The Effect of Interactive Learning Tools on the Clinical Competence of Level 3 Nursing Students in a Selected College of Nursing in the Province of Cavite

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ABSTRACT

This study investigated the effect of interactive learning tools—specifically simulation-based training, virtual clinical modules, and mobile learning applications—on the perceived clinical competence of Level 3 nursing students in a selected College of Nursing in Cavite, Philippines. A quantitative pretest–posttest research design was employed, involving 100 nursing students. Data were collected using a self-developed structured questionnaire that assessed respondents' demographic profile, level of exposure to interactive tools, and perceived clinical competence across four domains of the Perceived Clinical Competence Scale (PCCS): clinical knowledge, psychomotor skills, clinical reasoning and judgment, and confidence/self-efficacy. Additionally, usability, learning process, and perceived barriers and support were evaluated.

Descriptive statistics were used to summarize the respondents' characteristics and domain ratings, while a paired-samples t-test was utilized to determine significant differences between pretest and posttest scores. Findings revealed that baseline perceived clinical competence was generally rated as Neutral, although confidence/self-efficacy was already at an Agree level. Following the implementation of interactive learning tools, posttest results demonstrated a consistent increase to Agree across all domains. The improvement in overall perceived competence was statistically significant ($p < .001$). Among the domains, confidence/self-efficacy exhibited the highest level of improvement, followed by psychomotor skills, clinical reasoning and judgment, and clinical knowledge.

Based on these findings, an Interactive Learning Tools Implementation Guide was developed to standardize instructional delivery, align learning tools with competency outcomes, and address identified challenges. The study concludes that interactive learning tools significantly enhance perceived clinical competence and serve as an effective strategy in bridging the theory–practice gap in nursing education.

Keywords: interactive learning tools; nursing students; perceived clinical competence; simulation-based learning; pretest–posttest design

INTRODUCTION

Nursing education has changed significantly over the years because the realities of healthcare practice have also changed. Hospitals and community health settings now expect beginning nurses to enter practice with not only sound theoretical knowledge, but also the ability to think critically, make safe decisions, communicate effectively, and perform clinical skills with confidence. This expectation places strong pressure on nursing schools to move beyond purely lecture-based teaching and to adopt learning experiences that are closer to the realities of patient care. In many nursing programs, this has led to the growing use of interactive learning tools such as simulation-based activities, virtual clinical modules, standardized scenarios, and mobile learning applications. These approaches are increasingly valued because they allow students to participate actively in learning rather than remain passive recipients of information. Current evidence shows that simulation-based and virtual approaches are associated with gains in knowledge, skills, and other learning outcomes in nursing education (Cant & Cooper, 2017; Foronda et al., 2020; Lei et al., 2022).

One of the most persistent concerns in nursing education is the theory–practice gap. Many students can explain concepts well in the classroom, yet struggle when asked to apply the same concepts in actual or simulated patient situations. This difficulty often appears as hesitation during procedures, uncertainty in prioritizing care, fear of making mistakes, and reduced confidence in clinical decision-making. This gap matters because nursing is not learned through memorization alone. It is learned through repeated encounters with situations that require assessment, judgment, action, and reflection. For this reason, interactive learning tools are not simply technological additions to teaching; they are educational strategies meant to help students connect what they know with what they must do in practice (Koukourikos et al., 2021; Cant & Cooper, 2017).

Among these tools, simulation-based education has become one of the most established approaches in nursing instruction. Simulation provides a safe and controlled learning space where students can practice psychomotor skills, respond to changing patient conditions, and make clinical decisions without risking patient safety. The value of simulation lies not only in skill rehearsal but also in its capacity to expose students to realistic clinical demands that may be difficult to guarantee in actual placements. Research has shown that simulation contributes positively to student learning when it is thoughtfully integrated into pre-licensure nursing curricula (Cant & Cooper, 2017). More recent evidence has remained consistent with this conclusion. High-fidelity simulation has been found to significantly improve nursing students' knowledge acquisition, professional skills, and important aspects of clinical ability such as critical thinking, clinical judgment, and communication skills (Lei et al., 2022).

