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Simulation-Based Learning Engagement and Perceived Clinical Competency among Fourth-Year Nursing Students: A Correlational Study

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Abstract

Simulation-based learning provides nursing students with structured opportunities to apply theoretical knowledge, practise clinical procedures, and develop professional attitudes in a controlled environment. This study examined fourth-year nursing students' engagement in four simulation-based learning strategies and the perceived contribution of these strategies to clinical competency in knowledge, skills, and attitude. A quantitative descriptive-correlational design was employed among 203 fourth-year nursing students selected through proportionate stratified random sampling from a private university in Manila, Philippines. Data were collected using a researcher-developed questionnaire guided by the 2012 National Nursing Core Competency Standards. The instrument demonstrated good to excellent internal consistency, with Cronbach's alpha coefficients ranging from .859 to .973. Frequencies, percentages, means, rankings, and Kendall's tau were used for analysis. Case scenarios were the most frequently used strategy, followed by low-fidelity mannequins, partial-task simulators, and role-playing. All four strategies received favorable ratings for their perceived contribution to knowledge, skills, and attitude. Significant positive associations were found between engagement frequency and perceived competency; however, the coefficients were only very weak to weak. Satisfaction with implementation was generally favorable, although 35.96% rated it only satisfactory. Clinical instructor effectiveness was the most frequently identified contributing factor at 81%. The findings support continued use of simulation-based learning while emphasizing instructional quality, feedback, reflection, and appropriate resource utilization rather than exposure frequency alone.

Keywords: *clinical competency; clinical instruction; experiential learning; nursing education; simulation-based learning; student engagement*

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1. Introduction

Simulation-based learning has become an important instructional approach in nursing education because it allows students to apply theoretical concepts, practise clinical procedures, and respond to realistic patient-care situations in a controlled environment. Unlike conventional instruction that relies primarily on lectures and demonstrations, simulation requires learners to participate actively in clinical scenarios, make decisions, perform procedures, communicate with others, and evaluate the consequences of their actions. It therefore provides an experiential bridge between classroom learning and actual clinical practice, where errors may directly affect patient safety.

The increasing complexity of healthcare has strengthened the need for instructional strategies that prepare nursing students for clinical decision-making, technical performance, communication, teamwork, and professional accountability. Simulation is particularly relevant because students may encounter limited opportunities to practise certain procedures or manage high-risk conditions during clinical placement. Through simulation, learners can repeatedly perform clinical tasks, receive feedback, and correct errors without exposing actual patients to unnecessary risk. Meta-analytic evidence indicates that simulation-based learning can support complex skill development when activities are aligned with clear objectives and appropriate instructional support (Chernikova et al., 2020). In nursing education, simulation technology has likewise been associated with favorable learning outcomes and improved integration of theory and clinical practice (Mulyadi et al., 2021).

Simulation may take several forms, ranging from written or unfolding case scenarios to mannequins, task trainers, standardized patients, role-playing, and virtual environments. The educational value of each modality depends on its purpose, design, degree of realism, facilitation, and alignment with intended outcomes. Case scenarios are commonly used to strengthen clinical reasoning, prioritization, and decision-making. Low-fidelity mannequins allow students to practise fundamental procedures and develop psychomotor confidence. Partial-task simulators facilitate focused repetition of specific procedures, while role-playing supports communication, empathy, teamwork, and interpersonal competence.

The integration of simulation into nursing curricula is consistent with competency-based education. In the Philippines, the Bachelor of Science in Nursing curriculum emphasizes scientific knowledge, clinical skills, communication, ethical practice, and professional attitudes required for safe and effective nursing care. The Commission on Higher Education (2017) recognizes simulation and related learning experiences as part of nursing preparation. At the global level, simulation is also promoted as a means of strengthening healthcare education, team performance, patient safety, and equitable access to learning opportunities (Diaz-Navarro et al., 2024).

However, the presence of simulation activities in a curriculum does not guarantee comparable learning across students or modalities. The value of simulation may depend on scenario design, equipment and learning spaces, instructor competence, feedback, debriefing, and student engagement. Frequent but poorly facilitated exposure may be less educationally useful than carefully designed activities that include active participation and structured reflection. Consequently, both frequency of participation and perceived quality of implementation should be considered when evaluating simulation-based instruction.

Another issue concerns the distinction between actual competency and perceived competency. Students' perceptions do not constitute direct measures of clinical performance, but they remain educationally relevant because perceived preparedness, confidence, and usefulness can influence participation and acceptance of instructional strategies. Evaluating perceptions can help institutions identify which modalities are regarded as most useful, which competency domains are perceived to benefit, and which implementation conditions require improvement.

