

Student Perspective on Artificial Intelligence in Nursing Education: Basis for an Enhancement Program

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ABSTRACT

Artificial Intelligence (AI) is increasingly transforming healthcare and nursing education by enhancing learning experiences, clinical decision-making, and technology-assisted patient care. However, the successful integration of AI into nursing curricula depends on students' awareness, perceived benefits, and perspectives toward its adoption. This study aimed to determine nursing students' perspectives on Artificial Intelligence in Nursing Education as a basis for developing an enhancement program. A descriptive-correlational research design was employed involving 645 nursing students from selected Higher Education Institutions in Nueva Ecija, Philippines. Data were collected using a validated researcher-developed questionnaire and analyzed using frequency, percentage, weighted mean, standard deviation, Spearman's Rank Correlation, and Kruskal-Wallis H Test. The findings revealed that respondents demonstrated a favorable level of AI awareness ($M = 3.95$), positive perceptions of the benefits of AI integration ($M = 3.98$), and an overall favorable perspective toward AI adoption in nursing education ($M = 3.74$). Ethical concerns related to data privacy, security, and algorithmic bias emerged as the most prominent challenge. Significant relationships were found between demographic characteristics and students' awareness and perceived benefits, whereas no significant relationship was observed between demographic characteristics and students' perspectives. Moreover, awareness exhibited a significant positive relationship with students' perspectives, indicating that greater AI awareness contributes to more favorable attitudes toward AI integration. The study concludes that nursing students are generally receptive to AI-enhanced learning, highlighting the need for nursing institutions to strengthen AI literacy, technological readiness, and ethical competencies through structured educational initiatives. An AI enhancement program is recommended to support the effective and responsible integration of AI into nursing education.

Key words: Artificial Intelligence, Nursing Education, Nursing Students, AI Awareness.

1. INTRODUCTION

Artificial Intelligence (AI) has emerged as one of the most transformative technologies in the twenty-first century,

reshaping healthcare delivery, clinical decision-making, and professional education. In nursing education, AI-powered applications including intelligent tutoring systems, adaptive learning platforms, virtual patient simulations, predictive analytics, and generative AI tools have created new opportunities to enhance students' learning experiences, strengthen clinical reasoning, and improve preparedness for technology-driven healthcare environments. As healthcare systems continue to embrace digital transformation, nursing schools are challenged to equip future nurses with the knowledge, skills, and ethical competencies necessary to effectively and responsibly utilize AI in clinical practice.

Globally, higher education institutions are increasingly integrating AI into nursing curricula to promote personalized learning, simulation-based education, and evidence-informed clinical decision-making. Countries such as the United States, the United Kingdom, Canada, Australia, and several European and Asian nations have adopted AI-supported educational technologies to improve student engagement, diagnostic reasoning, and competency development. International organizations, including the World Health Organization, likewise recognize digital health and artificial intelligence as essential components of future healthcare systems. Consequently, nursing educators are expected to prepare graduates who are technologically competent while maintaining patient-centered, ethical, and compassionate care.

In the Philippines, the integration of AI into nursing education remains an emerging initiative. National efforts to promote digital transformation, including the Philippine Artificial Intelligence Roadmap 2021–2028 and the Philippine eHealth Strategic Framework and Plan, emphasize the importance of adopting innovative technologies across education and healthcare sectors. Despite these policy directions, many nursing institutions continue to experience challenges related to limited technological infrastructure, inadequate faculty preparation, insufficient curricular integration, and concerns regarding ethical and responsible AI use. As one of the world's leading producers of nursing professionals, the Philippines must ensure that nursing graduates possess competencies that align with the rapidly evolving demands of global healthcare systems where AI-assisted technologies are becoming increasingly prevalent.

At the local level, nursing schools in Nueva Ecija are gradually incorporating digital learning technologies into teaching and learning processes. However, the extent to which AI has been integrated into nursing education varies considerably among institutions due to differences in technological resources, institutional readiness, faculty expertise, and students' access to digital tools. While nursing students are increasingly exposed to AI applications such as generative AI, virtual learning platforms, and online clinical resources, little is known about their level of awareness, perceived educational benefits, and overall perspectives toward AI integration. Understanding these factors is essential for designing educational strategies that promote responsible AI utilization while addressing technological, pedagogical, and ethical challenges.

