STUDENTS' LEVEL OF CRITICAL THINKING AND CONFIDENCE AFTER NURSING PROCEDURE SIMULATION USE

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ABSTRACT

Nursing education faces significant challenges in bridging the gap between theoretical knowledge and practical application. Nursing procedure simulations have been proposed as a method to enhance critical thinking and confidence among nursing students. This study sought to explore the students' levels of critical thinking and confidence in performing nursing procedure simulation. The researchers utilized a descriptive-correlational research design for this study. The study involved eighty-five nursing students in one of the universities in Ozamis City, selected through purposive sampling. Data was elicited through a researcher-made questionnaire, which was treated statistically before being analyzed and interpreted. Pilot testing was conducted to ensure the validity and reliability of the questionnaire, involving a small sample of nursing students to refine the instrument based on their feedback. The results indicated that the students have demonstrated a moderately developed ability to think critically when performing nursing procedures. In addition, the students have demonstrated moderately high and consistent levels of confidence in performing nursing procedures. Future research may conduct further research on the impact of advanced and varied simulation-based interventions on nursing students' critical thinking and confidence. Investing in high-fidelity simulation models, implementing regular assessment and feedback, and providing support services for stress management are crucial for enhancing the learning experience. Additionally, longitudinal and comparative studies should be performed to evaluate the effectiveness of different teaching methods and simulation environments on student outcomes.

Keywords: Clinical Competence, Confidence, Critical Thinking, Nursing Education, Simulation-Based Learning

We, the researchers, collectively dedicate this research to our families and loved ones, whose unwavering support and encouragement have been our bedrock throughout this journey. Your belief in us has been our greatest source of motivation.

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The Researcher

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The Researchers

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INTRODUCTION

Rationale/ Background of the Study

Nursing students encounter difficulties in the practical implementation of theoretical knowledge, and this is a problem seen on an international scale (Koukourikos et al., 2021). Nursing procedure simulation is used to develop nursing students' clinical performance in assessing and managing situations in clinical placements. The use of nursing procedure simulation increased and became an integrated part of nursing education (Hustad, J et al., 2019). It enables students to work in an environment closely resembling that of a hospital and helps them to gain healthcare and nursing experience, even before they start working as professionals (Koukourikos et al., 2021). The students can put everything they have been taught into practice, cope with any difficulties and problems, and even make mistakes without causing damage, and all that in a safe environment, without any risk whatsoever for patients (Linda et al., 2022). One of the major problems of nursing education is the lack of coordination between theory and practice. An increase in the use of simulation is due to the lack of clinical structures for student training, lack of professors, and due to the increased quality of training provided through this method (Koukourikos et al., 2021).

Nursing procedure simulation is widely used among nursing students to enhance their knowledge, competence (Koukourikos et al., 2021), and skills in clinical settings (Geravandi et al., 2018). During their exposure to the simulation scenario, nursing students can commit every possible medical error in a safe environment without harming patients (Rogers & Franklin, 2021). Nursing procedure simulation provides the most effective use of cognitive load that improves learning outcomes (Johnson et al., 2020), increases psychomotor skills acquisition and retention (Anine et al., 2022), triggers comprehension, and decreases unpleasant emotions (Blackmore, Kasfiki & Purva, 2018). Additionally, it has been found to improve students' communication skills (Tabatabaeian et al., 2018), problem-solving abilities, and teamwork and collaboration (Arrogante et

al., 2022). Learners can interact and empathize with simulated patients in a well-developed scenario to improve their positive attitudes (Azizi et al., 2022). Furthermore, it provides supportive feedback and advances learning. Chang et al., (2021) stated that simulation bridged the gap between theory and practice.

Critical thinking and clinical reasoning are core competencies emphasized in nursing practices. Nursing students are required to develop and practice these skills throughout their nursing programs to graduate as competent nurses (Wong, Su Hui Valynn Wong et al., 2020). Nurses need critical thinking skills to navigate complex clinical situations and be accountable, given the global shifts in healthcare. Critical thinking in the profession of nursing has been defined as "the process of reflective and reasonable thinking about nursing problems without a single solution and is focused on deciding what to believe and do" (Adib-Hajbaghery et al., 2018). Nursing students who experience Nursing procedure simulation show increased knowledge and self-confidence, satisfaction, critical thinking disposition, assessment, and psychomotor skills. They also demonstrate increased problem-solving ability, communication competency, cooperation, leadership, and delegation skills (Bliss et al., 2018). The impact of nursing procedure simulation on the advancement of nursing students' clinical skills, which includes their areas of expertise, self-confidence, and their critical thinking ability to make significant decisions in clinical practice (Guerrero et al., 2022)

Confidence is a key component for effective, safe clinical performance. Nursing procedure simulation has been shown to be very useful in developing and increasing confidence (Bailey et al., 2022). One influential factor in enhancing the quality of clinical services is the presence of self-confidence in both students and educated nurses. Self-confidence is integral to clinical competence and serves as an important indicator of ability and proficiency (Tabriz et al., 2024). Confidence in nursing is a crucial quality of professional caring that develops trust and interaction between nurses and their patients (Kaliyaperumal et at., 2021). Kaliyaperumal et al., (2021) also found that the satisfaction of nursing students

with their learning was high, and their self-confidence had improved from the clinical simulation.

Nevertheless, according to Hung et al., (2021) research conducted to measure varying outcomes of nursing procedure simulation has been limited and remains undefined. The impact of simulation exposure and the identification of an accurate simulation modality on professional nurses to help them enhance their clinical competence and expertise remains unclear. Furthermore, no evidence exists to confirm whether simulation exposure can enhance their knowledge, skills, self-efficacy, confidence, and satisfaction. This study is concerned with the gap presented above and provides a comprehensive investigation into the effects of nursing procedure simulation on nursing students. By examining various outcomes such as clinical competence, expertise, knowledge, skills, self-efficacy, confidence, and satisfaction, this study aimed to fill the existing gap in research and shed light on the potential benefits of simulation exposure for nurses. Therefore, considering the given research gap, the significance of this study will be relevant to the field of nursing education and training. It provides valuable insights into the effectiveness of nursing procedure simulation in enhancing the overall competency and confidence of professional nurses.

Theoretical Framework

This study demonstrates the applicability of Benner's Novice to Expert Theory by Patricia Benner (1982) and David Kolb's Experiential Learning Theory (1984).

Benner's Novice to Expert Theory presents a systematic way of understanding how a learner whether a student, new or seasoned nurse develops skills and understanding of a practice situation/event over time. Benner proposed that as learners attempt to develop competency, they move through five stages–Novice, Advanced beginner, Competent, Proficient and Expert. Proceeding from novice to expert is a circular, rather than linear process, not linear. Accordingly, learners do not necessarily move systematically from one stage to the other and ultimately develop competency in certain skills. Instead, learners

may move from one stage to another repeatedly as they learn new knowledge and skills (Eustace, 2020).

The novice nurse has no experience; simulations can introduce novice nurses to a process of being able to perceive characteristics and aspects of critical patient care situations that may alter the way nursing care is provided. Simulations may promote confidence due to an increased sense of self-efficacy in practice (Bandura, 1986). Benner's Novice to Expert Model can be applied in the simulation environment assisting nurses to better recognize signs of clinical deterioration in a safe environment. According to Benner (1984) as cited by Eubank (2020), the model provides educators the ability to identify the nurse's level of development and allows for the identification of learning needs of the nurse in a specific situation.

Knowledge results from the combination of obtaining and transforming experience. For Kolb, experiential learning occurs through stages and styles. There are four stages: concrete experience (CE), in which one learns by feeling, being involved; reflective observation (RO), in which one learns by observing, reflecting, listening; abstract conceptualization (AC), which makes use of logic, reasoning, creating ideas and systematizing; active experimentation (AE), in which one learns through action, decision making, having their planned action seeking to influence the environment. The stages form a learning cycle in which knowledge will result in the union of the experience achieved and its modification (Figueiredo, Silva, & Prado, 2022).