At Centro Escolar University-Manila, simulation-based learning is implemented through case scenarios, low-fidelity mannequins, role-playing, and partial-task simulators. Despite their regular integration into instruction, limited institutional evidence was available regarding the extent of students' engagement in each approach, their perceived contribution to knowledge, skills, and attitude, and the relationship between exposure frequency and perceived clinical competency. There was also a need to determine students' satisfaction and the implementation factors they considered most important.

Objectives of the Study

This study aimed to examine simulation-based learning engagement and perceived clinical competency among fourth-year nursing students at Centro Escolar University-Manila. Specifically, it sought to:

1. determine the frequency of students' engagement in case scenarios, low-fidelity mannequins, role-playing, and partial-task simulators;
2. assess the perceived contribution of these simulation-based learning strategies to clinical competency in terms of knowledge, skills, and attitude;
3. determine the relationship between the frequency of engagement in each simulation strategy and students' perceived clinical competency;
4. evaluate students' level of satisfaction with the implementation of simulation-based learning; and
5. identify the factors perceived by students to contribute to the development of clinical competency during simulation-based learning.

2. Review of Related Literature

2.1 Simulation-Based Learning as Experiential and Competency-Based Pedagogy

Simulation-based learning is grounded in experiential education, through which learners construct understanding by participating in realistic activities, applying prior knowledge, receiving feedback, and reflecting on their decisions. In nursing education, this approach allows students to interpret patient information, select interventions, perform procedures, communicate with others, and evaluate outcomes before assuming comparable responsibilities in actual clinical settings. Simulation therefore functions as a structured bridge between classroom instruction and clinical practice rather than as a substitute for either.

Evidence supports simulation as a pedagogy for complex and integrated learning. Chernikova et al. (2020) found that simulation-based learning can strengthen complex skills when activities are organized around explicit objectives and appropriate instructional scaffolding. In nursing education, Mulyadi et al. (2021) likewise reported favorable effects of simulation technology-based learning across experimental studies. These findings indicate that simulation is most educationally valuable when it is intentionally designed to connect conceptual knowledge, procedural performance, communication, and professional judgment.

Simulation also aligns with competency-based and outcomes-based education because it makes intended abilities visible through performance, feedback, and reflection. Diaz-Navarro et al. (2024) emphasized faculty preparation, quality assurance, contextual relevance, and equitable access as conditions for responsible simulation practice, while the Commission on Higher Education (2017) recognizes simulation and related learning experiences within Philippine nursing preparation. In an adjacent Philippine allied-medicine context, Quinto (2020) found that faculty perceived outcomes-based education as fully implemented whereas students viewed it as only partially implemented, illustrating that formal curricular adoption and students' experienced implementation may diverge.

2.2 Simulation Modalities in Nursing Education

Simulation modalities differ in realism, cost, instructional purpose, and the type of competency they are designed to develop. The present study examines case scenarios, low-fidelity mannequins, role-playing, and partial-task simulators because these approaches are used in the institution under investigation. No single modality is universally superior; its usefulness depends on the intended learning outcome, the degree of learner participation, and the quality of facilitation (Cant & Cooper, 2017).

Case scenarios present structured or unfolding clinical situations that require learners to interpret data, identify problems, prioritize care, and justify interventions. Their principal advantage is the integration of theoretical knowledge with clinical reasoning and decision-making. Because cases can be implemented in classrooms, laboratories, conferences, and online environments, they are comparatively accessible and can be progressively adapted to greater complexity.

Low-fidelity mannequins and partial-task simulators are primarily suited to repetitive psychomotor practice. Low-fidelity mannequins provide simplified patient representations for foundational procedures, whereas partial-task simulators isolate a specific anatomical area or technical task. Findik et al. (2019) found that student nurses viewed low-fidelity simulation favorably, and Handeland et al. (2021) concluded that mannequins can elicit realistic professional behavior when learners are able to treat them as patients. Their limitations include restricted realism and a reduced capacity to reproduce complex communication, uncertainty, and whole-patient care.

Role-playing addresses interpersonal and attitudinal dimensions that equipment-based activities may not adequately reproduce. Dorri et al. (2019) reported improved learning outcomes from role-playing in nursing education, while Røssland et al. (2022) found that assuming the patient role can deepen appreciation of the patient perspective. Nevertheless, peer role-playing may be influenced by participant confidence and acting ability; Gorski et al. (2022) found simulated patients more effective than student role-playing for fostering patient-centred attitudes during communication training. Repetition must also remain purposeful, because perceived competence, self-efficacy, and satisfaction do not necessarily increase indefinitely with additional exposure (Hung et al., 2021).