Although numerous international studies have examined AI adoption in healthcare and medical education, relatively few have focused specifically on nursing students in the Philippine context. Existing studies primarily investigate faculty readiness, technological acceptance, or general digital literacy, leaving limited empirical evidence regarding nursing students' awareness, perceived benefits, and perspectives toward AI integration in nursing education, particularly in provincial higher education institutions. Furthermore, there remains a scarcity of studies that examine the relationships between students' demographic characteristics, AI awareness, perceived benefits, and perspectives to inform the development of institution-specific enhancement programs. This gap highlights the need for locally generated evidence that can guide curriculum development, faculty capacity building, and policy formulation for AI integration in nursing education.

Accordingly, this study aimed to determine the perspectives of nursing students on Artificial Intelligence in Nursing Education as a basis for developing an enhancement program. Specifically, it sought to describe the respondents' demographic profile, determine their level of AI awareness and perceived benefits, assess their perspectives toward AI integration, examine the relationships between demographic variables and AI-related perceptions, and determine the association between AI awareness and students' perspectives. The findings are expected to provide evidence that can assist nursing educators, academic administrators, curriculum developers, and policymakers in strengthening AI literacy, promoting ethical AI utilization, and developing responsive educational initiatives that prepare nursing graduates for technology-enabled healthcare environments. Ultimately, the proposed enhancement program seeks to facilitate the effective, ethical, and sustainable integration of artificial intelligence into nursing education, thereby contributing to improved educational quality and future nursing practice.

2. RELATED WORK

2.1 Artificial Intelligence in Nursing Education

Artificial Intelligence (AI) has become an integral component of healthcare innovation, significantly influencing nursing education through intelligent learning

systems, predictive analytics, virtual simulation, and generative AI applications. AI enables nursing students to engage in personalized learning experiences by adapting instructional content to individual learning needs, providing real-time feedback, and supporting competency development. Educational technologies powered by AI including virtual patients, intelligent tutoring systems, clinical decision support tools, and adaptive assessment platforms have enhanced students' critical thinking, clinical reasoning, and decision-making skills while promoting learner engagement and self-directed learning.

The rapid advancement of generative AI technologies, such as large language models, has further transformed nursing education by assisting students in literature review, concept explanation, case analysis, care planning, and academic writing. Despite these benefits, concerns remain regarding overdependence on AI, reduced critical thinking, academic integrity, algorithmic bias, patient data privacy, and ethical decision-making. Consequently, nursing educators emphasize that AI should complement rather than replace human judgment, compassionate care, and professional accountability.

Healthcare organizations worldwide continue to recognize AI as a strategic tool for improving healthcare quality and workforce readiness. Consequently, nursing curricula are increasingly integrating digital health, nursing informatics, and AI competencies to prepare graduates for technologically advanced healthcare environments.

2.2 Technology Acceptance Model (TAM)

Figure 1, Technology Acceptance Model (TAM), developed by Davis (1989), is one of the most widely applied theoretical frameworks for understanding technology adoption. TAM proposes that an individual's intention to use a technology is primarily influenced by two constructs: Perceived Usefulness (PU) – the extent to which an individual believes that using a technology enhances performance. Perceived Ease of Use (PEOU) – the extent to which an individual believes that using a technology requires minimal effort.

These perceptions shape users' attitudes toward technology, which subsequently influence their behavioral intention and actual system use.

Within nursing education, TAM has been extensively employed to explain nursing students' acceptance of simulation technologies, electronic health records, mobile learning applications, telehealth systems, and AI-based educational platforms. Students who perceive AI as beneficial for improving learning outcomes and easy to use are more likely to adopt AI-supported educational technologies. Conversely, perceived complexity, inadequate technological skills, and limited institutional support may reduce technology acceptance.