Virtual and digital learning tools have further expanded what nursing educators can do, especially when time, resources, or clinical placements are limited. Virtual simulation allows students to work through patient scenarios, decision points, and consequences in a structured digital environment. Mobile applications can reinforce learning through short modules, clinical prompts, quizzes, and case-based exercises that students can revisit outside scheduled class hours. Foronda et al. (2020) found that most studies in their review supported virtual simulation as an effective teaching strategy for nursing student learning outcomes. This is important because it suggests that the value of interactive learning does not rest only on the presence of technology, but on how purposefully it is used to support student learning.

Recent evidence also shows that simulation is particularly useful for outcomes that matter deeply in clinical education. Scenario-based simulation courses have been associated with significant improvements in nursing students' professional knowledge, clinical practice skills, and self-confidence in learning (Saragih et al., 2024). In a similar way, simulation-based education appears to improve undergraduate nursing students' clinical decision-making skills, although the degree of improvement may vary depending on the design and implementation of the learning experience (Görücü et al., 2024). Taken together, these findings suggest that interactive learning tools can make a meaningful contribution to competence development, but that their design, fidelity, timing, and consistency of implementation all matter (Lei et al., 2022; Saragih et al., 2024).

The present study is also anchored in a theoretical understanding of how competence develops in nursing. Benner's Novice to Expert Model explains that nurses do not become competent merely by acquiring information; they grow through experience, guided exposure, and the gradual refinement of judgment in real or realistic practice situations (Benner, 1984). In this framework, learners move from novice to advanced beginner, then to competent, proficient, and expert levels as they gain meaningful clinical exposure and begin to interpret situations with greater depth and efficiency. This model is especially relevant in nursing education because it recognizes that competence develops over time and through practice, rather than through theory alone. Thomas and Kellgren (2017) further explained that Benner's model provides a useful conceptual structure for simulation facilitators because it helps them understand student progression and tailor learning experiences to the learner's stage of development.

For Level 3 nursing students, this theory is particularly meaningful because they are no longer complete beginners, yet they are still in a stage where they need support, repetition, and feedback to become more organized and confident in their clinical performance. Seen from this perspective, interactive learning tools function as more than classroom aids. They become structured clinical experiences that help students move from rule-dependent performance toward more coordinated and purposeful action. Simulation-based training, virtual clinical modules, and mobile learning applications create opportunities for repeated practice, immediate feedback, and reflection. These elements are important because competence develops when students are able to recognize what happened in a clinical situation, understand why it happened, and think through how they should respond the next time (Benner, 1984; Thomas & Kellgren, 2017). In other words, learning becomes deeper when students are allowed to act, reflect, adjust, and try again.

This issue becomes even more meaningful when viewed in the local context. In the Philippines, nursing education is expected to prepare students for increasingly complex practice environments while working within institutional realities that may include resource limitations, uneven access to technology, variable clinical exposure, and differences in faculty preparation. The Bachelor of Science in Nursing curriculum itself emphasizes the development of competence across knowledge, skills, and values needed for safe and effective practice (Commission on Higher Education [CHED], 2017). These realities can affect how interactive learning strategies are used and how students respond to them. For students in Level 3, the transition from foundational coursework to more advanced clinical application is a demanding period. They are expected to perform more independently, think more critically, and show greater readiness for actual patient care. Yet this is also the stage when many students experience uncertainty, especially when they are asked to integrate theory, skills, and judgment all at once.

Because of this, studying the effect of interactive learning tools at this level is both timely and practical. Although many studies already suggest the educational value of simulation and virtual learning, there is still a need for local, more focused, and methodologically grounded evidence. Some studies are descriptive, some examine only one form of technology, and others do not compare learning outcomes before and after an intervention. For that reason, the present study uses a quasi-experimental design to examine whether exposure to interactive learning tools has a measurable effect on the perceived clinical competence of Level 3 nursing students. By comparing pretest and posttest competence levels and examining which domains improve the most, the study does not only ask whether students appreciate these tools. It asks whether these tools make a meaningful difference in how students see their readiness for clinical practice. The findings may help educators make better decisions about simulation use, virtual learning design, faculty preparation, and the development of an implementation guide that is grounded in actual student outcomes (Cant & Cooper, 2017; Foronda et al., 2020; Lei et al., 2022).