2.3 Clinical Competency in Knowledge, Skills, and Attitude

Clinical competency is multidimensional and cannot be reduced to the completion of isolated procedures. It requires the coordinated use of theoretical understanding, technical proficiency, clinical reasoning, communication, ethical judgment, and professional behavior. Hui et al. (2023) described clinical competency as the integration of knowledge, skills, attitudes, and values within clinical situations, underscoring that these domains are analytically distinguishable but functionally interdependent.

Knowledge provides the conceptual basis for assessment, diagnosis, planning, intervention, and evaluation, while skills include psychomotor performance, documentation, communication, decision-making, and the safe execution of care. Simulation can strengthen the application of knowledge by placing concepts within realistic clinical contexts. Mulyadi et al. (2021) reported improved learning outcomes from simulation-based approaches, and Hung et al. (2021) linked simulation experiences with perceived competence and self-efficacy.

Attitude encompasses empathy, accountability, cultural sensitivity, patient advocacy, ethical conduct, teamwork, and willingness to provide compassionate care. Role-playing, collaborative scenarios, feedback, and reflection are particularly relevant because they expose learners to interpersonal and ethical dimensions of practice (Dorri et al., 2019; Røssland et al., 2022). Related patient-centered scholarship similarly treats empathy, communication quality, and ethical-cultural interpretation as dimensions that should complement technical indicators rather than be reduced to them (Atento, Quinto, Espelita, & San Juan, 2025). In an adjacent Philippine student context, prosocial behavior, self-regulation, responsibility, and social awareness were likewise treated as related personal-social competencies, supporting a multidimensional conception of attitudinal development (Balut et al., 2026).

2.4 Conditions Supporting Effective Simulation

The availability of simulation activities does not by itself ensure meaningful learning. Effective implementation requires appropriate facilities, functional equipment, adequate opportunities for active participation, prepared faculty, and alignment between scenarios and intended outcomes. Diaz-Navarro et al. (2024) emphasized that simulation should be supported by faculty development, evaluation, quality assurance, and contextually appropriate design.

Clinical instructors convert simulation activities into structured learning experiences by clarifying expectations, observing performance, guiding discussion, and connecting simulated events with professional standards. Feedback and debriefing allow students to identify errors, explain their reasoning, and evaluate alternative actions. Chernikova et al. (2020) showed that instructional scaffolding influences simulation outcomes, while Hung et al. (2021) demonstrated that learner perceptions depend on how experiences are structured and repeated. A parallel pattern in AI-supported education shows that users may rate engagement, relevance, and feedback positively while judging direct performance gains more moderately, reinforcing the need to separate perceived usefulness from demonstrated outcomes (Rao et al., 2025).

Teamwork, motivation, psychological safety, and resource adequacy further shape the quality of participation. Collaborative simulation exposes students to communication, delegation, coordination, and shared decision-making, while psychological safety enables them to examine mistakes without humiliation. In an adjacent Philippine healthcare implementation context, favorable engagement coexisted with staffing, budget, and equipment constraints, indicating that acceptance of an initiative does not eliminate operational barriers (Garcia & Atento, 2026). Simulation should therefore be understood as an instructional system in which equipment, faculty capability, feedback, participation, and institutional support operate together.

2.5 Synthesis and Research Gap

The literature indicates that simulation-based learning can provide controlled opportunities to apply knowledge, practise procedures, develop clinical reasoning, and strengthen professional behavior (Chernikova et al., 2020; Mulyadi et al., 2021). Case scenarios, mannequins, role-playing, and partial-task trainers serve complementary functions, and no modality is uniformly superior across all competency domains (Cant & Cooper, 2017). Philippine health-professions scholarship similarly identifies clinical-placement scarcity, faculty capacity, and curriculum-practice misalignment as interconnected constraints, supporting simulation as part of a systems-level educational response rather than an isolated laboratory intervention (Bermido et al., 2025).

Instructional quality, faculty facilitation, feedback, repetition, contextual relevance, and access to resources influence whether simulation exposure becomes meaningful learning (Diaz-Navarro et al., 2024; Hung et al., 2021). At a broader workforce level, Philippine competency alignment has also been linked to applied clinical preparation, long-term-care readiness, digital documentation, and regulatory expectations, demonstrating that educational design must remain connected to evolving professional requirements (Atento, Quinto, & Espelita, 2025). However, fewer studies compare engagement in several commonly available simulation modalities within one nursing program while examining perceived knowledge, skills, attitude, satisfaction, and implementation factors together. The present study addresses this institutional gap by comparing four modalities and determining whether engagement frequency is associated with perceived clinical competency.