David Kolb's Experiential Learning Theory, applied to nursing procedure simulation in nursing education, underscores the transformative impact on critical thinking and confidence levels among students. Through immersive and realistic scenarios, nursing procedure simulation provides a concrete experience where nursing students can apply theoretical knowledge in a controlled environment (Koukourikos et al., 2021). Following these simulations, reflective observation promotes a thoughtful analysis of their performance, fostering a deeper understanding of their abilities and areas for improvement (Wijnen-Meijer, 2022).

In the abstract conceptualization stage, learning is achieved through logical analysis, systematic planning, and intellectual engagement with the situation, which enhances a student's ability to reason and articulate their actions clearly. During this stage, the student actively participates in the learning process by explaining their actions and the underlying reasons to the patient, thus demonstrating and refining their logical reasoning skills (Bresolin et al., 2022). This engagement fosters a deeper understanding of the clinical scenario. As students progress to the active experimentation stage, they apply their newly acquired knowledge and skills in real clinical settings. This practical application not only boosts their confidence but also sharpens their critical thinking abilities, as they see the direct impact of their actions and decisions in a clinical environment (Kolb, 2014). The confidence gained through these experiential learning opportunities is crucial, as it reinforces their competence and enhances their overall effectiveness in clinical practice.

Conceptual Framework

This study was conceptualized based on employing a nursing procedure simulation in developing students' levels of critical thinking and confidence in performing nursing procedures.

Critical Thinking. It refers to the extent to which an individual can analyze information, evaluate different options, and make informed decisions or solve complex problems**.** It requires application of judgement and relevant facts in resolving issues in a manner that is efficient.

Simulation is a form of experiential learning (Sterner, Sköld, & Andersson, 2023) and another parameter critical for assessing student's learning outcomes is critical thinking (Sterner et al., 2023).. Educators are challenged with providing an engaging and motivating learning environment for clinical nursing education (Koivisto et al., 2018). Identifying the best teaching strategies to sustain and promote nursing students' engagement in academic and clinical settings has always been a challenge for nurse educators. Hence, it is essential to provide a set of strategies for maintaining and enhancing the academic engagement of nursing

students (Mohammad, Hossein, & Abbas, 2020). The use of nursing procedure simulation is a way for educators to expose students to real-world situations without risking patients' well-being, while introducing caring assessment and interventions for when sudden illness occurs. According to the findings in this study, simulation is one method of supporting nurse students' critical thinking.

Confidence. It refers to the beliefs that we hold about our own potential to achieve an outcome. It is the belief in one's abilities, qualities, and judgment. It reflects a sense of self-assurance arising from an appreciation of one's own abilities or qualities. It contributes to the decisions that we make in our lives and careers and toward our ambitions (Patel, 2019). This is important in determining the confidence of nursing students in performing nursing procedures. Having faith in ourselves means that we are more inclined to take certain risks, weather 'storms' that life brings our way and in the end make it. Satisfaction on the opposite hand enables us to look up to and appreciate our achievable accomplishments providing us with natural satisfaction. Together, confidence and satisfaction create a positive cycle of motivation and growth in both our personal and professional lives. It is a multifaceted attribute that enhances your ability to navigate life's challenges and opportunities with a sense of assurance and positivity. In the simulation, satisfaction refers to contentment with learning through scenarios and can be an important component for Nursing students face challenges in the actual application of theoretical knowledge, and this is an issue on an international level (Koukourikos et al., 2021). Nursing procedure simulation is used to enhance nursing students' clinical performance in assessing and managing situations in clinical placements. The use of nursing procedure simulation increased and became an integrated part of nursing education (Hustad, J et al., 2019). It enables students to work in an environment that is almost similar to a hospital and helps them gain healthcare and nursing experience even before they start working as professionals (Koukourikos et al., 2021). With all this, taught to them, they can try everything and overcome all difficulties and problems; they can make mistakes even without causing any harm; all this, of course, in a safe space, with no risk for

patients whatsoever (Linda et al., 2022). Lack of coordination between theory and practice is one of the major problems of nursing education. An increase in the use of simulation is due to the lack of clinical structures for student training, lack of professors, and due to the increased quality of training provided through this method (Koukourikos et al., 2021).

Nursing procedure simulation is widely used among nursing students to enhance their knowledge, competence (Koukourikos et al., 2021), and skills in clinical settings (Geravandi et al., 2018). With simulation experience of the case, nursing students can commit any kind of medical error conceivable without any adverse effects to the patient (Rogers & Franklin, 2021). The nursing procedure simulation yields optimal use of cognitive load, hence better outcomes related to learning (Johnson et al., 2020), psychomotor skill accumulation, and retention (Anine et al., 2022), facilitation of comprehension, and also reduce aversive feelings in patients (Blackmore, Kasfiki & Purva, 2018). Furthermore, it enhances students' communication skills (Tabatabaeian et al., 2018), problem-solving, and teamwork and collaboration (Arrogante et al., 2022). Learners can interact and empathize with simulated patients in a well-developed scenario to improve their positive attitudes (Azizi et al., 2022). Besides that, it gives supportive feedback and promotes learning. According to Chang et al. (2021), simulation bridges the gap between theory and practice.

Critical thinking and clinical reasoning are among the competencies emphasized in nursing practice. Nursing students must therefore develop and practice them in their nursing programs before graduation as competent nurses (Wong, Su Hui Valynn Wong et al., 2020). Nurses must develop critical thinking skills in managing complex clinical situations to become accountable in this new healthcare scenario. According to Adib-Hajbaghery et al. (2018), "the process of reflective and reasonable thinking about nursing problems without a single solution and is focused on deciding what to believe and do." Nursing procedure simulation students develop more knowledge and personal confidence, satisfaction, and disposition of critical thinking for the assessment and

psychomotor skills. They also demonstrate increased problem-solving ability, communication competency, cooperation, leadership, and delegation skills (Bliss et al., 2018). The impact of nursing procedure simulation on the advancement of nursing students' clinical skills, includes their areas of expertise, self-confidence, and their critical thinking ability to make significant decisions in clinical practice (Guerrero et al., 2022)

Confidence is a key component for effective, safe clinical performance. Nursing procedure simulation has been shown to be very useful in developing and increasing confidence (Bailey et al., 2022). One influential factor in enhancing the quality of clinical services is the presence of self-confidence in both students and educated nurses. Self-confidence is integral to clinical competence and serves as an important indicator of ability and proficiency (Tabriz et al., 2024). Conferring self-confidence in nursing is the quality of professional care by fostering trust and interaction between the nurses and the patients (Kaliyaperumal et at., 2021). Satisfaction of the nursing students' learning was also high as indicated by the improvement of self-confidence of the student, following the clinical simulation from (Kaliyaperumal et at., 2021). However, according to Hung et al., (2021), research performed to assess differing results of nursing procedure simulation has been limited and remains undefined. Whether simulation exposure influences professional nurses and the discovery of an appropriate simulation modality to assist them to improve their clinical competence and expertise is unclear.

Additionally, there is no evidence that simulation exposure helps them to gain knowledge, skills, self-efficacy, confidence, and satisfaction. This study deals with the gap presented above and has a comprehensive investigation of effects of nursing procedure simulation for nursing students. Through investigating various outcomes such as clinical competence, expertise, knowledge, skills, self-efficacy, confidence, and satisfaction, this study will help in filling the gap of current research and enlighten about possible benefits of simulation exposure to nurses. Considering the provided research gap, this study is relevant to the field of nursing education and training. It will provide useful insight into the effectiveness

of nursing procedure simulation in improving the overall competency and confidence of professional nurses.

It has always been a challenge for nurse educators to find the best teaching strategies that can maintain and enhance nursing students' engagement in both academic and clinical settings.

Therefore, there is a need to provide a set of strategies that can be used to maintain and enhance the academic engagement of nursing students (Mohammad, Hossein, & Abbas, 2020).

Use of nursing procedure simulation is one way by which educators expose students to real-world situations without jeopardizing the patients' well-being and introducing caring assessment and interventions for when sudden illness strikes.

The study findings revealed that simulation is one support to nurse students' critical thinking.