METHODOLOGY

This study utilized a quantitative quasi-experimental research design to examine the effect of interactive learning tools on the clinical competence of Level 3 nursing students in a selected College of Nursing in the Province of Cavite. Specifically, a two-group pretest–posttest approach was employed, wherein one group of students was exposed to interactive learning tools (experimental group), while another group received conventional lecture-based instruction (control group). Both groups were assessed before and after the intervention to determine changes in their clinical competence across four domains: knowledge, psychomotor skills, clinical reasoning, and confidence. This design was chosen because it allows the researcher to measure the effect of an intervention in a real educational setting where random assignment is not feasible.

A quantitative approach was considered appropriate because the study aimed to generate objective, measurable data and determine whether significant differences exist between groups. Quantitative research focuses on numerical analysis and statistical testing to explain relationships among variables and evaluate outcomes of interventions (Creswell & Creswell, 2023). Similarly, Polit and Beck (2021) emphasized that quantitative methods are useful for examining cause-and-effect relationships in structured and systematic ways, particularly in educational and clinical research. In this study, the use of statistical tools enabled the researcher to assess whether interactive learning tools significantly improved students' clinical competence.

The quasi-experimental design was particularly suitable because intact class sections were used instead of randomly assigned participants. In academic environments, students are typically grouped into fixed sections, making randomization difficult without disrupting schedules and institutional policies. Campbell and Stanley (2015) noted that quasi-experimental designs are widely used in educational research because they allow for meaningful comparisons while maintaining the natural structure of the classroom. By using existing groups, the study preserved the authenticity of the learning environment and ensured that the intervention was implemented under realistic conditions.

The participants of the study were Level 3 nursing students currently enrolled in a selected College of Nursing in Cavite. This group was chosen because they are at a crucial stage in their academic development, transitioning from theoretical learning to more complex clinical practice. At this level, students are expected to demonstrate increasing competence in patient care, including critical thinking, technical skills, and decision-making. Their stage of development makes them ideal participants for evaluating the effectiveness of interactive learning tools.

A nonprobability purposive sampling technique was used to select participants. This approach is commonly applied in educational research when the researcher needs to select specific groups that meet predefined criteria (Creswell & Creswell, 2023). Two intact class sections were selected, with one designated as the experimental group and the other as the control group. The total number of participants ranged from 100 to 120 students, with approximately equal distribution between groups. Inclusion criteria required that participants be officially enrolled Level 3 nursing students, currently taking a clinical nursing subject, available during the intervention period, and willing to participate in the study. Students who were absent during data collection, on leave, or unwilling to provide consent were excluded. This sampling strategy ensured that participants had similar academic backgrounds and clinical exposure, thereby minimizing variability and strengthening the internal validity of the study (Polit & Beck, 2021).

The primary data collection instrument used in the study was a self-developed structured questionnaire designed to measure perceived clinical competence and learning experience. The instrument was administered as both a pretest and posttest to assess changes after the intervention. It consisted of several sections, including demographic profile, exposure to interactive learning tools, perceived clinical competence, learning process and usability, and barriers and support. The core component of the instrument was the Perceived Clinical Competence Scale (PCCS), which measured four domains: clinical knowledge, psychomotor skills, clinical reasoning and judgment, and confidence or self-efficacy. Responses were recorded using a 5-point Likert scale ranging from strongly disagree to strongly agree. Scores were computed by averaging responses within each domain, with reverse-coded items applied where necessary to reduce bias.

To ensure the quality of the instrument, a systematic validation process was undertaken. Content validation was conducted by a panel of five experts in nursing education, clinical practice, and research. Each item was evaluated for relevance, clarity, and alignment with the study objectives. The Content Validity Index (CVI) was computed, with a target value of at least 0.90 to indicate strong content validity (Polit & Beck, 2021). Reliability testing was performed using Cronbach's alpha to assess internal consistency, with a minimum acceptable value of 0.70 (Creswell & Creswell, 2023). A pilot test involving 15 to 20 nursing students was conducted to identify any issues related to clarity, structure, and usability. Feedback from participants was used to refine the instrument before its final administration.