3. Methodology

3.1 Research Design

The study employed a quantitative, cross-sectional, descriptive-correlational design. The descriptive component examined students' frequency of engagement in simulation-based learning strategies, perceived clinical competency, satisfaction with implementation, and perceived contributing factors. The correlational component determined whether engagement frequency was associated with perceived competency in knowledge, skills, and attitude. No intervention or experimental manipulation was undertaken; therefore, the design supports identification of associations but not causal conclusions.

3.2 Study Setting and Respondents

The study was conducted at the School of Nursing of Centro Escolar University-Manila during the first semester of academic year 2024-2025. The sampling frame consisted of 411 fourth-year nursing students distributed across eight class sections. Eligible respondents were regular fourth-year students who had experienced the four simulation modalities examined and voluntarily agreed to participate. Students from the first to third year levels were excluded because they had not necessarily experienced all included modalities. The final sample comprised 203 respondents.

3.3 Sample Size and Sampling Procedure

The sample size was calculated from the population of 411 students using Slovin's formula. Proportionate stratified random sampling ensured representation of all eight class sections. The allocated samples were 24 students from Section A, 26 from Section B, 27 from Section C, 26 from Section D, 25 from Section E, 23 from Section F, 25 from Section G, and 27 from Section H. Within each section, participants were selected through a fishbowl procedure until the required allocation was reached.

3.4 Research Instrument

Data were collected using a researcher-developed questionnaire guided by the 2012 National Nursing Core Competency Standards. The instrument measured engagement in case scenarios, low-fidelity mannequins, role-playing, and partial-task simulators using four ordered response categories: always, often, rarely, and never. For analysis, these categories were treated as ordinal self-classifications rather than exact exposure counts.

The instrument also measured the perceived contribution of each modality to knowledge, skills, and attitude using a four-point response scale from no impact to high impact. In this article, these scores are interpreted as perceived contribution rather than objective evidence of impact. Satisfaction was measured through six ordered categories, from lowest to highest: poor, fair, satisfactory, very satisfactory, superior, and excellent. A multiple-response checklist identified perceived contributing factors: facilities, clinical instructor effectiveness, immediate feedback, learning reflection, resource utilization, teamwork and collaboration, adaptability and flexibility, and engagement and motivation.

3.5 Instrument Review and Reliability

The questionnaire was reviewed by three nursing clinical instructors with experience in nursing education, clinical practice, and research instrumentation. Pilot testing was conducted among 30 fourth-year nursing students, with 15 completing printed forms and 15 answering online. Because the questionnaire underwent no substantive modification

after pilot testing, these 30 students and their responses were included once in the final analytic sample of 203. The online format was used for the remaining administration because it was considered more feasible.

Internal consistency was examined separately for the knowledge, skills, and attitude subscales under each simulation modality. Cronbach's alpha coefficients ranged from .859 to .973: case scenarios, .859-.912; low-fidelity mannequins, .884-.932; role-playing, .915-.950; and partial-task simulators, .953-.973. These coefficients indicate good to excellent internal consistency but do not independently establish construct validity.

3.6 Data-Gathering Procedure

Data collection commenced after approval from the university's Institutional Ethics Review Board and permission from the Dean of the School of Nursing. Selected students received information about the study's purpose, procedures, voluntary nature, confidentiality safeguards, and right to withdraw before providing informed consent. Respondents then completed the questionnaire, after which responses were organized, coded, and prepared for statistical analysis.

3.7 Data Analysis

Frequencies and percentages summarized engagement categories, satisfaction levels, and selected implementation factors. Rankings compared the relative frequency of engagement and the prevalence of perceived contributing factors. Means summarized perceived-competency ratings. Kendall's tau examined the association between ordinal engagement frequency and corresponding perceived knowledge, skills, and attitude scores. Statistical significance was evaluated at the .05 level, with interpretation focused on both significance and coefficient magnitude.

3.8 Ethical Considerations

The study received approval from the Centro Escolar University Institutional Ethics Review Board before data collection. Participants provided informed consent and were informed of their right to decline or withdraw. No names or directly identifying information were used in reporting, and access to the collected data was restricted to the research team. The researchers declared no financial, proprietary, institutional, or personal conflicts of interest that could compromise the conduct or reporting of the study.

4. Results and Discussion

4.1 Engagement in Simulation-Based Learning Strategies

Table 1 presents the percentage distribution of reported engagement in the four simulation-based learning strategies. Case scenarios were the most frequently experienced modality, followed by low-fidelity mannequins, partial-task simulators, and role-playing.

