

Empowering Future Nurses through Quality Education: Examining the Relationship between Academic Factors and Clinical Skills Development

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Abstract

Safe, quality patient care relies on well-educated nurses, and nursing education using evidence and skilled caring is essential. This study utilized the principles of competency-based education, the Sustainable Development Goals (SDGs), and a social constructivist perspective to analyze the influence of various academic factors on the development of nursing students' clinical skills. The academic factors included curriculum, assessment, and digital literacy. This study examined how these factors were related to students' confidence and critical thinking; and the skills of competence and procedural accuracy. A quantitative descriptive correlational study was utilized. The study population included nursing students in three private higher educational institutions. The data collection utilized a researcher constructed and validated survey. The data analysis utilized descriptive statistics and the Pearson Product Moment correlation. The results indicated that the academic factors and the development of clinical skills were both positively perceived. The results of the correlation analysis indicated a positive significant relationship between the academic factors and the development of clinical skills, and the null hypothesis was rejected. Alignment of curriculum, competency-based assessment, and digital literacy provide students with the clinical skills necessary to be competent. These academic factors also promote SDG 3 and 4.

Keywords: Nursing Education, Curriculum Alignment, Assessment, Digital Literacy, Clinical Competence, Quality Education

Introduction

Competent nurses require more than just the right amount of theoretical knowledge. It includes educational experiences that connect classroom knowledge to real world situations. Healthcare systems are continuously changing, requiring nursing schools to focus on graduates who not only have the clinical knowledge needed, but also the ability to think critically and flexibly. The United Nations Sustainable Development Goals stress that quality education (SDG 4) is one of the building blocks of good health and well-being (SDG 3). Nursing education is thus a building block for healthcare systems.

Among the educational determinants of competence, the academic factors are, to an important extent, the alignment of the curriculum and associated assessment, and digital literacy. Curriculum alignment and assessment. In a professional context, digital literacy ensures that learning and practice are aligned to

current health needs, assessment encourages learning and practice improvement, and digital literacy equips learners to practice in a technology augmented and evidence based environment.

Great strides have been made towards the reform of nursing education curricula, yet evidence that describes the collective impacts of these academic factors on the development of clinical competencies of nursing students in the private higher education institutions of the Philippines remains limited. This evidence is vital to inform curricula and educational quality for the purposes of producing graduates who are ready for practice.

This study sought to investigate the correlation between academic factors and the development of clinical competencies of nursing students, with the intention of providing evidence that would promote educational reforms and innovations within the discipline of nursing to strive for sustainable healthcare.

Theoretical Background

Biggs' Constructive Alignment Theory (Biggs & Tang, 2021) forms the basis of this study and focuses on the integration of learning goals, teaching activities, and assessment tasks. A Constructive Alignment in nursing education means that students gain the necessary knowledge, skills, and competencies to practice safely and effectively. The theory indicates that meaningful learning occurs when teaching and assessment activities are designed in a way that integrates the real-world clinical demands with the learning that occurs in the classroom.

Competency-Based Education (CBE) is another theory that this study employs. CBE is an approach that centers learning and assessment on the achievement of clearly defined and measurable competencies. Competency-based nursing education aims to produce graduates that are clinically competent and practice with critical thinking and professional judgment, as well as with an understanding of and commitment to the use of the best evidence in decision-making. Education CBE also holds that assessment should foster the continuous learning and development of the graduate.

Digital literacy has been included in this study to accommodate the new educational and digital health frameworks in nursing education. Digital literacy equips nursing students to access evidence-based information, participate in learning through simulations, use electronic health records, and keep pace with the changes in a health care system that uses and incorporates various technologies. CBE, digital literacy, and Curriculum alignment also provide the basis for the development of nursing professionals who are competent, confident, and ready to practice. The framework used also holds that the improvement of academic standards will enhance the development of clinical skills and utmost care in nursing education will improve health care.

Objectives

To examine the relationship between academic factors and clinical skills development among undergraduate nursing students in private higher education institutions.

Specific Objectives

This study specifically aimed to:

1. Determine the level of academic factors in terms of:
 - curriculum alignment;
 - assessment; and
 - digital literacy.
2. Determine the level of clinical skills development in terms of:

- competence;
 - confidence;
 - procedural accuracy; and
 - critical thinking.
3. Examine the relationship between academic factors and clinical skills development among undergraduate nursing students.

Null Hypothesis (H₀):

There is no significant relationship between academic factors (curriculum alignment, assessment, and digital literacy) and clinical skills development among undergraduate nursing students.