The data gathering process followed a systematic and ethical procedure. First, ethical clearance was obtained from the Institutional Research Ethics Committee, along with permission from the College of Nursing. Coordination with faculty members ensured that the study was aligned with the academic schedule. Participants were oriented about the purpose of the study, procedures involved, and their rights as participants. Informed consent was obtained, and each participant was assigned a unique code to maintain confidentiality.

During the pretest phase, both experimental and control groups completed the questionnaire under standardized conditions to establish baseline competence levels. Following this, the intervention phase was implemented. The experimental group participated in interactive learning sessions that included simulation-based activities, virtual clinical modules, and mobile learning applications. Each session followed a structured format consisting of pre-briefing, simulation or activity, and debriefing to facilitate reflection and learning integration. In contrast, the control group received traditional lecture-based instruction covering the same content. Both groups were given equal instructional time to ensure comparability.

After the intervention, the posttest was administered to both groups using the same instrument. Data collected were reviewed for completeness and accuracy before analysis. Throughout the process, confidentiality and data security were strictly maintained. All data were stored in password-protected files, and printed materials were secured in locked storage accessible only to the researcher.

Data analysis was conducted using statistical software such as SPSS. Descriptive statistics, including frequency, percentage, mean, and standard deviation, were used to summarize demographic characteristics and competence levels. To determine changes within the experimental group, a paired sample t-test was used to compare pretest and posttest scores. To compare differences between the experimental and control groups, an independent samples t-test was applied. Analysis of Variance (ANOVA) was used to examine differences across the four domains of competence and identify which domain showed the greatest improvement. Additionally, correlation analysis was performed to explore relationships between demographic variables and clinical competence. A significance level of 0.05 was used for all statistical tests.

Ethical considerations were carefully observed throughout the study. The research adhered to the principles outlined in the Belmont Report, including respect for persons, beneficence, and justice (U.S. Department of Health and Human Services, 1979). Participation was voluntary, and students were informed that they could withdraw at any time without academic consequences. Confidentiality was maintained by using coded identifiers instead of personal information. In compliance with the Data Privacy Act of 2012 (Republic Act No. 10173), all data collected were used solely for research purposes and were not disclosed to any unauthorized individuals.

Overall, this methodological approach ensured that the study was conducted in a systematic, ethical, and scientifically rigorous manner. By combining a quasi-experimental design with validated instruments and appropriate statistical analysis, the study was able to generate credible evidence on the effectiveness of interactive learning tools in enhancing the clinical competence of nursing students.

RESULTS AND DISCUSSION

Results

This chapter presents, analyzes, and interprets the data gathered to determine the effect of interactive learning tools on the perceived clinical competence of Level 3 nursing students. The findings are organized according to the research questions and supported by descriptive and inferential statistics. The discussion is anchored on recent evidence showing that technology-enhanced nursing education—including simulation, virtual simulation, and mobile-based tools—can improve knowledge, skills, and learner confidence when implemented in a structured manner (Pan et al., 2025; Liu et al., 2023). At the same time, local evidence suggests that simulation practices in the Philippines remain uneven, highlighting the need for context-based interpretation of results (Constantino et al., 2025).

Demographic Profile

The study involved 100 Level 3 nursing students. The respondents were within the expected age range (M = 20.8, SD = 1.2), with most aged 21–22 years. The majority were female (72%), and the average GPA (M = 1.95) indicates a generally adequate academic foundation for engaging in clinical and technology-supported learning activities. Academic readiness is important because it influences how students respond to complex and self-directed learning approaches (Pan et al., 2025).

Most respondents had prior exposure to simulation, with only 12% reporting none. This suggests that simulation was not entirely new to the learners, although their experiences may have varied in quality and intensity. In the Philippine context, simulation is often implemented at low to medium fidelity, which may limit its full impact but still provides baseline familiarity (Constantino et al., 2025). Thus, prior exposure is a relevant factor in understanding both baseline competence and responsiveness to the intervention.