Confidence. Beliefs that we hold about our own potential to achieve an outcome. It is the belief in one's abilities, qualities, and judgment. It reflects a sense of self-assurance arising from an appreciation of one's own abilities or qualities. It contributes to the decisions that we make in our lives and careers and toward our ambitions (Patel, 2019).

This is important in determining the confidence of nursing students in performing nursing procedures. Having faith in ourselves means that we are more likely to take some risks, weather 'storms' that life brings our way and in the end make it. Satisfaction on the opposite hand enables us to look up to and appreciate our achievable accomplishments providing us with natural satisfaction. Together, confidence and satisfaction create a positive cycle of motivation and growth in both our personal and professional lives. It is a multi-dimensional quality that adds to your confidence level of handling life's adversities and opportunities with greater assurance and optimism. Satisfaction, in the simulation, would be referring to satisfaction with learning via scenarios and can also play an important role for developing self-confidence. A self-assured person who has made appropriate

choices tends to have a higher level of satisfaction with the outcome (Guerrero, Ali, & Attallah, 2022). self-confidence. An individual who is confident in their abilities and choices tend to be more satisfied with the outcomes (Guerrero, Ali, & Attallah, 2022).

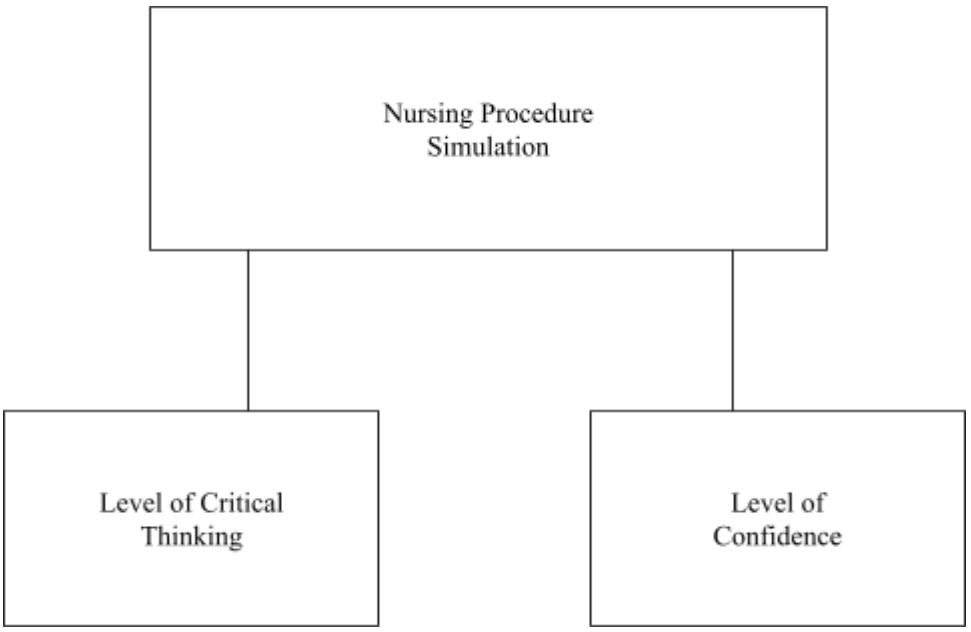

Figure1. Schematic Presentation of the Study

Objectives of the Study

This research study investigated the students' levels of critical thinking and confidence in performing nursing procedure simulation. Specifically, the study was guided by the following objectives:

(1) Assess the respondents' level of critical thinking after nursing procedure simulation.

(2) Determine the respondents' level of confidence after nursing procedure simulation

Significance of the Study

It is clear that the use of strategies based on simulation in improving the students' critical thinking skills level and self-efficacy in executing procedures in nursing is beneficial. For learners, it enables them to practice clinical skills and formulate decisions in a realistic and safe environment which increases their skills level and preparedness for actual health care environments. The instructors' perspective is enhanced since there are more efficient means of teaching and evaluating student performance on such complex tasks. The society on the other hand gains as the healthcare providers are equipped with better skills and confidence thus the quality of care is enhanced. Furthermore, in the case of research to be done in the future, the utilization of simulation strategy offers a wide scope in studying teaching strategies and measures of students' acquisition of knowledge and applications of simulation techniques in nursing education and care which will advance the nursing profession.

RESEARCH METHODOLOGY

This chapter presents the description of the research design, research setting, research respondents, research instruments, and validation of the instrument, data gathering procedure, ethical consideration, and statistical treatment.

Research Design

The research employed a descriptive-correlational design in assessing the students' critical thinking levels and their confidence in the adoption of the nursing procedures. Descriptive-correlation design is a kind of non-experimental research which aims to determine the relationships among two or more characteristics and it makes it possible for the researcher to make observations and correlations among various characteristics without engaging in any manipulative procedures. Data was elicited through the researcher-developed questionnaire which was subjected through statistical treatment before being analyzed and interpreted. A few nursing students took part in pretesting to make sure the questionnaire was valid and reliable and most of them gave suggestions to improve the instrument.

Research Environment

This research was carried out in one of the renowned higher education institutions of Ozamiz City in the Philippines aiming at delivering quality education and in the process ensuring its status as a centre of scholarly activities. The university is dedicated to developing students as global citizens, which has earned the institution accolades for its academic accomplishment in the past as well, accreditation from the PACUCOA and ISO certification award. This made the university the first institution in Mindanao to be awarded this recognition. Other offerings include a 4-year Bachelor of Nursing degree program.

Unit of Analysis, Respondents & Sampling Procedure

The study had a total of eighty-five respondents (85) composed of thirty-five (35) third-year and fifty (50) fourth-year students, selected through purposive sampling. The following criteria has been observed in the selection of the respondents who are: 1.) third- and fourth-year nursing students; and 2.) willingness to participate in the study. Respondents were given questionnaires that assessed their level of critical thinking and confidence in performing nursing procedures.

Data Gathering Instruments and Procedure

To gather pertinent data, the researcher utilized a researcher-made questionnaire in this study. The researchers distributed the questionnaires to eighty-five (85) respondents, allowing them 15 minutes to complete them. Those who declined participation were replaced by other respondents following the same process. The completed questionnaires were collected immediately. The questionnaire and data gathering was the primary tool of inquiry, which is divided into two parts as follows:

*Respondent's Level of Critical Thinking***.** This is a researcher-made questionnaire used to evaluate the respondents' levels of critical thinking in performing nursing procedures which is rated on a Likert scale from 1 (Never) to 4 (Always). Nursing students completed the questionnaire allowing them to demonstrate and reflect on their critical thinking abilities in performing nursing procedures. The collected data were analyzed to determine overall critical thinking levels.

Respondent's Level of Confidence. This is a researcher-made questionnaire used to evaluate respondents' level of confidence in performing nursing procedures which is rated on a Likert scale from 1 (Never) to 4 (Always). Nursing students completed the questionnaire allowing them to demonstrate and reflect on their confidence levels in performing nursing procedures. The collected data were analyzed to determine overall confidence levels.

Validity & Reliability of the Instruments

The nursing procedure simulation scenarios were developed in collaboration with nursing clinical instructors to ensure content validity by encompassing a wide range of nursing procedures and clinical situations. Questionnaire items addressing critical thinking and confidence were crafted based on established theories and definitions.

Construct validity was achieved through a systematic review of all simulation scenarios and questionnaire items to ensure accurate measurement of the intended constructs. This process involved correlating scores obtained using the instruments with American standards on critical thinking in nursing practice. Additionally, feedback from nursing educators and students was solicited to confirm the instruments' credibility and relevance.

Reliability was emphasized to ensure consistency and stability in the study's findings. A pilot test of the simulation scenarios and questionnaire was conducted prior to the main study to identify potential issues that might affect the results. Administration procedures were standardized to minimize response variability. Detailed documentation was maintained throughout the research process to uphold integrity and enhance replicability.

Scoring Guidelines

Each section of the questionnaire conforms to the scoring outline which has been outlined below and uses a continuum to organize the responses of the respondents logically. Using the above systematic procedure also ensures that the critical thinking skills of the respondents and their confidence in performing nursing procedures are objectively and consistently measured.