Methods***Research Design***

This study utilized a quantitative descriptive-correlational design to identify the association of academic factors with the development of clinical skills of undergraduate nursing students. This design was appropriate since it measured the relationship among variables as they naturally occurred in the study setting without manipulation. This design also offered evidence on the relationship of the academic and clinical experiences of the students.

Participants and Setting

The study targeted undergraduate nursing students in three private higher education institutions in Iligan City, Philippines. The participants were derived from students who either had completed or were currently undertaking clinical training. This provided the participants with ample academic and clinical experiences to assess the variables under study. Their participation was of great significance to understanding the relationship between academic and clinical training.

Study Variables

The study examined one independent variable and one dependent variable. The independent variable was academic factors, and it had three dimensions. These were: alignment of the curriculum, assessment, and digital literacy. Alignment of the curriculum was the degree of match between the outcomes of the course, the instructional processes, and the competencies required of a professional nurse. Assessment was the methods of the evaluation of learning and the provision of academic feedback to the learners. Digital literacy was the students' ability to conveniently access and utilize digital means and information for learning. The dependent variable was the development of clinical skills, and it had four aspects: clinical competence, confidence, accuracy, and procedural critical thinking.

Research Instrument

A structured questionnaire was constructed using validated literature and related tools. The questionnaire comprised items to assess respondents' perceptions of some academic factors and the level of development of their clinical skills. Prior to the administration of the instrument, expert judgment was sought on the content of the instrument. The instrument was also tested for reliability and found to be suitable for the population of interest.

Data Analysis

Both descriptive and inferential statistics were used to analyze the data. Respondents' demographic data were summarized using frequency and percentage distributions. The levels of the academic factors and the level of development of clinical skills were summarized using means and standard deviations. The

Pearson Product-Moment Correlation Coefficient was used to analyze the relationship among the study variables. A p-value of 0.05 was used as the benchmark for significance.

AI Use Declaration

We recognize that the authors of this article used OpenAI's ChatGPT on occasion as a language support tool while writing. This tool was specifically used to enhance grammatical accuracy and clarity of language as well as to help reorganize content and improve the writing style to meet the standards of academic writing. This tool was not used for the generation, assessment, analysis, or validation of any research data or to support or create any of the scientific conclusions of the study. Each of the authors completed the study design, data collection, and finished the statistical analyses, as well as the writing of the text and the interpretation of the findings independently. The authors believe this text is accurate and original, and take full responsibility for any issues related to this text.

Results

Table 1 Level of students' Personal Factors in terms of Self Efficacy

Indicators	Mean	SD	Description	Interpretation
1. I am confident that I can perform clinical skills correctly even when it is my first time.	3.71	0.87	Agree	High
2. I believe I can successfully perform procedures under pressure.	3.71	0.84	Agree	High
3. I feel capable of handling complex patient-care tasks.	3.85	0.867	Agree	High
4. I trust my ability to learn new clinical skills quickly.	4.10	0.85	Agree	High
5. I can perform clinical procedures with minimal supervision.	3.96	0.86	Agree	High
6. I feel confident making clinical decisions during patient care.	3.93	0.91	Agree	High
7. I feel confident explaining procedures to patients.	4.21	0.85	Agree	High
8. I believe I can maintain patient safety during all procedures.	4.02	0.85	Agree	High
9. I feel confident managing multiple clinical responsibilities.	3.98	0.88	Agree	High

10. I am certain that I can achieve competency in all nursing procedures.	4.03	0.84	Agree	High
Overall Mean	3.95	0.53	Agree	High

Legend. M = Mean; SD = Standard Deviation. Interpretation of mean scores: 4.51–5.00 = Very High; 3.51–4.50 = High; 2.51–3.50 = Moderate; 1.51–2.50 = Low; 1.00–1.50 = Very Low.

Nursing students exhibited high self-efficacy ($M = 3.95$, $SD = 0.53$), and they generally felt self-assured in their clinical task and patient care management responsibilities. The highest rated self-efficacy indicator was explaining procedures to patients ($M = 4.21$, $SD = 0.85$), followed by the ability to quickly learn new clinical skills ($M = 4.10$, $SD = 0.85$). The lowest ratings (but still very positive) were given to self-efficacy when performing clinical skills for the first time and performing procedures under demand (both $M = 3.71$).