Table 1. *Reported Engagement in Simulation-Based Learning Strategies*

Simulation strategy	Always (%)	Often (%)	Rarely (%)	Never (%)	Rank
Case scenarios	67.00	30.00	3.00	0.00	1
Low-fidelity mannequins	46.79	45.32	7.39	0.50	2
Partial-task simulators	35.00	39.00	24.00	2.00	3
Role-playing	30.00	47.00	22.00	1.00	4

Note. Rank was based on the ordered engagement distribution, with always = 4, often = 3, rarely = 2, and never = 1; higher weighted scores received higher ranks.

Case scenarios were reported as always used by 67% of respondents and often used by another 30%. More than nine in ten respondents likewise reported using low-fidelity mannequins always or often. Partial-task simulators and role-playing were comparatively less frequent, although most respondents still reported engaging in them always or often. The prominence of case scenarios is consistent with their flexibility across classroom, laboratory, conference, and online settings.

4.2 Perceived Contribution to Clinical Competency

The detailed competency results were consolidated into Table 2, which presents the overall mean for each simulation modality and competency domain. All means were above 3.35 on the four-point scale, indicating generally favorable perceived contributions.

Table 2. *Perceived Contribution of Simulation Strategies to Clinical Competency*

Simulation strategy	Knowledge, M	Skills, M	Attitude, M
Case scenarios	3.72	3.68	3.71
Role-playing	3.58	3.61	3.63
Low-fidelity mannequins	3.40	3.51	3.46
Partial-task simulators	3.45	3.35	3.38

Note. Scores were based on a four-point perceived-contribution scale. M = mean.

Case scenarios obtained the highest means for knowledge, skills, and attitude. Respondents particularly associated them with application of the nursing process, data gathering, medication safety, interdisciplinary care, documentation, advocacy, and clinical decision-making. Their broad coverage suggests that students viewed case scenarios as the most comprehensive strategy for integrating theoretical and professional competencies.

Role-playing obtained the second-highest means in all three domains and was rated most strongly for attitude. This pattern is consistent with its direct emphasis on interaction, communication, collaboration, and enactment of professional responsibilities. Low-fidelity mannequins received favorable but lower ratings, reflecting their primary value in procedural practice and confidence building. Partial-task simulators received the lowest skills and attitude means, but their narrower purpose should be considered: they are designed for focused procedural rehearsal rather than comprehensive patient encounters.

Across modalities, pathophysiology was repeatedly among the lower-rated knowledge indicators. Simulation appears to have been perceived as more effective for applying knowledge than for initially acquiring complex biomedical content, which may require continued support through lectures, readings, and guided conceptual discussion.

4.3 Association Between Engagement and Perceived Clinical Competency

Kendall's tau was used to determine whether frequency of engagement was associated with perceived competency. Table 3 shows that all 12 associations were statistically significant, but the coefficients were only very weak to weak.

Table 3. *Associations Between Simulation Engagement and Perceived Clinical Competency*

Simulation strategy	Domain	Kendall's τ	p	Interpretation
Case scenarios	Knowledge	.3241	< .001	Weak positive
	Skills	.3116	< .001	Weak positive
	Attitude	.2030	< .001	Weak positive
Low-fidelity mannequins	Knowledge	.1517	.0108	Very weak positive
	Skills	.1607	.0066	Very weak positive
	Attitude	.1326	.0281	Very weak positive
Role-playing	Knowledge	.2935	< .001	Weak positive
	Skills	.2583	< .001	Weak positive
	Attitude	.1933	< .001	Very weak positive
Partial-task simulators	Knowledge	.2085	< .001	Weak positive
	Skills	.1442	.0122	Very weak positive
	Attitude	.1935	.0010	Very weak positive

The null hypothesis of no association was rejected for all modality-domain combinations. However, coefficients ranged from .1326 to .3241. Statistical significance should therefore not be interpreted as evidence that frequency was a major determinant of perceived competency.

Case scenarios produced the strongest coefficients, particularly for knowledge and skills. Role-playing showed a similar pattern but with smaller coefficients. Low-fidelity mannequins produced the weakest associations. This may indicate that the educational value of equipment-based practice depends less on the number of exposures than on the procedure practised, degree of active participation, quality of supervision, and feedback received.

Associations for attitude were consistently among the lowest. Professional attitudes are likely influenced by a broader set of experiences, including clinical placement, faculty modelling, ethical reflection, institutional culture, and direct encounters with patients and families.

4.4 Satisfaction and Factors Supporting Simulation-Based Learning

Table 4 summarizes satisfaction with the implementation of simulation-based learning. The distribution indicates a generally favorable evaluation, although the largest single category was satisfactory.