The present study adopts TAM as one of its guiding theoretical foundations because students' awareness and perceived benefits of AI are expected to influence their perspectives toward AI integration in nursing education.

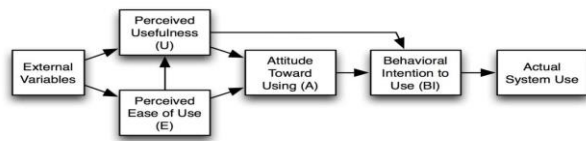


Figure 1: Technology Acceptance Model.

2.3 Experiential Learning Theory

Figure 2, Kolb's Experiential Learning Theory (ELT) provides another important framework for understanding how AI can enhance nursing education. ELT explains that meaningful learning occurs through the continuous transformation of experience into knowledge via four interconnected stages: Concrete Experience, Reflective Observation, Abstract Conceptualization, Active Experimentation.

AI-supported simulations, virtual patients, augmented clinical scenarios, and adaptive learning platforms provide authentic learning experiences that allow nursing students to repeatedly practice clinical skills within safe learning environments. Immediate AI-generated feedback enables students to reflect on their performance, refine clinical reasoning, and apply newly acquired knowledge to future situations.

Experiential Learning Theory therefore supports the integration of AI technologies that facilitate experiential, reflective, and student-centered learning while strengthening clinical competence and lifelong learning.

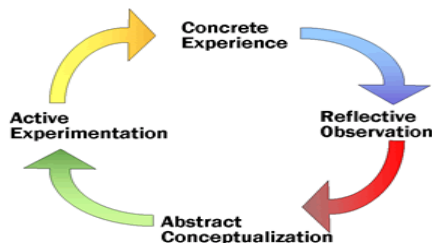


Figure 2: Kolb's Cycle of Experiential Learning Theory.

2.4 Technological Competency as Caring in Nursing Theory

Figure 3, Technological Competency as Caring in Nursing Theory, developed by Locsin (2005), emphasizes that technological competence should coexist with caring rather than replace it. According to the theory, technology enables nurses to know patients more fully and provide individualized, holistic care.

The theory argues that modern healthcare technologies including AI, robotics, electronic health records, and decision-support systems should serve as instruments that enhance nurses' ability to understand patients while

preserving compassion, empathy, ethical practice, and human dignity.

In nursing education, this theory reinforces the importance of preparing future nurses who are both technologically competent and caring professionals. AI should therefore be integrated into nursing curricula not only to improve technical competencies but also to strengthen ethical decision-making, communication, patient advocacy, and person-centered care.

This theoretical perspective is particularly relevant because one of the major findings of the present study highlights ethical concerns regarding privacy, security, and algorithmic bias. These concerns underscore the necessity of balancing technological innovation with the core values of the nursing profession.

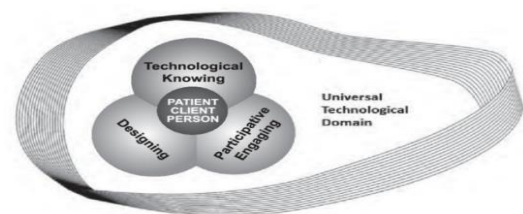


Figure 3: Technological Competency as Caring in Nursing.

2.5 Existing Studies on Artificial Intelligence in Nursing Education

Recent studies consistently demonstrate growing acceptance of AI among nursing students and educators. International research indicates that AI-assisted learning improves academic performance, clinical reasoning, diagnostic accuracy, personalized learning, and learner engagement. Students generally perceive AI as a valuable educational resource capable of supplementing classroom instruction, supporting simulation-based learning, and enhancing access to evidence-based information.

However, previous studies also report several barriers to AI integration. These include inadequate digital literacy, limited institutional infrastructure, faculty readiness, concerns regarding misinformation generated by AI systems, academic dishonesty, algorithmic bias, cybersecurity risks, and ethical dilemmas associated with patient confidentiality.