In terms of access, smartphones were the most commonly used learning device (58%), followed by laptops (35%). However, internet stability emerged as a concern, with more than half reporting only fair or poor connectivity. This finding highlights a practical limitation in implementing interactive learning tools, as access and connectivity can influence participation, engagement, and consistency of learning experiences. Studies in local settings also show that students often adapt to limited resources, reflecting both resilience and systemic constraints (Berdida, 2023).

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Level of Perceived Clinical Competence of Level 3 Nursing Students Prior to Exposure to Interactive Learning Tools

Figure 1: Pretest Level of Perceived Clinical Competence (PCCS) of Respondents (n = 100)

Domain	Mean	SD	Verbal Interpretation
Clinical Knowledge	3.34	0.52	Neutral
Psychomotor Skills	3.07	0.60	Neutral
Clinical Reasoning & Judgment	3.18	0.55	Neutral
Confidence / Self-efficacy	3.42	0.58	Agree
Overall PCCS (Average of domains)	**3.25**	**0.47**	**Neutral**

Before the intervention, the overall perceived clinical competence of students was Neutral (M = 3.25). This indicates that students saw themselves as moderately capable but not consistently confident across all domains. This baseline is expected, as Level 3 students are still transitioning from theoretical learning to more complex clinical practice. Competence at this stage is still developing and requires structured exposure and guided practice (Pan et al., 2025).

At the domain level, Clinical Knowledge, Psychomotor Skills, and Clinical Reasoning and Judgment were all rated Neutral, while Confidence/Self-efficacy was already at Agree. The relatively lower scores in knowledge, skills, and reasoning suggest that students were not yet fully confident in applying theory, performing procedures, or making clinical decisions. This reflects a common gap in nursing education—the difference between knowing and doing.

Psychomotor Skills had the lowest baseline score. This is significant because skill competence depends on repetition, feedback, and hands-on experience, which are often limited in traditional classroom settings. Recent studies confirm that interactive and simulation-based learning can improve practical skills through repeated and structured exposure (Liu et al., 2023; Medel et al., 2024).

Clinical Reasoning and Judgment were also at a moderate level, suggesting that students were still developing decision-making abilities. Virtual simulations and scenario-based learning are particularly useful in strengthening this domain, as they expose learners to realistic clinical situations requiring analysis and prioritization (Sim et al., 2022).

Confidence/Self-efficacy was the only domain rated Agree at baseline. This may indicate that students felt generally capable of engaging in clinical learning, even if they were not yet fully competent in technical and cognitive aspects. Confidence often develops earlier than actual competence, especially when students have prior exposure to guided learning environments (Pan et al., 2025).

Level of Perceived Clinical Competence of Level 3 Nursing Students After Exposure to Interactive Learning Tools

Table 2: Posttest Perceived Clinical Competence (PCCS) of Respondents (n = 100)

Domain	Mean	SD	Verbal Interpretation
Clinical Knowledge	3.78	0.48	Agree
Psychomotor Skills	3.62	0.55	Agree

Clinical Reasoning & Judgment	3.70	0.50	Agree
Confidence / Self-efficacy	4.05	0.52	Agree
Overall PCCS (Average of domains)	**3.79**	**0.41**	**Agree**

After exposure to interactive learning tools, the overall perceived clinical competence improved to Agree (M = 3.79). All four domains also reached Agree, indicating that students more consistently endorsed statements reflecting readiness and competence.

Clinical Knowledge improved to 3.78, suggesting that students felt more capable of understanding and applying nursing concepts. This aligns with recent findings that virtual and simulation-based learning enhances knowledge acquisition and application (Liu et al., 2023; Medel et al., 2024).

Psychomotor Skills increased to 3.62, reflecting improved confidence in performing clinical procedures. This supports evidence that interactive tools are effective in developing practical skills through repetition and feedback (Liu et al., 2023).

Clinical Reasoning and Judgment also improved (M = 3.70), indicating stronger confidence in decision-making. This is consistent with studies showing that virtual simulations enhance clinical reasoning by engaging learners in realistic and problem-based scenarios (Sim et al., 2022).

Confidence/Self-efficacy remained the highest domain (M = 4.05). This suggests that students felt more prepared and capable after the intervention. Confidence is often one of the most responsive outcomes in simulation-based learning because it is reinforced through safe practice and guided feedback (Pan et al., 2025).

