument development. Five instruments were constructed: (a) a 96-item multiple-choice test of academic achievement in Adult Nursing I; (b) a 30-item multiple-choice problem-solving test adapted to the Weir (1974) process; (c) a 30-item teamwork scale; (d) a 30-item nursing professional attitude scale (five dimensions); and (e) a 25-item satisfaction questionnaire (five dimensions). Content validity was determined by expert ratings using the Index of Item–Objective Congruence (IOC ≥ .50 as acceptable). Try-outs with non-sample cohorts supported item analysis (difficulty p = .20–.80;

discrimination r ≥ .20) and internal consistency reliability (Cronbach's α ≥ .70 as acceptable; Tavakol & Dennick, 2011; DeVellis, 2017). Phase 3: Field try-out (experimental implementation). A one-group pretest–posttest design (Shadish et al., 2002) was employed with purposive sampling of nursing students registered in Adult Nursing I (experimental group E). Measures were administered at baseline (O1), the intervention (X: blended model with collaborative, case-based activities distributed ~70% online and ~30% face-to-face), and post-intervention (O2). The intervention operationalized readiness assurance, team application of authentic cases, peer teaching, and facilitated debriefs consistent with blended, collaborative, and case-based principles (Garrison & Kanuka, 2004; Michaelsen et al., 2007; McLean, 2016). Phase 4: Evaluation and revision. Quantitative data (achievement, problem-solving, teamwork, attitudes, and satisfaction) were analyzed using descriptive statistics (mean, SD, percentage) and paired-sample t tests to compare pre- and post-scores (α = .05). Where appropriate, effect sizes (Cohen's d) were computed to gauge practical significance (Cohen, 1988). Qualitative comments from open-ended items and field notes were analyzed using content analysis to identify implementation strengths and areas for refinement (Polit & Beck, 2021). Findings informed final revisions to the model and manual. Ethical approval was obtained from the institutional review board. Participants provided informed consent; confidentiality and the right to withdraw without penalty were assured.

RESEARCH RESULTS

1) Synthesis of the Instructional Model. The developed blended learning model integrates collaborative learning and case-based learning and is organized into six interrelated components: (a) Rationale and significance, (b) Principles, (c) Goals, (d) Content, (e) Instructional process, and (f) Assessment and evaluation. The instructional process operationalizes a seven-step SDSSESP sequence Study the case, Diagnose problems, Search/Solve, Share knowledge, Evaluate solutions, Summarize/Report, and Present/Evaluate delivered in a blended format (~70% online; ~30% face-to-face). Content is aligned with Adult Nursing I and uses authentic nursing cases to trigger analysis, prioritization, and planning. Assessment spans pre-, during-, and post-instruction to capture growth in knowledge, problem solving, teamwork, and professional attitudes. 2) Expert Validation. Five domain experts appraised the model and user manual. Overall appropriateness was rated at a very high level (Mean = 4.72, SD = 0.35). Component-level ratings indicated very high appropriateness for Content (Mean = 5.00, SD = 0.00), Goals (Mean = 4.83, SD = 0.29), Principles (Mean = 4.75, SD = 0.43), Rationale (Mean = 4.67, SD = 0.43), and Assessment (Mean = 4.67, SD = 0.38). The Instructional process component was rated high (Mean = 4.44, SD = 0.58). Qualitative feedback led to refinements in orientation materials, online facilitation prompts, and technical guidelines. 3) Pilot Teaching (Formative Try-out). A pilot with non-sample students surfaced three implementation issues: (a) Orientation clarity students initially confused online vs. in-class tasks; (b) Sustained engagement early units required stronger prompts and visual supports for cases; and (c) Technical constraints connectivity and device issues disrupted online segments. Revisions included an expanded orientation, richer case media (images/video), and coordination with technical support, which collectively improved flow and student participation in later units. 4) Experimental Implementation (One-Group Pretest–Posttest; n = 35). 4.1) Academic Achievement. On the 96-item test, mean scores increased from 19.28 (SD = 4.53) pre-instruction to 54.48 (SD = 7.15) post-instruction; the difference was statistically significant, $t(34) = 26.86$, $p < .001$. The standardized within-group effect size was $d = 4.54$ (very large). 4.2) Problem-Solving Ability. On the 30-item measure, scores improved from 9.00 (SD = 2.50) to 18.28 (SD = 3.50), $t(34) = 17.60$, $p < .001$, $d = 2.97$ (very large). Post-responses evidenced clearer problem statements, more accurate prioritization, and stronger justification of nursing interventions. 4.3) Teamwork Skills. Teamwork (1–5 scale) increased from 3.83 (SD = 0.19) to 4.07 (SD = 0.16), $t(34) = 36.24$, $p < .001$, $d = 6.12$ (very large). Gains were most visible in readiness/role clarity and constructive contribution during application exercises. 4.4) Professional Attitudes. Professional attitude scores (1–5 scale) rose from 2.70 (SD = 0.23) to 3.80 (SD = 0.19), $t(34) = 20.45$, $p < .001$, $d = 3.46$ (very large). Students reported greater appreciation of nursing values, professional responsibilities, and interprofessional collaboration. 4.5) Student Satisfaction and Qualitative Insights. Satisfaction with the blended, case-anchored approach was high (descriptive analysis), with narrative comments praising case authenticity, peer interaction, and timely feedback. Suggestions focused on ensuring stable connectivity, providing clearer pacing guides for online tasks, and expanding multimedia case materials. Classroom observations corroborated a shift from passive reception to active, team-based inquiry. Across outcomes, the model produced large to very large improvements, indicating strong educational value for Adult Nursing I in the Tak Special Economic Zone. The blend of collaborative structures and authentic cases appears to be the key mechanism activating