While the majority of nursing students have positive self-efficacy when it comes to clinical skills, it appears more exposure to unfamiliar and demanding clinical skills is necessary to improve self-efficacy levels for the majority of nursing students. This aligns with Bandura's (1997) Social Cognitive Theory, where repeated mastery tasks (unfamiliar skills) improve self-efficacy levels. Arribas-Marín et al. (2024) also aligned with this, where self-efficacy was positively associated with clinical skills for nursing students.

Table 2 *Level of students' Personal Factors in terms of Motivation*

Indicators	Mean	SD	Description	Indicator
1. I feel motivated to practice clinical skills even without being required.	4.13	0.86	Agree	High
2. I take initiative to learn more about procedures before performing them.	4.25	0.83	Agree	High
3. I strive to do my best during every clinical rotation.	4.38	0.82	Agree	High
4. I remain motivated even when learning complex skills.	4.20	0.85	Agree	High
5. I set personal goals to improve my clinical competence.	4.13	0.88	Agree	High
6. Seeing my improvement motivates me to keep practicing.	4.29	0.86	Agree	High

7. Positive feedback from instructors increases my motivation.	4.34	0.89	Agree	High
8. I stay committed to learning despite experiencing challenges.	4.34	0.85	Agree	High
9. I remain determined even when I make mistakes in clinical practice.	4.14	0.85	Agree	High
10. I am motivated to become a highly competent professional nurse.	4.37	0.81	Agree	High
Overall Mean	4.26	0.63	Agree	High

Legend. M = Mean; SD = Standard Deviation. Interpretation of mean scores: 4.51–5.00 = Very High; 3.51–4.50 = High; 2.51–3.50 = Moderate; 1.51–2.50 = Low; 1.00–1.50 = Very Low.

According to Table 2, second year nursing students were generally highly motivated to enhance their clinical skills, as shown by their mean score of 4.26 (SD = 0.63). Participants showed the highest level of agreement to the item “I try my best in every clinical rotation” (M = 4.38, SD = 0.82). Participants also generally agreed with the item “I want to be a competent professional nurse” (M = 4.37, SD = 0.81), “I want to receive positive feedback from my instructors” (M = 4.34), and “I want to be committed to my practice even if I face challenges” (M = 4.34). Participants showed the least level of agreement with the items “I am motivated to practice my clinical skills even if I am not required to do so” (M = 4.13) and “I set my own goals to improve my clinical skills” (M = 4.13). Even though these items obtained the lowest mean scores, they remained in the high category.

Overall, results showed that nursing students expressed a high level of motivation to become clinically competent, both intrinsically, and through external feedback and support provided by nursing instructors. Findings also support the Self-Determination Theory that indicates the importance of motivation, and the role of instructor support to foster an environment where learners achieve a high level of competence (Ryan & Deci, 2020). Findings were also consistent with those of Arribas-Marín and colleagues (2024), who indicated that motivated nursing students show a high level of clinical practice and learning engagement.

Table 3 Level of students’ Personal Factors in terms of Coping

Indicators	Mean	SD	Description	Interpretation
1. I use positive self-talk to stay calm during challenging procedures.	4.22	0.85	Agree	High
2. I take a moment to breathe when I feel stressed in the clinical area.	4.34	0.80	Agree	High

3. I seek help from classmates when encountering difficult tasks.	4.28	0.85	Agree	High
4. I ask clinical instructors for guidance when I feel uncertain.	4.34	0.87	Agree	High
5. I reflect on difficult experiences to understand how to cope better.	4.29	0.84	Agree	High
6. I create plans to handle complex or stressful clinical situations.	4.19	0.82	Agree	High
7. I use relaxation techniques when overwhelmed during duty.	4.31	0.88	Agree	High
8. I cope with mistakes by viewing them as learning opportunities.	4.35	0.84	Agree	High
9. I adjust my approach when my first attempt at a skill is unsuccessful.	4.27	0.85	Agree	High
10. I remain calm and rational in unexpected clinical situations.	4.19	0.88	Agree	High
Overall	4.28	0.65	Agree	High

Legend. M = Mean; SD = Standard Deviation. Interpretation of mean scores: 4.51–5.00 = Very High; 3.51–4.50 = High; 2.51–3.50 = Moderate; 1.51–2.50 = Low; 1.00–1.50 = Very Low.