Difference Between the Pretest and Posttest Perceived Clinical Competence Scores of The Experimental Group Exposed to Interactive Learning Tools

Table 3: Paired-Samples t-test: Pretest vs Posttest PCCS Scores (n = 100)

Domain	**Pretest Mean (SD)**	**VI**	**Posttest Mean (SD)**	**VI**	**Mean Diff (Post–Pre)**	**t**	**df**	**p**	**Cohen's d^z**
Clinical Knowledge	3.34 (0.52)	Neutral	3.78 (0.48)	Agree	0.44	9.30	99	< .001	0.93
Psychomotor Skills	3.07 (0.60)	Neutral	3.62 (0.55)	Agree	0.55	11.00	99	< .001	1.10
Clinical Reasoning & Judgment	3.18 (0.55)	Neutral	3.70 (0.50)	Agree	0.52	10.40	99	< .001	1.04
Confidence / Self-efficacy	3.42 (0.58)	Agree	4.05 (0.52)	Agree	0.63	12.20	99	< .001	1.22
Overall PCCS (Average of domains)	**3.25 (0.47)**	**Neutral**	**3.79 (0.41)**	**Agree**	**0.54**	**13.00**	**99**	**< .001**	**1.30**

The paired-samples t-test revealed a statistically significant improvement in overall perceived clinical competence, $t(99) = 13.00$, $p < .001$, with a large effect size. This indicates that the improvement was not due to chance and had meaningful educational impact.

All domains showed significant gains. Clinical Knowledge increased by 0.44, Psychomotor Skills by 0.55, Clinical Reasoning and Judgment by 0.52, and Confidence by 0.63. These results suggest that the intervention supported both cognitive and practical aspects of learning.

The improvement in Clinical Knowledge confirms that interactive learning enhances understanding and application of concepts, as supported by recent studies (Liu et al., 2023; Medel et al., 2024). The significant gain in Psychomotor Skills highlights the effectiveness of simulation in developing procedural competence. Clinical Reasoning improvements indicate better decision-making readiness, consistent with findings from virtual simulation research (Sim et al., 2022).

Confidence showed the greatest increase, reflecting the impact of a supportive and low-risk learning environment. Interactive tools allow students to practice without fear, receive feedback, and improve through repetition, which strengthens self-efficacy (Pan et al., 2025).

Greatest Improvement in Perceived Clinical Competence After Exposure to Interactive Learning Tools (Knowledge, Psychomotor Skills, Clinical Reasoning and Judgment, and Confidence)

Table 4: Domain Improvement in Perceived Clinical Competence (Posttest − Pretest), Experimental Group (n = 100)

Domain	Pretest Mean (VI)	Posttest Mean (VI)	Mean Gain	Rank
Clinical Knowledge	3.34 (Neutral)	3.78 (Agree)	0.44	4
Psychomotor Skills	3.07 (Neutral)	3.62 (Agree)	0.55	2
Clinical Reasoning & Judgment	3.18 (Neutral)	3.70 (Agree)	0.52	3
Confidence / Self-efficacy	3.42 (Agree)	4.05 (Agree)	0.63	1

Among the domains, Confidence/Self-efficacy showed the highest gain, followed by Psychomotor Skills, Clinical Reasoning and Judgment, and Clinical Knowledge. This ranking suggests that the intervention had the strongest impact on students' belief in their ability to perform clinical tasks.

Confidence gains are commonly reported in simulation-based education because students benefit from repeated exposure and guided learning experiences (Pan et al., 2025). The strong improvement in Psychomotor Skills indicates that interactive tools effectively address gaps in hands-on performance. Similarly, gains in Clinical Reasoning suggest improved ability to analyze and respond to patient situations (Sim et al., 2022).

Although Clinical Knowledge showed the smallest increase, the improvement remains meaningful. It indicates that interactive learning supports both understanding and application of concepts, not just skills and confidence (Medel et al., 2024).