Studies conducted in developing countries suggest that technological infrastructure and faculty preparedness remain significant determinants of successful AI implementation. While students generally express favorable attitudes toward AI, they also emphasize the importance of structured training, institutional policies, ethical guidelines, and curriculum integration to maximize AI's educational benefits.

Within the Philippine context, research on AI in nursing education remains limited. Existing investigations primarily focus on technology adoption, e-learning readiness, digital literacy, or nursing informatics rather than students'

comprehensive perspectives regarding AI awareness, perceived benefits, technological barriers, educational challenges, and ethical concerns. Consequently, there is limited empirical evidence describing how Filipino nursing students perceive AI as an educational innovation.

2.6 Research Gap

Although the literature demonstrates the growing importance of AI in nursing education, several research gaps remain. First, most existing studies have been conducted in technologically advanced countries, limiting the applicability of their findings to developing educational contexts such as the Philippines. Second, previous research has predominantly examined AI adoption among faculty members, healthcare professionals, or medical students, with relatively few studies focusing specifically on undergraduate nursing students.

Third, limited research has simultaneously examined nursing students' awareness, perceived benefits, and overall perspectives toward AI integration while exploring their relationships with demographic characteristics. Moreover, ethical concerns—including data privacy, algorithmic bias, responsible AI use, and technological readiness—have often been investigated independently rather than within a comprehensive framework that informs educational interventions.

There remains a lack of evidence-based enhancement programs designed specifically to improve AI readiness among Filipino nursing students. Addressing these gaps, the present study investigates nursing students' awareness, perceived benefits, and perspectives regarding AI integration in nursing education among selected Higher Education Institutions in Nueva Ecija. The findings provide empirical evidence for the development of a structured enhancement program that supports responsible, ethical, and effective AI integration into nursing education while strengthening students' technological competence and preparedness for future healthcare practice.

3. METHODOLOGY

3.1 Research Design

This study employed a descriptive-correlational research design to determine nursing students' perspectives on Artificial Intelligence (AI) in nursing education and examine the relationships among demographic characteristics, level of awareness, perceived benefits, and perspectives toward AI integration. The descriptive component described the respondents' demographic profile, awareness, perceived benefits, and perspectives, while the correlational component examined the relationships between demographic variables (age, year level, and socio-economic status), awareness, perceived benefits, and students' perspectives, including the association between awareness and overall perspective. This design was appropriate because it allowed the investigation

of naturally occurring relationships among variables without manipulating the study environment.

3.2 Respondents

The respondents consisted of 645 undergraduate nursing students enrolled in selected Higher Education Institutions (HEIs) in Nueva Ecija, Philippines during the Academic Year 2025–2026. Participants were selected using proportionate stratified random sampling to ensure adequate representation across participating institutions and year levels. Eligible respondents were officially enrolled Bachelor of Science in Nursing students who voluntarily agreed to participate and provided informed consent. Students who were absent during data collection or who declined participation were excluded from the study.

The selected respondents represented different age groups, year levels, and socio-economic backgrounds, allowing the researcher to examine variations in awareness, perceived benefits, and perspectives toward AI integration across demographic characteristics. The sample size was considered sufficient to provide reliable statistical analysis and meaningful interpretation of the study findings.

3.3 Research Instrument

Data were collected using a researcher-developed questionnaire designed to assess nursing students' perspectives on Artificial Intelligence in Nursing Education. The instrument was developed following an extensive review of related literature and previous empirical studies concerning AI, educational technology, nursing informatics, and technology acceptance.

The questionnaire consisted of five sections: Part I. Demographic Profile, including age, year level, and monthly family income, Part II. Level of Awareness of Artificial Intelligence in Nursing Education, Part III. Perceived Benefits of Artificial Intelligence in Nursing Education, Part IV. Student Perspectives on AI Integration, comprising four dimensions: Student Readiness, Technological Barriers, Andragogical Challenges, Ethical Concerns.

Responses for Parts II to IV were measured using a five-point Likert scale, where higher scores indicated greater awareness, stronger perceived benefits, or stronger agreement with the corresponding statements.