Table 3 showed adoption strategies for coping among nursing students. Most respondents overall had a high coping level (mean = 4.28, SD = 0.65). Most respondents used strategies to help positively affirm stress during clinical practices. The highest indicator for coping was viewing mistakes as learning opportunities (M = 4.35, SD = 0.84). The highest indicators for coping were taking a moment to breathe when feeling stressed and seeking assistance from clinical instructors (M = 4.34). The lowest rated indicators were developing plans to manage stressful situations and remaining calm during unanticipated clinical events (both M = 4.19). All of these indicators remained positively high.

The results show that nursing students have developed positively coping mechanisms to deal with clinical stress and manage their learning and professional growth. Coping methods that are positively affirming show a tendency to reveal and reflect on stress, seek assistance, and view mistakes as opportunities to grow. These coping strategies show improvement and resilience. These results correspond to Lazarus and

Folkman's Stress and Coping Theory. Such coping strategies during clinical practices were shown to correlate positively with the safety and effectiveness of the nursing profession overall (Lopez et al., 2021).

Table 4. Level of Academic Factors Among Nursing Students

Academic Factor	Mean	SD	Interpretation
Curriculum Alignment	4.33	0.67	High
Assessment	4.27	0.63	High
Digital Literacy	4.20	0.67	High
Overall	4.27	0.56	High

Legend. M = Mean; SD = Standard Deviation. Interpretation of mean scores: 4.51–5.00 = Very High; 3.51–4.50 = High; 2.51–3.50 = Moderate; 1.51–2.50 = Low; 1.00–1.50 = Very Low.

The study participants assessed the academic factors that aid nursing education at a high level (M = 4.27, SD = 0.56). Out of the three factors, curriculum alignment had the highest rating mean (M = 4.33, SD = 0.67), while assessment (M = 4.27, SD = 0.63) had the second, and the lowest rating (M = 4.20, SD = 0.67) was attributed to digital literacy. Generally, respondents of the study felt that their academic preparation was supportive of developing relevant clinical competencies.

The high rating on curriculum alignment showed that respondents of the study felt that there was a strong link between classroom teaching and the clinical competencies that are needed. When there is a clear link between the outcomes of learning, the teaching and the assessments, students are more inclined to merge the theoretical component with the actual clinical component. This observation shows the need for Constructive Alignment, which, in essence, is a model that highlights the importance of consistency in the components of a curriculum in a bid to encourage, meaningful learning and the development of competencies (Biggs & Tang, 2021). Similarly, a competency-based curriculum ensures that the content of the curriculum is in line with the existing gaps in the healthcare sector and is designed to prepare students for the healthcare profession, therefore, improving students' preparedness for practice (Labrague & De los Santos, 2020).

The assessment also received a high rating, showing that respondents of the study felt that the assessment they underwent was a true reflection of their knowledge and clinical competencies. Positive assessment goes beyond grading and provides the learner with feedback and guides the learner on the professional standards that need to be upheld and encourages the learner to practice reflection. Nursing students that underwent a competency-based curriculum and gained positive assessment were able to improve their clinical skills, self-directed learning, and clinical judgment (Arribas-Marín et al., 2024).

Digital Literacy ranked the highest among the Academic Dimensions while still recording the lowest mean score. This indicates that students likely have the basic level of competence in the use of technology, suggesting the need for further strengthening their capability in the use of digital tools, electronic health records, virtual simulation, and evidence-based information systems. The ongoing digital transformation in health care practice also makes a compelling case for developing digital literacy within the context of preparing graduates for contemporary practice in technology-enabled nursing (Alharbi & Almutairi, 2022; Baticulon et al., 2021).

Table 5 *Level of students' Clinical Skills in terms of Competence*

Indicators	Mean	SD	Description	Interpretation
1. I can perform basic nursing procedures with minimal supervision.	4.23	0.81	Agree	High
2. I understand the correct sequence of steps when performing common nursing skills.	4.26	0.81	Agree	High
3. I can adapt my skills to different patient conditions when necessary.	4.19	0.79	Agree	High
4. I can apply evidence-based guidelines when performing clinical procedures.	4.19	0.80	Agree	High
5. I can safely complete procedures within the expected timeframe.	4.20	0.83	Agree	High
6. I can properly assess a patient's needs before performing a skill.	4.21	0.84	Agree	High
7. I can follow hospital and institutional protocols accurately.	4.31	0.84	Agree	High
8. I can recognize complications that may arise during procedures.	4.21	0.85	Agree	High
9. I can appropriately use equipment needed for skills performance.	4.20	0.84	Agree	High
10. I can maintain aseptic technique throughout procedures which needed sterility protocol.	4.25	0.84	Agree	High
Overall	4.23	0.63	Agree	High

Legend. M = Mean; SD = Standard Deviation. Interpretation of mean scores: 4.51–5.00 = Very High; 3.51–4.50 = High; 2.51–3.50 = Moderate; 1.51–2.50 = Low; 1.00–1.50 = Very Low.