readiness, promoting shared reasoning, and reinforcing professional identity while the blended format affords flexibility and repeated practice. The validated model and manual, refined through expert review and iterative piloting, provide a feasible, scalable approach for similar nursing contexts. As show Table 1 and Table 2.

Table 1: Expert Validation of the Blended, Collaborative, Case-Based Instructional Model (n = 5 experts)

Component	Mean (M)	SD	Rating Level
Content	5.00	0.00	Very High
Goals	4.83	0.29	Very High
Principles	4.75	0.43	Very High
Rationale & Significance	4.67	0.43	Very High
Assessment & Evaluation	4.67	0.38	Very High
Instructional Process	4.44	0.58	High
Overall (Grand Mean)	**4.72**	**0.35**	**Very High**

Note. Ratings used a 5-point Likert scale (1 = very low to 5 = very high). Experts reviewed clarity, relevance, coherence with course outcomes, feasibility in blended delivery, and alignment with collaborative and case-based pedagogy.

Table 2: Pre–Post Outcomes for Students Taught with the Developed Blended, Collaborative, Case-Based Model (n = 35)

Outcome	n	Pre M	Pre SD	Post M	Post SD	t (df = 34)	p-value	Cohen's d
Academic Achievement (0–96)	35	19.28	4.53	54.48	7.15	26.86	< .001	4.54
Problem-Solving (0–30)	35	9.00	2.50	18.28	3.50	17.60	< .001	2.97
Teamwork (1–5)	35	3.83	0.19	4.07	0.16	36.24	< .001	6.12
Professional Attitudes (1–5)	35	2.70	0.23	3.80	0.19	20.45	< .001	3.46

Notes. Paired-sample t tests compare pre- and post-instruction scores (α = .05). Cohen's d reflects standardized within-group effect size. All outcomes show statistically significant and practically large gains following implementation of the blended, collaborative, case-based model in Adult Nursing I.

DISCUSSION & CONCLUSION

The findings of this study provide strong empirical support for the effectiveness of a blended learning model that integrates collaborative learning and case-based learning to enhance nursing education outcomes. Results demonstrated significant gains in academic achievement, problem-solving ability, teamwork skills, and professional attitudes among nursing students after participating in the intervention. These findings are consistent with global literature emphasizing the transformative potential of blended learning when grounded in evidence-based pedagogies (Garrison & Kanuka, 2004; Graham, 2013). 1) Enhancing Academic Achievement. The substantial improvement in academic achievement following implementation highlights the capacity of blended learning to foster deeper understanding and retention of knowledge. The model's use of multimedia, online modules, and structured group activities likely contributed to increased engagement and opportunities for self-directed learning, which have been identified as key drivers of success in blended environments (Means et al., 2013). Importantly, the integration of case-based content contextualized theoretical knowledge in realistic clinical scenarios, enabling students to apply concepts more effectively. These results align with prior research in nursing and health professions education demonstrating that case-based approaches promote comprehension and application of complex material (McLean, 2016). 2) Strengthening Problem-Solving Skills. Problem-