Respondent's Level of Critical Thinking. This is a researcher-made questionnaire used to evaluate the respondents' levels of critical thinking in performing nursing procedures which is rated on a Likert scale from 1 (Never) to 4 (Always). Nursing students completed the questionnaire allowing them to demonstrate and reflect on their critical thinking abilities in performing nursing

procedures. The collected data were analyzed to determine overall critical thinking levels using this continuum:

Weight	Continuum	Response	Interpretation
4	4.51-5.00	Always	Very High (VH)
3	3.51-4.50	Often	High (H)
2	2.51-3.50	Sometimes	Moderately High (MH)
1	1.51-2.50	Never	Low (L)

Respondent's Level of Confidence. This is a researcher-made questionnaire used to evaluate respondents' level of confidence in performing nursing procedures which is rated on a Likert scale from 1 (Never) to 4 (Always). Nursing students completed the questionnaire allowing them to demonstrate and reflect on their confidence levels in performing nursing procedures. The collected data were analyzed to determine overall confidence levels using this continuum:

Weight	Continuum	Response	Interpretation
4	4.51-5.00	Always	Very High (VH)
3	3.51-4.50	Often	High (H)
2	2.51-3.50	Sometimes	Moderately High (MH)
1	1.51-2.50	Never	Low (L)

Mode of Analysis, Statistical Instruments/Procedure

To derive complete, valid, and reliable results, the following statistical methods and techniques have been used.

Mean and Standard Deviation. This was used to determine the respondents' levels of critical thinking and confidence in performing nursing procedures when employing a simulation-based strategy.

Ethical Considerations

The researchers employed all the ethical considerations in the conduct of the study. The researchers strictly implemented the following: (1) A request letter addressed to the Dean of the College of Nursing, Midwifery, and Radiologic Technology; (2) The respondents were asked to sign an informed consent before the actual distribution of the questionnaire; (3) The respondents were fully informed about the purpose, benefits, and potential risks of the study; (4) The respondents were informed that they can withdraw anytime they wanted from participating in the study; and (5) It is a top priority that researchers handled the data with care, using encryption and anonymization techniques when necessary to protect their identities. Adequate safeguards were put in place to prevent unauthorized access, use, or disclosure of the respondents' personal information. The principle of voluntary participation was emphasized not just at the point of obtaining informed consent but throughout the entire study. Regular check-ins with respondents were conducted to ensure that they remained comfortable with their participation. This ongoing consent process ensured that participants felt empowered and respected throughout the study duration. Participants were given the opportunity to provide feedback on the research process. This feedback was used to improve future studies and to address any issues or concerns raised by the participants. By valuing participant feedback, the researchers demonstrated their commitment to continuous improvement and ethical research practices.

RESULTS AND DISCUSSION

This chapter presents the data analysis and interpretation of the study based on the sequence below.

Respondents' level of critical thinking after nursing procedure simulation

Respondents' level of confidence after nursing procedure simulation

Respondents' Level of Critical Thinking after Nursing Procedure Simulation

Table 1 presents the respondents' critical thinking levels following nursing procedure simulations. The results indicate a moderately high level of critical thinking, with a weighted mean score of 3.50 (SD = 0.46), suggesting that nursing students demonstrate a moderately developing level of critical thinking during simulated nursing procedures. These findings support the effectiveness of simulation training in fostering critical thinking and confidence among nursing students, though additional support may be beneficial for more complex or high-stress situations. This points to the value of enhancing current simulation training with more advanced scenarios to further strengthen students' critical thinking skills. Furthermore, the results underscore the need for ongoing assessment and feedback in educational programs, ensuring that nursing students are prepared for the diverse and unpredictable challenges of clinical practice

These findings highlight the importance of curriculum improvements to better cultivate critical thinking skills in nursing, particularly for handling complex and nuanced tasks. Given that critical thinking is essential in nursing, training strategies should be carefully designed to support the development of this skill (Stenseth et al., 2022). Simulation training is a key method used by nursing programs to boost students' critical thinking abilities (Blakeslee, 2020). Understanding the role of critical thinking in nursing practice is crucial, as attitudes toward critical thinking are integral to the concept of good care and professionalism (Pegueroles et al., 2020). Additionally, assessing

critical thinking is vital for addressing healthcare challenges, validating teaching strategies, and promoting ongoing improvements in nursing education (Prado et al., 2024).

Table 1. Level of Critical Thinking after Nursing Procedure Simulation

Critical Thinking	Mean	SD	Interpretation
Overall	**3.50**	**0.46**	**Moderately High**

Confidence Scale: Critical Thinking Scale: *(4.51-5.00 – Very High), (3.51-4.50 – High), (2.51-3.50 – Moderately High), (1.51-2.50 – Low)*

Respondents' Level of Confidence after Nursing Procedure Simulation

Table 2 presents respondents' confidence levels following nursing procedure simulations, showing an overall moderately high level of confidence. The weighted mean score for confidence was 3.49 (SD = 0.48), suggesting that nursing students generally felt moderately assured in their ability to perform nursing procedures, with consistent and moderately high levels of developing confidence. This finding implies that while simulation training significantly boosts students' confidence in executing procedures, there is still room for growth to achieve a higher degree of assurance and mastery. The moderately high confidence level indicates that respondents felt reasonably competent in their skills after the simulations, an encouraging outcome given the importance of confidence in effective clinical practice. However, the fact that their confidence did not reach the "High" category suggests opportunities for further improvement in training or additional support to help students attain even greater self-assurance.

These findings align with recent research. Zhen et al. (2021) found that high-fidelity simulation greatly enhances nursing students' confidence in clinical settings, underscoring its role in skill development. Similarly, a systematic review by Silva et al. (2022) affirmed that simulation training boosts students' confidence by providing a safe practice environment and immediate feedback. Furthermore, Goldsworthy et al. (2022) demonstrated that a combination of virtual and high-fidelity simulations enhances confidence and competency in nursing students. These studies collectively highlight the value of simulation training as an

essential tool in nursing education, emphasizing the importance of its inclusion in curricula to better prepare nursing students for the demands of real-world clinical practice.

Table 2. Respondents' Level of Confidence after Nursing Procedure Simulation

Confidence	Mean	SD	Interpretation
Overall	**3.49**	**0.48**	**Moderately High**

Confidence Scale: Critical Thinking Scale: *(4.51-5.00 – Very High), (3.51-4.50 – High), (2.51-3.50 – Moderately High), (1.51-2.50 – Low)*

CONCLUSIONS AND RECOMMENDATIONS

This chapter includes a summary of the problem, the findings of the study, conclusions based on the significant findings, and the recommendations proposed based on the result of the study.

Conclusions

1. Table 1 shows that nursing procedure simulation enhances students' critical thinking. This indicates that the students are demonstrating a moderately developed ability to think critically when performing nursing procedures.
2. Table 2 shows that nursing procedure simulation boosts students' confidence in procedures. This indicates that the students are demonstrating moderately high and consistent levels of confidence in performing nursing procedures.

Recommendations

Based on the conclusion drawn from the study, the researchers offer the following recommendations:

1. Conduct a research study exploring how enhanced simulation-based interventions influence the development of critical thinking skills in nursing students. Specifically, it will focus on the effects of integrating advanced simulation scenarios, including high-fidelity simulations that provide real-time feedback and structured debriefing sessions, on the critical thinking capabilities of these students.
2. Conduct a research study exploring how additional and varied simulation experiences affect the confidence levels of nursing students. The focus will be on determining whether increasing the diversity and complexity of simulation scenarios, along with offering more frequent and thorough debriefing sessions, can enhance students' confidence from a moderately high level to a high level.