Table 4. *Level of Satisfaction with Simulation-Based Learning Implementation*

Satisfaction category	Frequency	Percentage
Excellent	34	16.75
Superior	47	23.15
Very satisfactory	43	21.18
Satisfactory	73	35.96
Fair	6	2.96
Poor	0	0.00
Total	**203**	**100.00**

A total of 124 respondents (61.08%) rated implementation as very satisfactory, superior, or excellent. Another 35.96% selected satisfactory, while 2.96% selected fair and none selected poor. The results indicate positive acceptance but also a substantial group that perceived noticeable room for improvement.

Respondents also selected the factors they believed contributed to competency development. Because this was a multiple-response item, percentages do not sum to 100%.

Table 5. *Factors Perceived to Support Clinical Competency Development*

Implementation factor	Percentage selecting factor
Clinical instructor effectiveness	81
Teamwork and collaboration during simulation	65
Immediate feedback from clinical instructors	63
Availability of facilities	63
Engagement and motivation	61
Adaptability and flexibility	60
Learning reflection	60
Resource utilization	60

Clinical instructor effectiveness was the most frequently identified factor, selected by 81% of respondents. Teamwork and collaboration ranked second at 65%, followed by immediate feedback and facility availability at 63%. The remaining factors were each identified by at least 60%. Students therefore viewed simulation as an instructional system rather than merely as access to equipment.

4.5 Discussion

The findings demonstrate a distinction between high perceived usefulness and weak statistical association with frequency. Students evaluated all four modalities favorably, particularly case scenarios and role-playing, yet more frequent exposure was only weakly related to higher perceived competency. This indicates that the quality and structure of simulation may be more educationally consequential than the number of encounters alone.

Case scenarios obtained the highest engagement and perceived-contribution ratings. Their flexibility allows them to incorporate assessment, pathophysiology, medication administration, prioritization, ethical issues, and interdisciplinary decision-making in a single activity. This supports the view of simulation as an integrated pedagogical process rather than a technology-dependent exercise. Chernikova et al. (2020) similarly found that simulation outcomes depend on learning objectives and instructional scaffolding.

The strong evaluation of role-playing, particularly for attitude and skills, suggests that interpersonal simulation occupies a distinct educational role. Equipment-based activities provide technical repetition, whereas role-playing requires communication, empathy, collaboration, and professional behavior. Evidence that patient-role exchange can deepen appreciation of the patient perspective supports this interpretation (Røssland et al., 2022). At the same time, the

very weak association between role-playing frequency and attitude indicates that merely increasing the number of enactments may be insufficient. Scenario authenticity, role preparation, psychological safety, feedback, and reflection are likely necessary.

The findings for low-fidelity mannequins and partial-task simulators emphasize the importance of matching modality to competency. These methods are suitable for focused procedural rehearsal and foundational psychomotor development. Their lower ratings on broad competency measures should not be interpreted as failure; rather, they reflect a narrower instructional purpose. Findik et al. (2019) and Handeland et al. (2021) likewise documented the educational value of low-fidelity and mannequin-based practice.

The weak correlations reinforce the argument that exposure frequency is only one element of simulation effectiveness. Clinical instructor effectiveness, feedback, teamwork, facilities, engagement, flexibility, reflection, and resources were all identified by substantial proportions of respondents. This aligns with the global consensus that high-quality simulation requires faculty development, quality assurance, contextually relevant design, and institutional support (Diaz-Navarro et al., 2024).

Clinical instructor effectiveness emerged as the most important implementation factor. Investment in equipment without corresponding faculty preparation may produce limited educational returns. Instructors require competence in scenario design, facilitation, observation, formative feedback, and debriefing. The satisfaction findings further suggest that the program was positively received but not uniformly optimized: the 73 students who rated implementation only satisfactory represent a substantial group whose experiences may have been affected by uneven access, limited time, insufficient hands-on participation, or variable facilitation.

The study measured self-reported perceptions rather than objectively demonstrated knowledge, skills, or clinical behavior. Its cross-sectional correlational design cannot establish causality, and the single-institution setting limits generalization. The original engagement item did not define a separate numerical category for four to six exposures; engagement findings were therefore analyzed and reported through respondents' ordinal self-classifications rather than reconstructed exposure counts. In addition, role-playing engagement was reported as percentages because the corresponding working frequencies were internally inconsistent. These limitations should be considered when interpreting the findings.

5. Conclusions, Recommendations, and Implications

5.1 Conclusions

Simulation-based learning was a regularly experienced and positively evaluated component of fourth-year nursing education in the institution. Case scenarios were the most frequently encountered modality, followed by low-fidelity mannequins, partial-task simulators, and role-playing.