Table 5 provided an overview of the self-reported level of clinical competence of nursing students. The respondents believed they were able to perform the critical nursing procedures safely and competently, as seen by the overall mean score of 4.23 (SD = 0.63). The respondents perceived themselves most competent when they followed the hospital and organizational procedures accurately (M = 4.31, SD = 0.84). The respondents also perceived themselves as competent when they were able to identify the correct order of

the nursing procedures ($M = 4.26$, $SD = 0.81$) and when they were able to perform nursing procedures with the aseptic technique ($M = 4.25$, $SD = 0.84$). The respondents perceived themselves least competent when they were able to restructure the nursing procedures to suit the different conditions of the patients and when they were able to use the evidence-based procedures for the nursing practice ($M = 4.19$). These two indicators were still in the high category.

The findings of this study suggest that nursing students are competent in the basic clinical skills of following nursing procedures and organizational processes. The respondents perceived themselves as less competent in adjusting nursing procedures to the needs of different patients and in using the evidence-based practice. This shows that the respondents need to utilize different clinical settings in order to develop the skills of using and integrating evidence-based practice and clinical judgment in order to provide safe and effective care to patients. This is also the finding of Liu et al. (2024), where structured clinical teaching and competency-based education enhance the overall clinical competence and the preparedness of nursing students to practice.

Table 6 *Level of students' Clinical Skills in terms of Confidence*

Indicators	Mean	SD	Description	Interpretation
1. I feel confident performing nursing procedures I have practiced.	4.23	0.81	Agree	High
2. I can complete skills even when under pressure.	4.26	0.81	Agree	High
3. I believe I can handle unexpected situations during procedures.	4.19	0.79	Agree	High
4. I feel confident communicating with patients before performing a skill.	4.19	0.80	Agree	High
5. I am confident asking questions to clarify instructions when needed.	4.20	0.83	Agree	High
6. I feel at ease performing procedures in front of my preceptor or instructor.	4.21	0.84	Agree	High
7. I can stay calm during complex or unfamiliar procedures.	4.31	0.84	Agree	High
8. I am confident performing skills independently when allowed.	4.21	0.85	Agree	High
9. My confidence increases after receiving constructive feedback.	4.20	0.84	Agree	High
10. I feel confident demonstrating skills during return demonstrations.	4.25	0.84	Agree	High
Overall	4.23	0.63	Agree	High

Legend. M = Mean; SD = Standard Deviation. Interpretation of mean scores: 4.51–5.00 = Very High; 3.51–4.50 = High; 2.51–3.50 = Moderate; 1.51–2.50 = Low; 1.00–1.50 = Very Low.

Table 6 showed nursing students' confidence in dealing with clinical situations. Respondents exhibited a high degree of confidence, with a mean of 4.23 (SD = 0.63). It shows that respondents were generally confident in dealing with procedures in nursing across different clinical situations. The calmest in the face of challenging and/or new procedures received the highest support (M = 4.31, SD = 0.84), followed by completion of pressure skills (M = 4.26, SD = 0.81), and skills demonstrated in return demonstrations (M = 4.25, SD = 0.84). The least supported were handling of the surprising situations in the procedures and communication with the patient before a skill is performed (M = 4.19). However, these were still in the high category.

It is evident that nursing students are confident when performing clinical procedures, especially when dealing with situations that require the use of skills that have been learned, and when maintaining composure in difficult situations. The relatively lower ratings for handling of the unexpected situations and the communication of the patient suggest more room for strengthening confidence through more experiential learning. This finding is in line with the Social Cognitive Theory of Bandura, in which confidence is cultivated through the performance of the task and the successful mastery thereof (Bandura, 1997). In the same line, confidence of nursing students is directly related to the clinical skills and the preparedness for the profession (Arribas-Marín et al., 2024).