Prior to data collection, the instrument underwent face and content validation by a panel of experts composed of nursing educators and information technology specialists. Recommendations from the validators were incorporated into the final instrument to improve clarity, relevance, and content adequacy. Reliability testing likewise demonstrated that the questionnaire possessed satisfactory internal consistency, making it appropriate for data collection.

3.4 Ethical Considerations

The study adhered to established ethical principles for research involving human participants. Ethical clearance was obtained from the appropriate Institutional Ethics Review Committee, with approval from the Philippine Women’s University under Ethics Review Protocol No. ERB2025_181, and permission was secured from the participating higher education institutions. Participation was voluntary, and informed consent was obtained after respondents were informed of the study’s purpose, procedures, benefits, and minimal risks. Participants were free to withdraw at any time without consequence. Confidentiality and anonymity were maintained by excluding personal identifiers, securely storing all data, and restricting access to the researcher. The study upheld the principles of respect for persons, beneficence, non-maleficence, justice, privacy, and confidentiality throughout the research process.

3.5 Data Collection

Following the approval of the research protocol and the issuance of institutional permissions, the researcher coordinated with the participating colleges of nursing regarding the schedule and procedures for data collection. Eligible respondents were informed about the nature and objectives of the study and were invited to participate voluntarily.

After obtaining informed consent, the researcher administered the validated questionnaires either through face-to-face distribution or an online survey platform, depending on the institutional preference and accessibility of the respondents. Participants were given adequate time to complete the questionnaire independently.

Completed questionnaires were reviewed for completeness before encoding and organizing the data for statistical analysis. All responses were treated confidentially throughout the data management process.

3.6 Statistical Analysis

Collected data were encoded, organized, and analyzed using appropriate statistical software. Both descriptive and inferential statistical techniques were employed to address the research objectives.

The following statistical tools were utilized:

Table 1: Statistical Tools.

Research Objective	Statistical Tool
Describe respondents' demographic profile	Frequency and Percentage Distribution
Determine the level of awareness	Weighted Mean and Standard Deviation
Determine the perceived benefits	Weighted Mean and Standard Deviation
Determine students' perspectives	Weighted Mean and Standard Deviation
Determine the relationship between age and awareness, perceived benefits, and perspectives	Spearman's Rank Correlation Coefficient
Determine the relationship between year level	Kruskal–Wallis H Test

and awareness, perceived benefits, and perspectives	
Determine the relationship between socio-economic status and awareness, perceived benefits, and perspectives	Kruskal–Wallis H Test
Determine the relationship between awareness and students' perspectives	Spearman's Rank Correlation Coefficient

A 5% level of significance ($\alpha = 0.05$) was adopted for all inferential analyses. The null hypothesis was rejected when the computed p-value was less than 0.05, indicating a statistically significant relationship between the variables. The use of non-parametric statistical tests was appropriate because the data were obtained from ordinal Likert-scale responses and did not require the assumption of normal distribution.

4. RESULTS AND DISCUSSION

4.1 Demographic Profile of the Respondents

Table 2: Demographic Profile of the Respondents.

Age Group	Frequency	Percentage (%)
18 and below	82	12.71
19-20	295	45.74
21-22	242	37.52
23-24	13	2.02
25 and above	13	2.02
18 and below	82	12.71
19-20	295	45.74
21-22	242	37.52
23-24	13	2.02
25 and above	13	2.02
Below ₱10,000	155	24.03
₱10,001-₱19,999	117	18.14
₱20,000-₱29,999	133	20.62
₱30,000-₱39,999	86	13.33
₱40,000-₱49,999	67	10.39
₱50,000-₱59,999	42	6.51
₱60,000-₱69,999	18	2.79
₱70,000 and above	27	4.19
		100

n=645

For Table 2, a total of 645 undergraduate nursing students participated in the study. The demographic profile was analyzed in terms of age, year level, and socio-economic status.