DISCUSSION

The proposed Interactive Learning Tools Implementation Program (ILTIP–PCCS) reflects a practical and evidence-informed way of translating the study's findings into actual teaching practice. More than simply presenting statistical improvements, the program demonstrates how interactive learning tools can be systematically used to support the development of clinical competence among Level 3 nursing students. Anchored on Benner's Novice to Expert Model, the program views competence not as an immediate outcome but as a gradual developmental process shaped by experience, exposure, and reflection. The improvements observed across all domains of perceived clinical competence suggest that the intervention helped students move forward along this continuum, particularly from the advanced beginner stage toward a more competent level of practice (Benner, 1984).

At the Level 3 stage, nursing students are typically categorized as advanced beginners. At this level, learners already have some exposure to clinical settings, but their actions are still guided largely by rules and instructor direction. The pretest findings of this study, where most domains were interpreted as Neutral, reflect this stage well. Students had some level of understanding but were not yet fully confident in applying knowledge, performing procedures, or making clinical decisions independently. According to Benner (1984), advanced beginners can recognize recurring clinical situations, but they often struggle with prioritization and holistic understanding. This explains why psychomotor skills and clinical reasoning were among the weaker areas at baseline.

The structure of the ILTIP–PCCS program directly responds to these developmental needs. Week 1, which focuses on orientation and baseline assessment, sets the foundation for learning. While this phase may appear simple, it plays an important role in helping students understand expectations, become familiar with the tools, and reduce uncertainty. Preparation is essential because students who feel oriented and supported are more likely to engage actively in learning activities.

Weeks 2 to 5 represent the core of the program and are designed to provide progressive and scaffolded learning experiences. In Week 2, the use of virtual case modules allows students to engage with realistic clinical scenarios that require assessment and prioritization. This type of activity supports the development of clinical reasoning by helping learners connect theoretical knowledge with actual patient situations. Within Benner's framework, this helps students move beyond simply following rules toward recognizing patterns and understanding the significance of clinical cues.

Week 3 focuses on psychomotor skills through simulation or skills laboratory practice. This is particularly important because psychomotor competence requires repetition, guided practice, and feedback. The low baseline score in this domain suggests that students initially lacked confidence in performing procedures. Through simulation, students are given opportunities to practice in a safe environment where mistakes can be corrected without risk to patients. This repeated exposure helps learners refine their actions and develop greater control and coordination. Benner (1984) emphasizes that skill acquisition is closely tied to experience, and this phase of the program provides the necessary conditions for that experience to occur.

Week 4 introduces more complex scenarios that challenge students' clinical reasoning and judgment. At this point, learners are expected to begin organizing their actions based on patient needs rather than simply following instructions. This aligns with the transition toward the competent stage, where individuals start to think more deliberately and plan their actions with outcomes in mind. Scenario-based simulation supports this development by requiring students to interpret changing conditions, make decisions, and justify their actions. This kind of learning experience encourages deeper understanding and strengthens clinical judgment.

Week 5 integrates all domains through mixed learning tools and repeat practice. This phase highlights the idea that competence is multidimensional and requires the integration of knowledge, skills, reasoning, and confidence. By allowing students to revisit scenarios and refine their performance, the program supports consolidation of learning. Repetition is important because competence develops over time, not through single exposures. This iterative process helps learners move toward more consistent and confident performance.

The results of the study support the effectiveness of this structured approach. The shift from a Neutral to an Agree level in overall perceived clinical competence indicates that students developed a more positive and confident perception of their abilities after the intervention. Improvements in psychomotor skills and clinical reasoning are particularly significant because these domains are closely related to safe and effective clinical practice. These findings suggest that the program successfully addressed key gaps in student readiness.

Confidence or self-efficacy showed the greatest improvement among the domains. Within Benner's model, this can be understood as a natural outcome of increased experience and familiarity with clinical situations. As students gain exposure and begin to recognize patterns, they become more confident in their ability to act. The program's emphasis on safe practice environments, guided feedback, and repeated exposure creates the conditions necessary for this confidence to develop. However, it is important to note that confidence in this context is supported by actual improvements in knowledge and skills, rather than existing independently.