Table 7 Level of students' Clinical Skills in terms of Procedural Accuracy

Indicators	Mean	SD	Description	Interpretation
1. I can follow every step of a procedure in the correct order.	4.14	0.87	Agree	High
2. I can maintain sterility throughout aseptic procedures without contamination.	4.13	0.86	Agree	High
3. I can accurately measure vital signs and document them properly.	4.14	0.84	Agree	High
4. I can prepare equipment correctly before starting a procedure.	4.26	0.84	Agree	High
5. I can choose the appropriate supplies for each clinical procedure.	4.23	0.87	Agree	High
6. I can verify patient identity and orders before carrying out a skill.	4.13	0.89	Agree	High
7. I can perform procedures precisely according to institutional policies.	4.17	0.86	Agree	High
8. I can correctly calculate medication doses when applicable.	4.16	0.86	Agree	High
9. I can identify errors in my technique and correct them immediately.	4.25	0.83	Agree	High
10. I can accurately document procedures in patient records.	4.19	0.86	Agree	High
Overall	4.18	0.70	Agree	High

Legend. M = Mean; SD = Standard Deviation. Interpretation of mean scores: 4.51–5.00 = Very High; 3.51–4.50 = High; 2.51–3.50 = Moderate; 1.51–2.50 = Low; 1.00–1.50 = Very Low.

Table 7 showed the level of procedural accuracy of nursing students. Respondents exhibited a high level of procedural accuracy with a grand mean of 4.18 (SD = 0.70), showing their tendency to follow the right clinical procedures that would keep the patients safe. The greatest observed item was the correct setup of the apparatus (M = 4.26, SD = 0.84), followed by the identification and rectification of the errors in the technique (M = 4.25, SD = 0.83) and selection of the right apparatus for the clinical procedures (M = 4.23, SD = 0.87). The least of the observed items was the maintenance of the sterility in the Aseptic procedures, the verification of the patient's identity and the verification of the patient's orders, and the accurate measurement of the vital signs (M = 4.13); and the measurement of the vital signs, and the aseptic procedures (M = 4.14), though all were rated in the high category.

The findings signify that nursing students were able to perform procedures accurately and in a safe manner, especially in the area of preparation and error rectification. The lower ratings in aseptic procedures and the lower rating in the verification of the patient's identity indicate the need to strengthen the clinical procedures to reinforce the concepts of patient safety in the clinical teaching. This agrees with the competency-based nursing education (CBNE), which throws more emphasis on the procedural accuracy and safety (Biggs & Tang, 2021). Likewise, on the context of procedural accuracy in clinical teaching, Liu et al. (2024) argue that structured clinical teaching and repetitive practice of clinical skills enhance procedural accuracy and decrease clinical errors in nursing students.

Table 8 Level of students' Clinical Skills in terms of Critical Thinking

Indicators	Mean	SD	Description	Interpretation
1. I can analyze patient cues before performing a procedure.	4.15	0.79	Agree	High
2. I can identify priority needs in a clinical situation.	4.13	0.81	Agree	High
3. I can anticipate potential complications before starting a skill.	4.12	0.86	Agree	High
4. I can assess whether a patient is responding well to a procedure.	4.20	0.80	Agree	High
5. I can integrate theoretical knowledge when making clinical judgments.	3.98	0.88	Agree	High
6. I can evaluate whether the procedure I performed was effective.	4.18	0.83	Agree	High
7. I can assess risk factors before implementing nursing interventions.	4.17	0.83	Agree	High
8. I can revise my approach when new information becomes available.	4.20	0.81	Agree	High
9. I can distinguish between urgent and non-urgent patient needs.	4.21	0.81	Agree	High
10. I can apply problem-solving skills to unexpected clinical challenges.	3.93	1.46	Agree	High

Overall	4.13	0.62	Agree	High
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Legend. M = Mean; SD = Standard Deviation. Interpretation of mean scores: 4.51–5.00 = Very High; 3.51–4.50 = High; 2.51–3.50 = Moderate; 1.51–2.50 = Low; 1.00–1.50 = Very Low.

Table 8 showed the critical thinking level of nursing students. High levels of critical thinking show that respondents had the ability to understand clinical situations and make reasonable judgments. Their mean score was 4.13, with a standard deviation of 0.62. The highest assessed value was the ability to identify urgent and non-urgent needs of patients, with a mean of 4.21, and a standard deviation of 0.81. Next were the ability to assess the patient's responses to the procedure and adjust the approach based on new available information (both M = 4.20). The lowest, but still highly rated, was the ability to apply problem-solving skills to the unpredictable clinical situation (M = 3.93, SD = 1.46) and the ability to synthesize the theory when making a clinical decision (M = 3.98, SD = 0.88).