3. Conduct a research study examining the causal relationship between targeted critical thinking training and the confidence levels of nursing students. The study will implement specific interventions designed to enhance critical thinking, including problem-based learning modules and scenario-based simulations, and assess their direct impact on students' confidence. By evaluating changes in confidence levels before and after the intervention, this research seeks to provide valuable insights into how improving critical thinking skills can directly enhance confidence in clinical practice.
4. The administration should invest in additional high-fidelity simulation models and equipment to offer a wider variety of scenarios, thereby enriching the learning experience for nursing students. This investment should include the development of more complex and diverse simulation scenarios that specifically target medication management and emergency response, with the goal of further enhancing students' confidence and competence in these critical areas.
5. Implement regular assessment and feedback mechanisms throughout simulation training to consistently track student progress and offer timely interventions to address any challenges they may encounter.
6. Develop support services, such as counseling and mentoring, to assist students in coping with the stress and anxiety associated with nursing procedure simulation training. This initiative will foster a positive learning environment and promote the overall well-being of students.
7. Conduct a longitudinal study to monitor the development of critical thinking and confidence levels from the onset of nursing education through to clinical practice.
8. Conduct a research study comparing the effectiveness of different teaching methods (e.g., traditional lectures vs. simulation-based learning) on critical thinking and confidence.

9. Study the relationship between stress levels and performance in simulation-based learning, focusing on critical thinking and confidence.
10. Study the influence of different simulation environments (e.g., high-fidelity vs. low-fidelity simulations) on student outcomes.

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Appendix A – Research Questionnaire

Research Questionnaire

STUDENTS' LEVEL OF CRITICAL THINKING AND CONFIDENCE

AFTER PERFORMING NURSING PROCEDURE SIMULATION USE

Name (Optional):

Gender:

Year-Level:

PART I. HIGH FIDELITY SIMULATION BASED STRATEGY CASE SCENARIO

In a nursing school setting, 3rd and 4th year nursing students are given the opportunity to observe and practice on a high-fidelity simulator named Susie Mannequin. The scene is set in a surgical or medical ward, and Susie Mannequin is stationed on a hospital bed, portraying symptoms of urinary retention. As the scenario unfolds, Susie's distress becomes evident, with signs of discomfort and urgency. The students are tasked with performing a catheterization procedure to alleviate her discomfort and prevent potential complications.

PART II. LEVEL OF CONFIDENCE

Directions: Put a check in the box that corresponds to your perception.

4 – Always (A) 3 – Often (O)

2 – Sometimes (S) 1 – Never (N)

APPENDIX A – Cont'd

STATEMENT	1	2	3	4
	N	S	O	A
1. I am confident in my ability to perform catheterization in a patient after the high-fidelity simulation training.				
2. High-fidelity simulation training improved my confidence in performing catheterization to patients with urinary retention.				
3. I am confident in my ability to obtain and interpret vital signs accurately after the simulation training.				
4. High-fidelity simulation training increased my confidence in providing comfort measures to patients.				
5. I am confident in my ability to perform basic nursing procedure, such as catheterization, in a medical or surgical ward after the simulation training.				
6. High-fidelity simulation training improved my confidence in communicating with patients and families about their care.				
7. I am confident in my ability to document patient care accurately after the simulation training.				

8. High-fidelity simulation training increased my confidence in managing patient medications and responding to medication-related incidents.				
9. I am confident in responding to emergency situations, after the simulation training.				
10. High-fidelity simulation training improved my confidence in working effectively in interdisciplinary healthcare teams in a medical or surgical ward.				
11. I am confident in my ability to identify and respond to changes in patient condition, such as in a patient with urinary retention, sepsis, or diabetic ketoacidosis, after the simulation training.				
12. High-fidelity simulation training increased my confidence in assessing and managing pain in patients with complex medical conditions.				
13. I am confident in my ability to manage and maintain sterility in performing catheterization in a medical or surgical ward after the simulation training.				
14. High-fidelity simulation training improved my confidence in conducting patient education and discharge planning in a medical or surgical ward.				
15. I am confident in my ability to maintain patient privacy and confidentiality, and uphold ethical				

standards of practice, after the simulation training.				

PART III. LEVEL OF CRITICAL THINKING.

Directions: Put a check in the box that corresponds to your perception.

4 – Always (A) 3 – Often (O)

2 – Sometimes (S) 1 – Never (N)

STATEMENT	**1**	**2**	**3**	**4**
	N	**S**	**O**	**A**
1. High-fidelity simulation training enhanced my ability to critically analyze patient data and determine the appropriate nursing interventions.				
2. I feel that the simulation training has prepared me to prioritize nursing interventions and manage competing patient needs in a medical or surgical ward.				
3. High-fidelity simulation training increased my ability to apply evidence-based practice guidelines to patient care.				
4. I am confident in my ability to analyze and interpret patient data				

accurately after the simulation training.				
5. High-fidelity simulation training improved my ability to think critically and problem-solve in complex patient scenarios.				
6. I feel that the simulation training has prepared me to anticipate and respond to potential complications or adverse events in patient care.				
7. High-fidelity simulation training improved my ability to evaluate the effectiveness of nursing interventions and adjust care plans accordingly.				
8. I feel that the simulation training has prepared me to anticipate and address ethical dilemmas in patient care after the simulation training.				
9. High-fidelity simulation training improved my ability to evaluate and utilize research findings in patient care.				
10. I feel that the simulation training has prepared me to work collaboratively in interdisciplinary healthcare teams in a medical or surgical ward.				
11. High-fidelity simulation training increased my ability to identify and address cultural, socioeconomic, and personal factors that may impact patient care.				

12. High-fidelity simulation training improved my ability in performing catheterization after the simulation training.				
13. High-fidelity simulation training improved my ability to evaluate and prioritize patient needs in a medical or surgical ward.				
14. High-fidelity simulation training improved my ability to communicate effectively with patients and families about their care after the simulation training.				
15. High-fidelity simulation training improved your ability to identify gaps in your own knowledge and seek resources to inform your nursing practice.				

APPENDIX B

Sample of Filled Out Questionnaire

Questionnaire
On

EMPLOYING HIGH FIDELITY SIMULATION-BASED STRATEGY IN DEVELOPING STUDENTS' LEVEL OF CRITICAL THINKING AND CONFIDENCE IN PERFORMING NURSING PROCEDURES

Name (Optional): :)
Gender: Female
Year-Level: 4A

PART I. HIGH FIDELITY SIMULATION BASED STRATEGY CASE SCENARIO

In a nursing school setting, 3rd and 4th year nursing students are given the opportunity to observe and practice on a high-fidelity simulator named Susie Mannequin. The scene is set in a surgical or medical ward, and Susie Mannequin is stationed on a hospital bed, portraying symptoms of urinary retention. As the scenario unfolds, Susie's distress becomes evident, with signs of discomfort and urgency. The students are tasked with performing a catheterization procedure to alleviate her discomfort and prevent potential complications.

PART II. LEVEL OF CONFIDENCE

Directions: Put a check in the box that corresponds to your perception.
4 – Always (A) 3 – Often (O)
2 – Sometimes (S) 1 – Never (N)

STATEMENT	1 N	2 S	3 O	4 A
1. I am confident in my ability to perform catheterization in a patient after the high-fidelity simulation training.			✓	
2. High-fidelity simulation training improved my confidence in performing catheterization to patients with urinary retention.			✓	
3. I am confident in my ability to obtain and interpret vital signs accurately after the simulation training.			✓	
4. High-fidelity simulation training increased my confidence in providing comfort measures to patients.			✓	
5. I am confident in my ability to perform basic nursing procedure, such as catheterization, in a medical or surgical ward after the simulation training.		✓		
6. High-fidelity simulation training improved my confidence in communicating with patients and families about their care.			✓	
7. I am confident in my ability to document patient care accurately after the simulation training.			✓	
8. High-fidelity simulation training increased my confidence in managing patient medications and responding to medication-related incidents.		✓		
9. I am confident in responding to emergency situations, after the simulation training.		✓		
10. High-fidelity simulation training improved my confidence in working effectively in interdisciplinary healthcare teams in a medical or surgical ward.		✓		
11. I am confident in my ability to identify and respond to changes in patient condition, such as in a patient with urinary retention, sepsis, or diabetic ketoacidosis, after the simulation training.			✓	
12. High-fidelity simulation training increased my confidence in assessing and managing pain in patients with complex medical conditions.			✓	

APPENDIX B – Con'd

13. I am confident in my ability to manage and maintain sterility in performing catheterization in a medical or surgical ward after the simulation training.				✓
14. High-fidelity simulation training improved my confidence in conducting patient education and discharge planning in a medical or surgical ward.				✓
15. I am confident in my ability to maintain patient privacy and confidentiality, and uphold ethical standards of practice, after the simulation training.			✓	

PART III. LEVEL OF CRITICAL THINKING.