Most respondents were 19–20 years old (45.74%), followed by those aged 21–22 years (37.52%), indicating that the participants largely belonged to the traditional undergraduate nursing population. This finding reflects the characteristics

of contemporary nursing students who are generally familiar with digital technologies and increasingly exposed to artificial intelligence applications in educational settings. Previous studies have shown that nursing students demonstrate favorable attitudes toward AI and recognize its potential to enhance learning and clinical competence when provided with appropriate educational experiences (Booth *et al.*, 2024; De Gagne, 2023). Likewise, greater academic and clinical exposure enables students to better appreciate the practical and ethical applications of AI in nursing practice (Ronquillo *et al.*, 2021).

Respondents were also distributed across all year levels, with Second-Year students (26.36%) comprising the largest group, allowing the study to capture perspectives from different stages of nursing education. As students' progress through the nursing curriculum, they are increasingly exposed to digital health technologies, simulation-based learning, and clinical decision-support systems, which may strengthen their understanding and acceptance of AI in nursing education (Booth *et al.*, 2024; Robert, 2019).

In terms of socio-economic status, most respondents came from poor to lower-middle-income households, with 24.03% reporting a monthly family income below ₱10,000. Socio-economic differences may influence students' access to digital devices, internet connectivity, and AI-enabled educational resources, which in turn affect opportunities to develop AI-related competencies. Nevertheless, institutional initiatives that provide equitable access to digital infrastructure, faculty support, and AI literacy programs can help reduce these disparities and promote inclusive AI integration in nursing education (World Health Organization, 2021; Ronquillo *et al.*, 2021; Castonguay *et al.*, 2023).

The demographic characteristics provide important context for interpreting students' awareness, perceived benefits, and perspectives toward AI integration, as differences in educational exposure and access to technological resources may contribute to variations in AI readiness.

4.2 Students' Level of Awareness of Artificial Intelligence in Nursing Education

Table 3: Student Level of Awareness of AI in Nursing Education.

No.	Statement	Mean	SD	Interpretation
1	I know how AI is used in the medical field in helping with the diagnosis of patients.	3.9922	0.791	Moderately Aware
2	I am familiar with AI-based devices which allow for controlling patient health and basic life indicators.	3.9364	0.8156	Moderately Aware
3	I appreciate the importance of AI in improving patient management in the hospital environment.	4.1581	0.7537	Very Aware
4	I am knowledgeable of AI usage related to precision medicine specialty practices.	3.8915	0.8547	Moderately Aware

5	In my practice, I met AI-based decision-support tools designed for clinical use.	3.7302	0.9234	Moderately Aware
6	I am knowledgeable of AI systems that help healthcare professionals do their administrative work such as scheduling and billing.	3.9287	0.8254	Moderately Aware
7	I am able to identify the possible problems that can be faced during the adoption of AI in health care.	4.0233	0.7748	Very Aware
Overall		3.9515	0.6545	Moderately Aware

Legend: 4.21 – 5.00 Extremely Aware; 3.41 – 4.20 Very Aware; 2.61 – 3.40 Moderately Aware; 1.81 – 2.60 Slightly Aware; 1.00– 1.80 Not Aware at All

In Table 3, the respondents demonstrated an overall high level of awareness of AI in nursing education (M = 3.9515, SD = 0.6545), indicating a solid understanding of AI applications in healthcare. The highest-rated item, appreciating AI's role in improving patient management (M = 4.1581), suggests that students recognize AI's potential to enhance healthcare efficiency and patient outcomes. This finding is consistent with previous studies showing that nursing students who possess greater knowledge of AI are more likely to recognize its value in supporting clinical decision-making, improving patient care, and enhancing learning experiences (Booth *et al.*, 2024; De Gagne, 2023). Likewise, the Technology Acceptance Model (TAM) explains that perceived usefulness is a key determinant of technology acceptance, supporting students' favorable awareness of AI.