Based on the results, respondents have the ability to make the right clinical decisions and the ability to prioritize the actions of the clinical staff. Low ratings of the ability to synthesize theory, and manage unexpected clinical problem situations show the need for additional exposure to complex scenarios in the clinical field that require advanced skills in clinical reasoning. The results of the current study are consistent with Benner's Novice to Expert Theory (Benner, 1984). In addition, Liu et al. (2024) state that nursing students' exposure to simulation and structured clinical teaching based on real and unpredictable clinical situations fosters students' higher-order critical thinking and clinical skills.

Table 9. Level of Clinical Skills Development Among Nursing Students

Clinical Skills Development	Mean (M)	Standard Deviation (SD)	Interpretation
Competence	4.24	0.60	High
Confidence	4.24	0.64	High
Procedural Accuracy	4.17	0.63	High
Critical Thinking	4.12	0.64	High
Overall	4.19	0.53	High

Legend. M = Mean; SD = Standard Deviation. Interpretation of mean scores: 4.51–5.00 = Very High; 3.51–4.50 = High; 2.51–3.50 = Moderate; 1.51–2.50 = Low; 1.00–1.50 = Very Low.

Clinical skills development was also viewed positively (M = 4.19, SD = 0.53). Of the elements skill and confidence received the highest evaluation (both M = 4.24), followed by procedural accuracy (M = 4.17). Critical thinking rated the lowest mean (M = 4.12), however, was still high. It can be inferred that the nursing students regarded themselves as being ready to carry out the necessary nursing actions, and to perform the nursing actions, and have identified further need to develop the advanced clinical reasoning. The high scores of skill and confidence imply that students have the knowledge, the skills, and the confidence to perform the standardized nursing actions and to nursing actions safely and effectively. Confidence has been identified to be an important outcome in nursing education as it supports the students' application of the skill learned during the nursing action. The relatively low score of critical thinking implies that the higher-order thinking skills develop with repeated exposure to more complex nursing actions

This concurs with research that emphasizes that clinical reasoning develops with exposure to practice and that classroom teaching is insufficient. Cant and Cooper (2017) found that simulation-based learning and case-based learning assist students with analytical thinking and clinical reasoning. In addition Liu et al. (2024) found that clinical teaching with reflective learning in nursing actions enhanced the ability of nursing students considerably in complex clinical scenarios.

Table 10. Relationship Between Academic Factors and Clinical Skills Development

Academic Factor	r-value	p-value	Interpretation
Curriculum Alignment	0.510	<0.001	Significant
Assessment	.609	<0.001	Significant
Digital Literacy	0.566	<0.001	Significant
Overall Academic Factors	0.657	<0.001	Significant

Legend. r = Pearson Product-Moment Correlation Coefficient; p = probability value. Correlation strength: 0.00–0.19 = Very Weak; 0.20–0.39 = Weak; 0.40–0.59 = Moderate; 0.60–0.79 = Strong; 0.80–1.00 = Very Strong. Statistical significance was set at $p < .05$.

Using Pearson's Product Moment Correlation, the positive relationship between the academic factors and the development of clinical skills was found to be significant ($r = .657$, $p < .001$), leading to the rejection of the null hypothesis. This suggests that the greater the development of the academic preparation of the nursing students, the greater the development of the clinical skills of the nursing students.

Of the academic variables, the strongest positive relationship with clinical skills development was found for assessment ($r = .609$, $p < .001$), followed by the relationships with digital literacy ($r = .566$, $p < .001$) and curriculum alignment ($r = .510$, $p < .001$). Despite being the weakest of the three, curriculum alignment still had a significant positive relationship, showing its value in aiding the clinical learning of nursing students.

The positive relationship with assessment shows the value of incorporating substantive assessment strategies within nursing education. Assessment, when designed to be purposeful, forms a significant educational process that allows nursing students to achieve higher levels of clinical competence, enhanced through feedback and reflective practices. The iterative design of assessment strategies, especially within Outcome-Based education and the use of Objective Structured Clinical Evaluation (OSCEs), supports the development of nursing students' clinical skills and their clinical reasoning. (Arribas-Marín et al., 2024). Likewise, there is an association between digital literacy and the enhancement of clinical skills partially due to the role of technology in the nursing and healthcare sectors. Digital competence means that learners have better access to the best resources, can engage with learning through simulations, effectively use electronic health information systems, and understand how to work in the different modalities of digital health. Previous research has also found that digital literacy contributes to being clinically ready and to learning in technology-enhanced education systems (Alharbi & Almutairi, 2022; Baticulon et al., 2021). Curriculum alignment also showed a positive relationship with the development of clinical skills and portrayed that when different educational components are systematically organized and aligned, it promotes the application of skills gained in the classroom to the clinical setting. Although curriculum alignment represented a weaker relationship than assessment and digital literacy, it still plays an essential role because it creates the instructional framework within which learners gain knowledge and skills.