solving scores improved markedly, suggesting that the SDSSESP sequence provided students with a systematic structure for identifying, analyzing, and resolving clinical issues. The findings resonate with Johnson and Johnson's (2009) meta-analyses on cooperative learning, which emphasize that structured collaboration fosters higher-order thinking. Through exposure to authentic case studies and guided peer discussion, students practiced prioritization, causal reasoning, and evidence-based decision-making competencies that are increasingly vital in modern nursing practice (Benner et al., 2010). 3) Building Teamwork and Collaboration. The observed enhancement in teamwork skills underscores the importance of embedding collaborative activities in both online and face-to-face components. Team-based learning principles, such as individual accountability and group interdependence, were central to this model and reflected in the outcomes (Michaelsen et al., 2007). In addition, teamwork improvements reflect broader professional competencies required by the nursing workforce, particularly in settings characterized by interprofessional collaboration and resource variability such as the Tak Special Economic Zone. Students' ability to communicate effectively, share responsibility, and constructively contribute to team goals is directly aligned with the World Health Organization's (2021) call for strengthening collaborative competencies in nursing education. 4) Fostering Professional Attitudes. Equally important was the significant increase in students' professional attitudes toward nursing. The integration of case-based learning not only exposed students to technical content but also encouraged reflection on ethical, social, and professional dimensions of practice. By engaging with scenarios that mirrored real patient care, students deepened their appreciation of nursing values, responsibilities, and professional identity. This outcome is supported by existing evidence that experiential and collaborative pedagogies foster not only knowledge acquisition but also positive dispositions toward the profession (Ironside, 2015). 5) Addressing Implementation Challenges. While outcomes were overwhelmingly positive, several challenges were identified during pilot testing and implementation. Students initially expressed confusion regarding expectations for online versus face-to-face components, highlighting the need for clear orientation and scaffolding in blended courses. Technical issues such as connectivity also hindered participation at times, underscoring the importance of reliable infrastructure and faculty training in digital pedagogy (Boelens et al., 2017). Addressing these factors is critical to sustaining engagement and ensuring equitable access. 6) Implications for Nursing Education. The results of this study have several implications for nursing education, particularly in developing regions. First, blended models can expand access to high-quality instruction while maintaining opportunities for clinical reasoning and teamwork, thereby supporting both flexibility and professional socialization. Second, case-based learning ensures relevance by linking classroom instruction with clinical realities, enhancing readiness for practice. Third, collaborative structures foster interpersonal and problem-solving skills aligned with 21st-century healthcare needs. Collectively, these findings suggest that the integration of blended, collaborative, and case-based strategies offers a feasible and impactful pathway for nursing programs worldwide. This research demonstrates that a blended learning model grounded in collaborative and case-based pedagogies can significantly enhance academic and professional outcomes among nursing students in the Tak Special Economic Zone. The intervention yielded statistically and practically significant improvements across all measured outcomes, confirming the model's validity and utility. Beyond measurable gains, the study also advanced a framework SDSSESP that operationalizes blended pedagogy in a structured and replicable manner. Future research should extend these findings through comparative studies with control groups, longitudinal evaluations of professional competence, and exploration of scalability across diverse nursing programs. Additionally, further attention should be given to addressing technological barriers and ensuring inclusivity in digital learning environments. Despite challenges, the evidence affirms that blended, collaborative, and case-based learning holds substantial promise for preparing competent, reflective, and team-oriented nursing graduates capable of meeting the demands of contemporary healthcare.

Recommendations

1. Practical Recommendations

Based on the findings, several practical recommendations are proposed for nursing educators, administrators, and policymakers seeking to integrate blended, collaborative, and case-based learning into nursing curricula. First, blended models should be systematically integrated across core nursing courses, with a 70% online and 30% face-to-face balance, ensuring both flexibility and essential in-person skill development. Second, orientation and digital literacy programs must be strengthened to address initial confusion, with clear guidance on expectations, technology, and time management for both students and

faculty. Third, technological infrastructure requires enhancement, particularly in rural or special economic zones, to provide reliable internet, robust learning management systems, and multimedia resources. Fourth, faculty development in case-based pedagogy is essential, emphasizing authentic clinical scenarios and collaborative facilitation strategies. Finally, ongoing monitoring and evaluation should be institutionalized, combining outcome measurement with student feedback to ensure continuous refinement and alignment with contemporary healthcare and educational needs.

2. Recommendations for Future Research

While this study confirms the effectiveness of blended, collaborative, and case-based learning, further research is needed to broaden understanding and validate findings across diverse contexts. First, comparative designs using quasi-experimental or randomized controlled trials should be employed to contrast blended, face-to-face, and fully online models. Second, longitudinal studies are recommended to evaluate the long-term impact on graduates' clinical competence, problem-solving, and professional identity. Third, cross-cultural replication should test adaptability in varied educational and resource settings, from urban to rural institutions. Fourth, expanding into interprofessional education (IPE) could explore benefits for collaborative practice among nursing, medical, and allied health students. Fifth, technology-enhanced innovations, including simulation, augmented reality, and AI-driven adaptive learning, should be integrated to strengthen engagement and personalization. Finally, qualitative investigations using interviews, focus groups, or reflective journals can capture motivational and emotional dimensions, enriching interpretation of outcomes. These directions will refine and strengthen nursing education models for 21st-century healthcare.

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