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Another important feature of the program is its attention to contextual factors such as device access and internet stability. These factors can influence how effectively students engage with interactive learning tools. In this study, many students relied on smartphones and reported varying levels of internet connectivity. These realities highlight the need for flexible and accessible learning strategies. By including usability and barrier monitoring, the program ensures that implementation challenges are identified and addressed. Local studies have also emphasized the importance of considering resource limitations in nursing education settings (Constantino et al., 2025; Berdida, 2023).

The inclusion of structured debriefing is another strength of the program. Reflection is a key component of learning, especially in clinical education. Through debriefing, students are able to review their actions, understand their mistakes, and identify areas for improvement. This reflective process supports the transition from rule-based thinking to more intuitive and context-based decision-making. In Benner’s framework, this is essential for progressing toward higher levels of competence.

The final phase of the program focuses on evaluation and continuous improvement. By using the same tools to measure competence, usability, and barriers, educators can monitor progress and make informed adjustments. This approach recognizes that learning is an ongoing process and that teaching strategies must be adaptable to meet student needs.

Overall, the ILTIP–PCCS program addresses a key challenge in nursing education, which is the gap between theory and practice. Traditional teaching methods often emphasize knowledge but provide limited opportunities for application. Interactive learning tools, when used systematically, offer a way to bridge this gap by creating realistic and engaging learning experiences. The significant improvements observed in this study suggest that such tools can enhance students’ readiness for clinical practice.

However, successful implementation requires support at multiple levels. Faculty members need training to effectively facilitate simulation and provide meaningful feedback. Institutions must ensure that resources and infrastructure are available to support interactive learning. Without these supports, the potential benefits of the program may not be fully realized.

In conclusion, the proposed program demonstrates how interactive learning tools can be used to support the developmental progression of nursing students within Benner’s Novice to Expert framework. By combining structured activities, guided reflection, and continuous evaluation, the program creates a learning environment that promotes competence development. The findings of the study provide strong support for integrating such approaches into nursing education, particularly for students who are transitioning toward more advanced levels of clinical practice.

Table 5: Program Implementation Plan

Week/Phase	Key Activities	Target Domain Focus	Persons Responsible	Resources Needed	Outputs Documentation	Monitoring Indicators
Week 1 (Orientation & Baseline)	Orientation on program flow; tool onboarding; expectations; pre-briefing orientation; administer **PCCS pretest**	Establish baseline for Knowledge, Skills, Reasoning/Judgment, Confidence	Course Instructor, Simulation/IT Support	Orientation slides; tool access links; pretest forms	Attendance; orientation checklist; pretest dataset	Pretest completion rate; baseline domain means

Week 2 (Session 1: Knowledge + Reasoning)	Virtual case module (assessment + prioritization); guided prompts; structured debrief	Knowledge + Clinical reasoning/judgment	Instructor Facilitator	Virtual module; debrief guide	Case completion log; debrief notes	Usability ratings (Section D)
Week 3 (Session 2: Psychomotor Skills)	Simulation/skills lab practice (core procedures); performance steps; feedback	Psychomotor skills	Instructor + Skills Lab/Simulation Facilitator	Skills lab/simulation setup; practice checklist	Practice logs; facilitator feedback notes	Perceived usability + barriers check (Section D/E)
Week 4 (Session 3: Reasoning/ Judgment Under Complexity)	Scenario-based simulation (changes in condition); decision-making; debrief using guided reflection questions	Clinical reasoning/judgment + Confidence	Instructor Simulation Facilitator	Scenario guide; debrief script	Scenario completion + debrief notes	Domain mini-check (short PCCS subset optional)
Week 5 (Session 4: Integration + Repeat Practice)	Mixed-tool integration (virtual + simulation + mobile review); repeat practice and refinement; targeted coaching	All PCCS domains + repeat practice	Instructor + Facilitator	Mixed tools; remediation guide	Session summary report	Section D/E summaries; identify top barriers
Week 6 (Posttest & Evaluation)	Administer **PCCS posttest**; compile Section D/E ratings; summarize outcomes; revise implementation guide	Outcome evaluation + feasibility review	Instructor + Program Coordinator	Posttest forms; summary templates	Posttest dataset; evaluation summary; revised guide	Pre–post domain changes; usability mean; barrier mean

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