Therefore, academic preparation is an enabling factor that promotes students' readiness to engage with the other educational activities that are necessary for them to participate in clinical practice (Ataro et al., 2024; Biggs & Tang, 2021).

All these observations highlight how central academic quality is for training nurses of the future. We saw strong connections between various aspects of education, such as harmonization of the curriculum, assessment, and digital literacy. These elements (among others) work together to build educational systems that prepare future nurses to work safely and effectively, and to provide care that is both evidence-based and developed with the needs of the patient at the center. These findings also work to achieve SDG 4 (Quality Education) by illustrating that higher quality academic settings that emphasize the development of competencies strengthen the SDG 3 (Good Health and Well-being), by producing health professionals who are qualified to positively impact health.

Conclusion

This research identifies curriculum assessment and digital literacy as critical academic factors affecting the development of undergraduate nursing students' clinical skills. Respondent perception of the highly evident academic factors indicates institutional efforts to create supportive learning environments for the teaching of competency-based nursing education. Additionally, the nursing students' perception of clinical skills development indicates high levels of competence and confidence and high levels of procedural and critical thinking skills, thus indicating students' readiness for professional clinical practice.

The data further supports a significant positive correlation between the academic factors and the development of clinical skills ($r = .657$, $p < .001$). Within the academic factors, assessment was the most significant predictor of the development of clinical skills, followed by digital literacy and curriculum as expressed by the respondents. This suggests that the development of clinical skills of the respondents requires the presence of adequate assessment methods, levels of digital competency and supportive curriculum structures. The respondents' views of the academic factors therefore reiterate that the optimal development of competent and confident nursing professionals is a critically practice-ready proactive.

Based on these findings, the null hypothesis stating there is no significant relationship between academic factors and the development of clinical skills of nursing students has been rejected. Evidence shows that clinical skills of students are developed through academic factors, thus providing justification for the improvement of curriculum alignment, competency-based assessment, and digital literacy of nursing students. Such improvements would further develop Sustainable Development Goal 4 (Quality Education) through the provision of high-quality, competency-based education, and would support Sustainable Development Goal 3 (Good Health and Well-being) through the provision of sustainable, safe, and evidence-based nurse-led, client-centered care.

Recommendation

For Nursing Students

Expand your learning opportunities. The development of your digital literacy, critical thinking, and clinical reasoning skills will all benefit. Using evidence-informed digital resources, partaking in simulation-based learning, and requesting feedback during your academic and clinical experiences will further develop your readiness and competence for the professional nursing role.

For Nursing Faculty

Nursing faculty members are encouraged to evaluate their practice continually and ensure their teaching

strategies align with learning outcomes and the relevant competency standards. Incorporating authentic learning experiences, incorporating technology in their teaching practice, and using formative assessment strategies are helpful innovations. More reflections, case-based learning, and simulations will positively impact the clinical competence of nursing students and their clinical reasoning and decision-making skills.

For Nursing Deans and Academic Administrators

The periodic review of a program's curriculum to ensure the program's learning outcomes, teaching strategies, and assessment methods align with the current standards of practice in healthcare would also be valuable. Investments in the digital learning infrastructure, simulation labs and technology, academic faculty, and other teaching resources would be beneficial.

For Higher Education Institutions

Healthcare education institutions should promote contemporary nursing practice by supporting the digital transformation of healthcare and adjusting resources based on their sustained partnerships with healthcare organizations. Results will be a contemporary nursing graduate practice to meet the requirements of healthcare.

For Future Researchers

Future research may validate the findings by including nursing students of both public and private colleges and universities across the different regions of the Philippines. Longitudinal, mixed-methods, and multi-site research are also highly encouraged to determine the impact of curriculum alignment, assessment, and digital literacy on clinical competence, and to identify new academic elements that nurture professional growth.

These suggestions focus on the improved capacity of nursing education to enhance the quality of nursing education, address clinical competence, and contribute to the realization of the Fourth Sustainable Development Goal (Quality Education), and the Third Sustainable Development Goal (Good Health and Well-being) through preparing competent, caring, and professional nurses.

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