All four modalities received favorable ratings for their perceived contribution to knowledge, skills, and attitude. Case scenarios obtained the highest means across the three domains, suggesting that students regarded them as the most comprehensive strategy for integrating theoretical knowledge, clinical reasoning, procedural judgment, communication, and professional decision-making. Role-playing ranked second and was particularly relevant to interpersonal and attitudinal learning. Low-fidelity mannequins and partial-task simulators were valued primarily for focused procedural and psychomotor practice.

Engagement frequency was significantly associated with perceived competency for every modality and domain; however, the Kendall's tau coefficients were only very weak to weak. Frequency alone was therefore not strongly associated with perceived competency, and simply increasing the number of simulation activities cannot be expected to produce proportionately greater benefits.

Satisfaction was generally favorable, but more than one-third of respondents rated implementation only satisfactory. Clinical instructor effectiveness was the most frequently identified supporting factor, followed by teamwork, immediate feedback, facilities, engagement, adaptability, reflection, and resource utilization. Effective simulation thus depends on instructional quality and an integrated support system rather than on equipment or exposure frequency alone.

5.2 Recommendations

- The School of Nursing should retain simulation-based learning as an integrated component of the curriculum while mapping each modality to specific course outcomes and nursing competencies.
- Case scenarios should continue to be used extensively and may be strengthened through progressively complex and unfolding situations that require assessment, prioritization, medication safety, interdisciplinary coordination, and evaluation of outcomes.
- Role-playing should be systematically used for communication, empathy, patient advocacy, ethical judgment, teamwork, and therapeutic relationships, with clear role preparation, psychological safety, and guided debriefing.
- Low-fidelity mannequins and partial-task simulators should be used for repetitive procedural practice and linked with case analysis, communication exercises, and post-simulation reflection so that students understand how, when, and why procedures are performed.
- Faculty development should prioritize simulation pedagogy, scenario construction, facilitation, observation, formative feedback, and debriefing. Periodic peer observation and faculty calibration may reduce variation across instructors and courses.
- Students should receive equitable opportunities for active participation through role rotation, manageable group sizes, and sufficient practice time. Preparation and structured self-assessment should be incorporated before and after simulation.
- The institution should periodically evaluate access, equipment functionality, scenario realism, debriefing quality, instructor facilitation, group size, student anxiety, and opportunities for hands-on participation.
- Future studies should use objective competency measures, longitudinal or quasi-experimental designs, and multi-institutional samples. Revised instruments should employ complete and mutually exclusive engagement categories and maintain a clear separation between pilot testing and final data collection whenever substantive instrument changes are possible.

5.3 Implications of the Study

From an educational perspective, the findings support an integrated simulation curriculum in which different modalities serve complementary functions. Case scenarios are suited to reasoning and knowledge integration; mannequins and task trainers support procedural rehearsal; and role-playing addresses communication, empathy, and professional interaction.

Institutionally, the prominence of clinical instructor effectiveness indicates that faculty capability is a central simulation resource. Investments in laboratories and equipment should be accompanied by sustained faculty development, standardized facilitation, equipment maintenance, scheduling, and routine quality evaluation.

Methodologically, the study highlights the importance of distinguishing perceived competency from objectively demonstrated competency and of interpreting statistical significance together with effect magnitude. Self-report evidence is useful for understanding acceptance and perceived usefulness, but it cannot independently establish performance gains.

For nursing practice preparation, simulation can provide a structured transition between theoretical instruction and direct patient care, but it should complement rather than replace supervised clinical exposure. Its principal value lies in allowing students to rehearse decisions, procedures, communication, and professional conduct before or alongside actual clinical responsibilities.

6. References

Atento, R. G. O., Quinto, L. F., & Espelita, C. A. M. H. (2025). Bridging global health workforce gaps 2050: A multilevel analysis of global demand, Philippine supply fragilities, and competency alignment. *International Journal of Health and Business Analytics*, 1(2), 1–30. https://doi.org/10.65166/kgbpey79

Atento, R. G. O., Quinto, L. F., Espelita, C. A. M., & San Juan, F. M. (2025). Narrative health analytics: Integrating empathy, data, and ethics in patient-centered healthcare. *International Journal of Health and Business Analytics*, 1(2), 1–33. https://doi.org/10.65166/yxgx8e59

Balut, I. M., Baltazar, R. K., Fronda, M., Siador, K., Tandog, P. J. B., & Atento, R. G. (2026). Peer influence experiences and personal-social competencies among late adolescents: Evidence from a private higher education institution in the Philippines. *International Journal of Behavioral and Social Analytics*, 1(1). https://doi.org/10.65166/magr2j66