Directions: Put a check in the box that corresponds to your perception.

4 – Always (A) 3 – Often (O)

2 – Sometimes (S) 1 – Never (N)

STATEMENT	1 N	2 S	3 O	4 A
1. High-fidelity simulation training enhanced my ability to critically analyze patient data and determine the appropriate nursing interventions.				✓
2. I feel that the simulation training has prepared me to prioritize nursing interventions and manage competing patient needs in a medical or surgical ward.			✓	
3. High-fidelity simulation training increased my ability to apply evidence-based practice guidelines to patient care.			✓	
4. I am confident in my ability to analyze and interpret patient data accurately after the simulation training.				✓
5. High-fidelity simulation training improved my ability to think critically and problem-solve in complex patient scenarios.			✓	
6. I feel that the simulation training has prepared me to anticipate and respond to potential complications or adverse events in patient care.				✓
7. High-fidelity simulation training improved my ability to evaluate the effectiveness of nursing interventions and adjust care plans accordingly.			✓	
8. I feel that the simulation training has prepared me to anticipate and address ethical dilemmas in patient care after the simulation training.			✓	
9. High-fidelity simulation training improved my ability to evaluate and utilize research findings in patient care.				✓
10. I feel that the simulation training has prepared me to work collaboratively in interdisciplinary healthcare teams in a medical or surgical ward.				✓
11. High-fidelity simulation training increased my ability to identify and address cultural, socioeconomic, and personal factors that may impact patient care.			✓	
12. High-fidelity simulation training improved my ability in performing catheterization after the simulation training.			✓	
13. High-fidelity simulation training improved my ability to evaluate and prioritize patient needs in a medical or surgical ward.				✓
14. High-fidelity simulation training improved my ability to communicate effectively with patients and families about their care after the simulation training.			✓	
15. High-fidelity simulation training improved your ability to identify gaps in your own knowledge and seek resources to inform your nursing practice.			✓	

2

APPENDIX C

Informed Consent Form

MISAMIS UNIVERSITY

Ozamis City

College of nursing, Midwifery and Radiologic Technology

Title

This study is titled "Employing Simulation-Based Strategy in Developing Students' Level of Critical Thinking and Confidence in Performing Nursing Procedures" In Partial Fulfillment of the Requirements For the Degree of Bachelor of Science in Nursing

Researcher

This study is to be conducted by Ralph Josh Y. Alantaol, Joshua Roberto S. Barcela, Edvel Done A. Baura, Nicole Joy B. Bazar, and Apple Pearl Campaner who are pursuing the degree in bachelor of science in nursing at Misamis University College of Nursing, with Susan Ng Santos, MAN, RN as the adviser. The researcher was contacted through this email.

Purpose of the research

The purpose of this study was to observe and practice on a high-fidelity simulator named Susie Mannequin on how it affects the confidence and critical thinking of nursing students in performing nursing procedures.

Description of the Research

Quantitative was used in this study, specifically the descriptive correlational method. This research utilized a quantitative design specifically the descriptive

APPENDIX C - Cont'd

research design and the data was collected through a researcher-made questionnaire within 2 months.

Potential Benefits

The study was a great benefit to the third and fourth-year Nursing Students. Respondents were given a chance to use Susie and perform procedures that can enhance their confidence and critical thinking in real life scenarios. Thus the experience will enable the students to understand the importance of confidence and critical thinking in performing nursing procedures.

Confidentiality

In the conduct of the study, full confidentiality was assured. No information that discloses your identity will be released or published without your specific consent to the disclosure and only imperatively necessary. The materials that contained the raw information derived from you will be destroyed after data processing within a given period.

Publications

The results of this study may be published in any form for public and scholarly consumption or used in classroom instruction to enrich learning and generate more knowledge for future research.

Participation

Your participation in this study must be voluntary and you have the right to withdraw if you feel uncomfortable in the process of gathering information from you.

APPENDIX C - Cont'd

Informed Consent

Given the information above, I confirm that the potential harms, benefits, and alternatives have been explained to me. I have read and understood this consent

form, and I understand that I am free to withdraw from my involvement in the study any time I deem it to be necessary or to seek clarification for any unclear steps in the research process. My signature indicates my willingness to participate in the study.

_____ _____

Printed Name & Signature of the Research Respondents **Date**

APPENDIX D

Approved Letters of Consent

MISAMIS UNIVERSITY
Ozamiz City 7200, Philippines
College of Nursing, Midwifery and Radiologic Technology
Tel No. +63 88 521-0367 / Telefax No. +63 88 521-2917
E-mail Address: mu@mu.edu.ph

CERTIFIED: ISO 9001:2015 Quality Management System – DNV
ACCREDITED: Philippine Association of Colleges and Universities Commission on Accreditation (PACUCOA)
GRANTED: AUTONOMOUS STATUS by the Commission on Higher Education (CHED)

LETTER OF REQUEST

May 28, 2024
DR. JESUS G. OCAPAN, PhD, MAN RN
Dean, College of Nursing, Midwifery and Radiologic Technology
Misamis University

Dear Dr. Ocapan,

Greetings of Peace and Prosperity!

We, the third-year students of Misamis University, Ozamiz City taking up Bachelor of Science in Nursing would like to formally request permission to conduct research entitled "EMPLOYING SIMULATION-BASED STRATEGY IN DEVELOPING STUDENTS' LEVEL OF CRITICAL THINKING AND CONFIDENCE IN PERFORMING NURSING PROCEDURES" This study aims to assess the level of critical thinking and confidence in performing nursing procedures among the third year and fourth year nursing students after a simulation-based strategy.

Be assured that any information obtained here will be handled with utmost confidentiality.

Sincerely yours,

RALPH JOSH Y. ALANTAOL
JOSHUA ROBERTO S. BARCELA
EDVEL DONE A. BAURA
NICOLE JOY B. BAZAR
APPLE PEARL CAMPANER

Researchers

Noted by:

SUSAN NG SANTOS, MAN, RN
Research Adviser

Approved by:

DR. JESUS G. OCAPAN, PhD, MAN, RN
College Dean

APPENDIX E

Statistical Computations

1. Determine the respondent's simulation-based strategy to develop level of critical thinking in performing nursing procedures as to year level, third year, and fourth year.

Table 1. Level of Critical Thinking

Critical Thinking	Mean	SD	Interpretation
1. I am confident in my ability to perform catheterization in a patient after the high-fidelity simulation training.	3.55	0.59	High
2. High-fidelity simulation training improved my confidence in performing catheterization to patients with urinary retention.	3.51	0.59	High
3. I am confident in my ability to obtain and interpret vital signs accurately after the simulation training.	3.52	0.63	High
4. High-fidelity simulation training increased my confidence in providing comfort measures to patients.	3.55	0.57	High
5. I am confident in my ability to perform basic nursing procedure, such as catheterization, in a medical or surgical ward after the simulation training.	3.52	0.61	High
6. High-fidelity simulation training improved my confidence in communicating with patients and families about their care.	3.46	0.63	Moderately High
7. I am confident in my ability to document patient care accurately after the simulation training.	3.55	0.63	High
8. High-fidelity simulation training increased my confidence in managing patient medications and responding to medication-related incidents.	3.45	0.65	Moderately High
9. I am confident in responding to emergency situations, after the simulation training.	3.40	0.64	Moderately High

APPENDIX E - Cont'd

10. I feel that the simulation training has prepared me to work collaboratively in interdisciplinary healthcare teams in a medical or surgical ward.	3.41	0.66	Moderately High
11. High-fidelity simulation training increased my ability to identify and address cultural, socioeconomic, and personal factors that may impact patient care.	3.34	0.63	Moderately High
12. High-fidelity simulation training improved my ability in performing catheterization after the simulation training.	3.45	0.65	Moderately High
13. High-fidelity simulation training improved my ability to evaluate and prioritize patient needs in a medical or surgical ward.	3.49	0.70	Moderately High
14. High-fidelity simulation training improved my ability to communicate effectively with patients and families about their care after the simulation training.	3.56	0.61	High
15. High-fidelity simulation training improved your ability to identify gaps in your own knowledge and seek resources to inform your nursing practice.	3.60	0.62	High
Overall Confidence	**3.49**	**0.48**	**Moderately High**

Confidence Scale: Critical Thinking Scale: *(4.51-5.00 – Very High), (3.51-4.50 – High), (2.51-3.50 – Moderately High), (1.51-2.50 – Low)*

3. Explore the significant relationship between students' levels of critical thinking and confidence in performing nursing procedures in employing simulation-based strategy.