Bermido, C. M., Quinto, L. F., & Atento, R. G. O. (2025). A qualitative thematic review of contemporary challenges affecting health professions education: Implications for higher education leadership. *International Journal of Health and Business Analytics*, 1(2). https://doi.org/10.65166/yfm5w791

Cant, R. P., & Cooper, S. J. (2017). Use of simulation-based learning in undergraduate nurse education: An umbrella systematic review. *Nurse Education Today*, 49, 63-71. https://doi.org/10.1016/j.nedt.2016.11.015

Chernikova, O., Heitzmann, N., Stadler, M., Holzberger, D., Seidel, T., & Fischer, F. (2020). Simulation-based learning in higher education: A meta-analysis. *Review of Educational Research*, 90(4), 499-541. https://doi.org/10.3102/0034654320933544

Commission on Higher Education. (2017). *CMO No. 15, series of 2017: Policies, standards and guidelines for the Bachelor of Science in Nursing program*. https://legacy.ched.gov.ph/wp-content/uploads/2017/10/CMO-15-s-2017.pdf

Diaz-Navarro, C., Armstrong, R., Charnetski, M., Freeman, K. J., Koh, S., Reedy, G., Smitten, J., Ingrassia, P. L., Maio Matos, F., & Issenberg, B. (2024). Global consensus statement on simulation-based practice in healthcare. *Advances in Simulation*, 9, Article 19. https://doi.org/10.1186/s41077-024-00288-1

Dorri, S., Farahani, M. A., Maserat, E., & Haghani, H. (2019). Effect of role-playing on learning outcome of nursing students based on the Kirkpatrick evaluation model. *Journal of Education and Health Promotion*, 8, Article 197. https://doi.org/10.4103/jehp.jehp_138_19

Findik, U. Y., Yesilyurt, D. S., & Makal, E. (2019). Determining student nurses' opinions of the low-fidelity simulation method. *Nursing Practice Today*, 6(2), 71-76. https://doi.org/10.18502/npt.v6i2.911

Garcia, A. E., & Atento, R. G. O. (2026). Engagement and perceptions of middle managers in PhilHealth Benchbook II accreditation: Evidence from a tertiary hospital case study. *Journal of Enterprise Strategy & Management Innovation*, 1(1). https://doi.org/10.65166/jev58v44

Gorski, S., Prokop-Dorner, A., Pers, M., Stalmach-Przygoda, A., Malecki, L., Cebula, G., & Bombeke, K. (2022). The use of simulated patients is more effective than student role playing in fostering patient-centred attitudes during communication skills training: A mixed method study. *BioMed Research International*, 2022, Article 1498692. https://doi.org/10.1155/2022/1498692

Handeland, J. A., Prinz, A., Ekra, E. M. R., & Fossum, M. (2021). The role of manikins in nursing students' learning: A systematic review and thematic metasynthesis. *Nurse Education Today*, 98, Article 104661. https://doi.org/10.1016/j.nedt.2020.104661

Hui, T., Zakeri, M. A., Soltanmoradi, Y., Rahimi, N., Hossini Rafsanjanipoor, S. M., Nouroozi, M., & Dehghan, M. (2023). Nurses' clinical competency and its correlates: Before and during the COVID-19 outbreak. *BMC Nursing*, 22, Article 156. https://doi.org/10.1186/s12912-023-01330-9

Hung, C.-C., Kao, H.-F. S., Liu, H.-C., Liang, H.-F., Chu, T.-P., & Lee, B.-O. (2021). Effects of simulation-based learning on nursing students' perceived competence, self-efficacy, and learning satisfaction: A repeat measurement method. *Nurse Education Today*, 97, Article 104725. https://doi.org/10.1016/j.nedt.2020.104725

Mulyadi, M., Tonapa, S. I., Rompas, S. S. J., Wang, R.-H., & Lee, B.-O. (2021). Effects of simulation technology-based learning on nursing students' learning outcomes: A systematic review and meta-analysis of experimental studies. *Nurse Education Today*, 107, Article 105127. https://doi.org/10.1016/j.nedt.2021.105127

Quinto, L. F. (2020). Status of the implementation of outcomes-based education in the allied medicine programs. *Laguna Journal of Multidisciplinary Research*, 4(1), 1–9.

Rao, L., Tian, Y., & Atento, R. G. O. (2025). Adoption and perceived effectiveness of AI in education: Personalization, outcomes, and equity. *International Journal of Health & Business Analytics*, 1(1). https://doi.org/10.65166/qgq89291

Røssland, A., Svellingen, A., & Røykenes, K. (2022). Role exchange in student-led simulation: The importance of nursing students taking the role of patients. *SAGE Open Nursing*, 8, 23779608221130605. https://doi.org/10.1177/23779608221130605