Table 3. Significant Relationship Between Students' Level of Critical Thinking and Confidence in Performing Nursing Procedures in Employing Simulation-based Strategy.

Variables	r- value	p-value	Interpretation

APPENDIX E - Cont'd

Critical Thinking & Confidence	0.74	0.00	Highly Significant

Note: p<0.01 (Highly Significant; p<0.05 (Significant); p>0.05 (Not Significant)

Descriptive Statistics: Confidence Average, CRITICAL THINKING-AVERAGE

```
Variable                    Mean    StDev
Confidence Average        3.4937   0.4788
CRITICAL THINKING-AVERAG  3.5020   0.4598
```

Correlation: Confidence Average, CRITICAL THINKING-AVERAGE

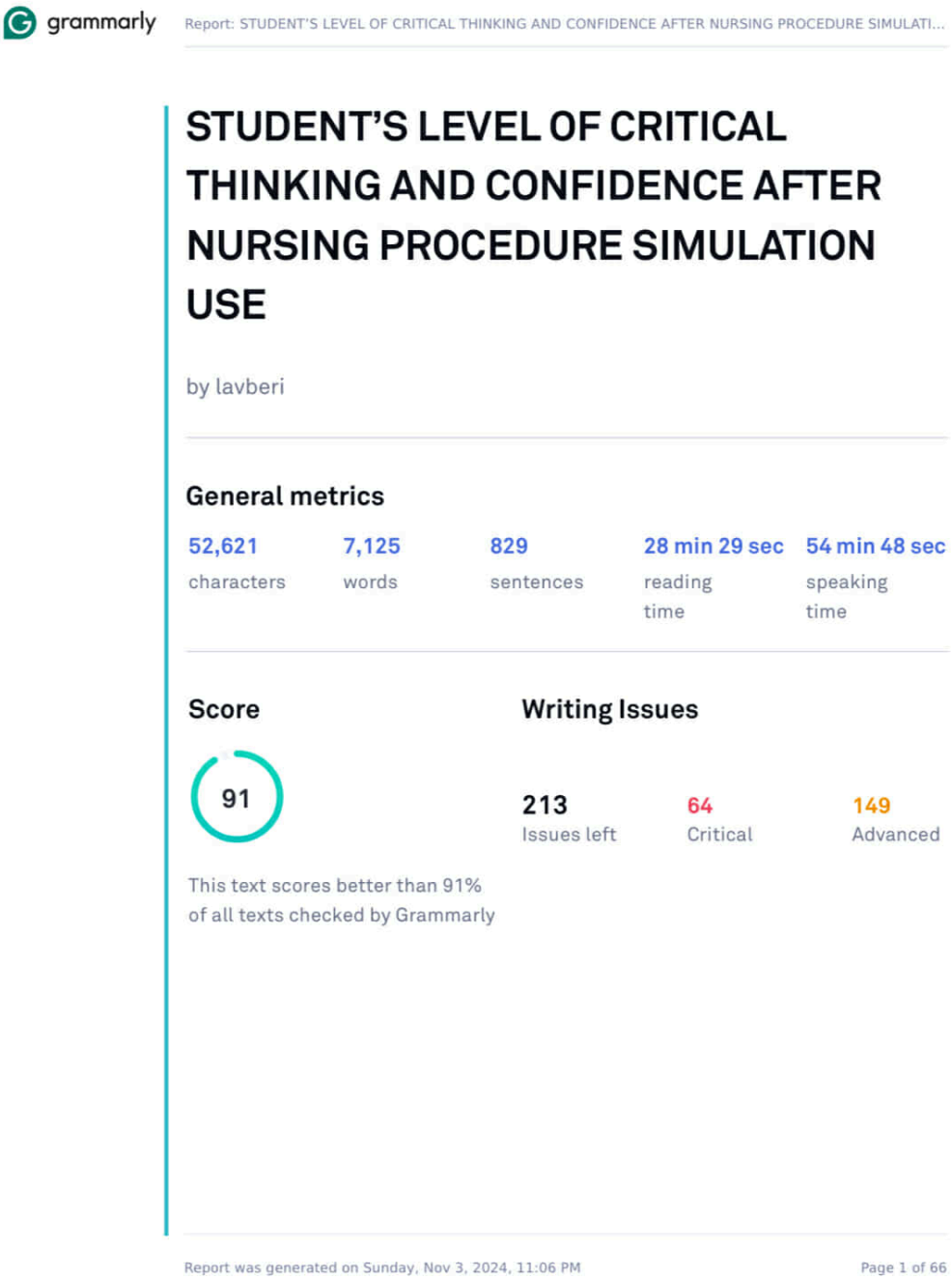
```
Pearson correlation of Confidence Average and CRITICAL THINKING-AVERAGE = 0.740
P-Value = 0.000
```

APPENDIX F

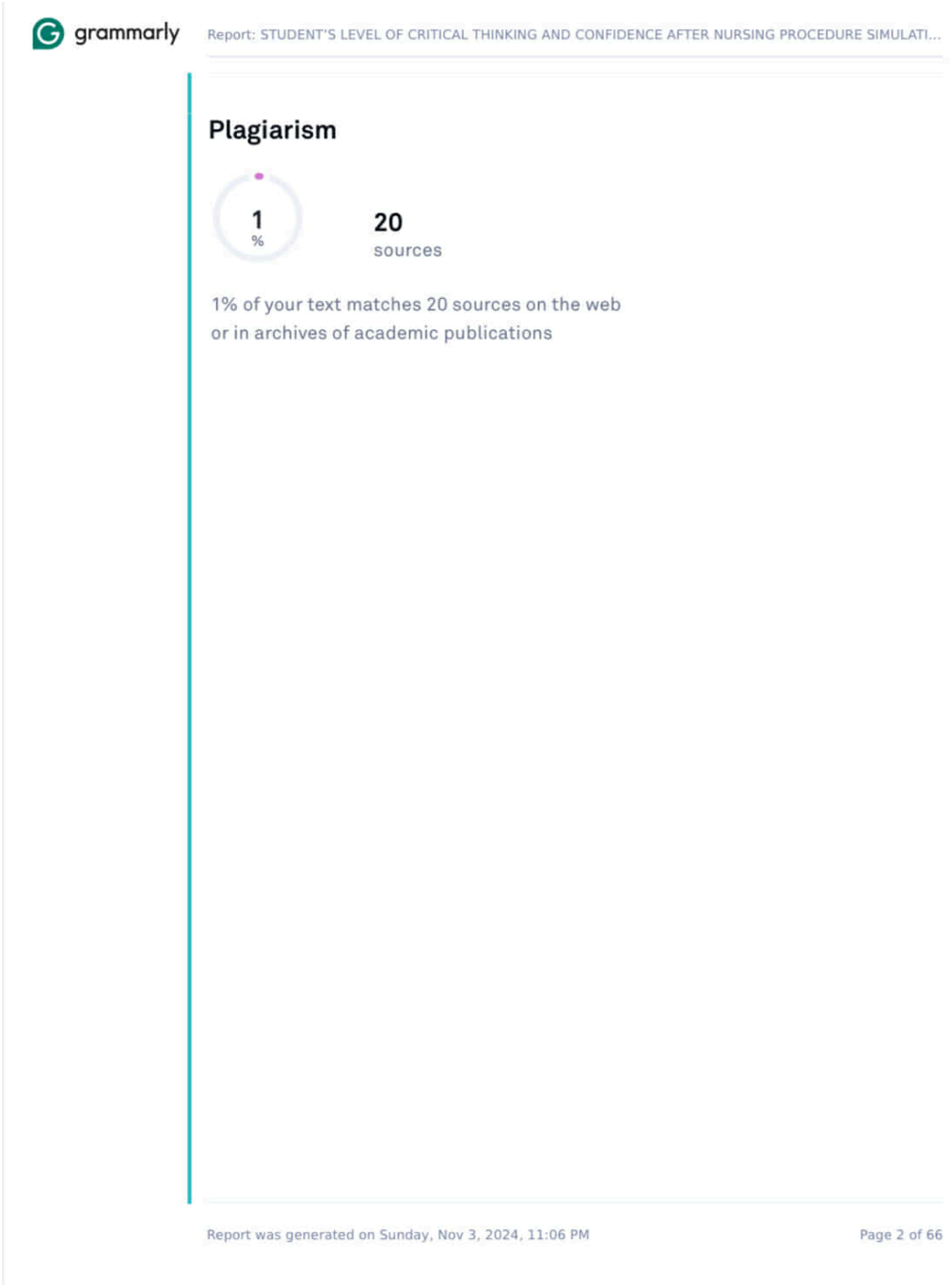
Documentations

APPENDIX G

Grammarly Report, and Turnitin Results

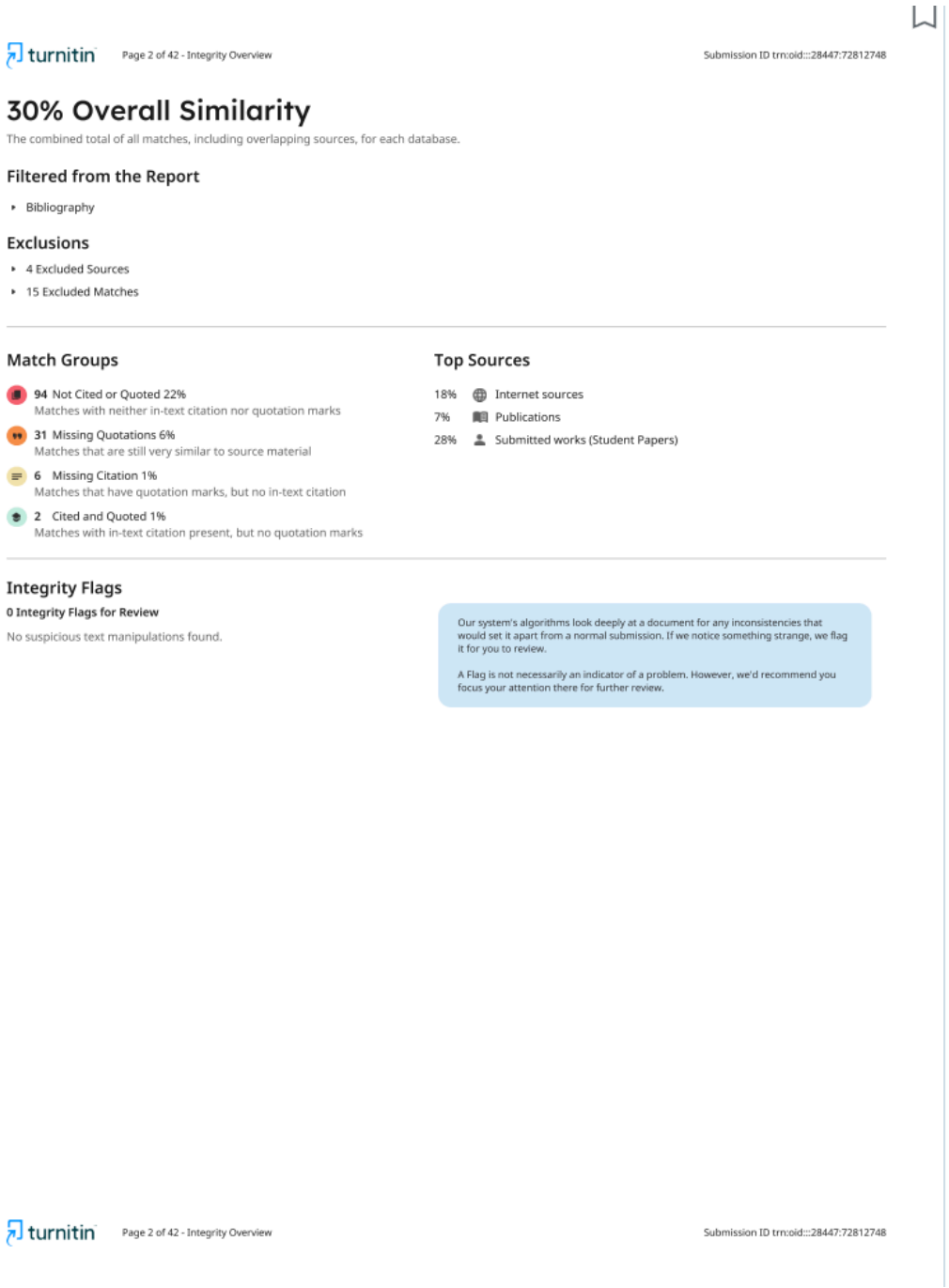


APPENDIX G – Cont'd



APPENDIX G - Cont'd

Turnitin Result



turnitin Page 2 of 42 - Integrity Overview Submission ID trn:oid:::28447:72812748

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- 2 Cited and Quoted 1%
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CURRICULUM VITAE

PERSONAL DATA

Name: Ralph Josh Y. Alantaol

Date of Birth: May 2, 2003

Parents: Mr & Mrs. Raul L. Alantaol

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Contact Number: 09157041900

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EDUCATIONAL BACKGROUND

Elementary: Misamis University

Secondary: Junior High School: Misamis University

Senior High School: La Salle University Integrated School

Tertiary: Misamis University

CURRICULUM VITAE

PERSONAL DATA

Name: Joshua Roberto S. Barcela

Date of Birth: April 11, 2002

Parents: Mr & Mrs. Barcela

Religion: Roman Catholic

Residence: 020 Purok Makiangayon, Maningcol, Ozamiz City, Misamis Occidental

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EDUCATIONAL BACKGROUND

Elementary: Medina College Grade School

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Senior High School: Misamis University

Tertiary: Misamis University

CURRICULUM VITAE

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Name: Edvel Done A. Baura

Date of Birth: April 21, 2002

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Religion: Roman Catholic

Residence: Purok 7 Dimaporo St. Poblacion, Baroy, Lanao del Norte

Contact Number: 09159078593

Email: edveldonebaura@gmail.com

EDUCATIONAL BACKGROUND

Elementary: Baroy Central Elementary School

Secondary: Junior High School: Lanao del Norte National High School

Senior High School: Lanao del Norte National High School

Tertiary: Misamis University

CURRICULUM VITAE

PERSONAL DATA

Name: Nicole Joy B. Bazar

Date of Birth: October 14, 2002

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Religion: Roman Catholic

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Contact Number: 09150449594

Email: nicolejoybazar14@gmail.com

EDUCATIONAL BACKGROUND

Elementary: Tangub City Central School

Secondary:

Junior High School: Tangub City National High School

Senior High School: Northwestern Mindanao State College

Tertiary: Misamis University

CURRICULUM VITAE

PERSONAL DATA

Name: Apple Pearl Campaner

Date of Birth: January 6, 2003

Parents: Ms. Aileen E. Campaner

Religion: The Church of Jesus Christ of Latter Day Saints

Residence: R.S Tan Maningcol, Ozamiz City, Misamis Occidental

Contact Number: 09708991712

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EDUCATIONAL BACKGROUND

Elementary: La Salle University

Secondary:

Junior High School: Misamis University

Senior High School: Misamis University

Tertiary: Misamis University