Students also demonstrated awareness of the challenges associated with AI adoption (M = 4.0233), reflecting an understanding of ethical, privacy, and implementation issues. This finding is consistent with studies emphasizing that AI education should promote not only technical competence but also awareness of ethical responsibilities, data privacy, transparency, and responsible AI use in healthcare (World Health Organization, 2021; Ronquillo *et al.*, 2021). Respondents likewise recognized AI applications in diagnosis, patient monitoring, and administrative functions, supporting previous findings that exposure to digital health technologies enhances AI awareness and readiness among nursing students (Booth *et al.*, 2024; Robert, 2019).

The lowest-rated item was exposure to AI-based clinical decision-support tools (M = 3.7302), suggesting that although respondents possess adequate theoretical knowledge, opportunities for practical experience with AI remain limited. Similar observations have been reported by O'Connor (2022), who noted that nursing students require greater exposure to AI-supported clinical applications to strengthen competence and confidence in technology-enabled practice. These findings underscore the need to enhance AI integration through experiential learning, simulation-based education, and curriculum innovation to better prepare future nurses for increasingly technology-driven healthcare environments (De Gagne, 2023; Booth *et al.*, 2024).

4.3 Perceived Benefits of Artificial Intelligence in Nursing Education

Table 4: Student Perceived Benefits of AI in Nursing Education.

No.	Statement	Mean	SD	Interpretation
1	AI can enhance patient outcomes by increasing the accuracy of clinical diagnoses.	3.8295	0.8481	Agree
2	AI can be helpful in ensuring that care delivery in nursing practice is evidence-based.	3.9147	0.8098	Agree
3	AI makes it possible to streamline operational processes by addressing unnecessary tasks on a routine basis.	3.9101	0.7750	Agree
4	I anticipate that AI will lighten the burden carried out by nurses and transform the level of care provided to patients.	3.9938	0.8396	Agree
5	I imagine AI might be useful in detecting diseases early which would enhance the prognosis of the patient.	3.9364	0.8251	Agree
6	I am worried about the possibility that AI will remove the personal touch in the patient's care process.	4.0450	0.8896	Agree
7	I perceive AI to be a threat to the employment opportunities available to nurses in some branches of healthcare.	3.8543	0.9606	Agree
8	I think that the introduction of AI would create dependence on technology, which would hinder nursing practice.	3.9426	0.8766	Agree
9	I think that there is a need for education about AI and that it should be used as a supporting factor in nursing practice and not as a form of substitution.	4.2760	0.7711	Strongly Agree
10	I believe that AI can assist with the management of healthcare records and other information relevant to patients.	4.0837	0.8013	Agree
11	AI based on real-time analysis of patients' data streams can eliminate a lot of guesswork in the decision-making processes for nurses.	3.9705	0.8099	Agree
Overall		3.9779	0.6203	Agree

Legend: 4.21 – 5.00 Strongly Agree (SA); 3.41 – 4.20 Agree (A); 2.61 – 3.40 Slightly Agree (SLA); 1.81 – 2.60 Disagree (D); 1.00 – 1.80 Strongly Disagree (SD)

Table 4 shows that the respondents generally agreed on the benefits of AI in nursing education ($M = 3.9779$, $SD = 0.6203$), indicating positive perceptions of its role in improving healthcare delivery, clinical decision-making, and nursing practice. The highest-rated item, the need for AI education while using AI as a support rather than a replacement for nurses ($M = 4.2760$), reflects students' recognition that AI should complement professional judgment and compassionate care. This finding is consistent with the World Health Organization (2021), which emphasizes that artificial intelligence should augment rather

than replace healthcare professionals while supporting safe, ethical, and person-centered care. Likewise, Booth et al. (2024) highlighted that AI should be integrated into nursing education as a complementary tool that enhances clinical reasoning and learning rather than substituting professional judgment.

Respondents also agreed that AI can improve healthcare record management, reduce nurses' workload, support evidence-based practice, facilitate early disease detection, and enhance clinical decision-making. These findings are consistent with De Gagne (2023) and Ronquillo et al. (2021), who reported that AI technologies improve healthcare efficiency, strengthen clinical decision-making, and support evidence-based nursing practice while enhancing the quality of patient care. Similarly, Robert (2019) emphasized that AI has the potential to optimize healthcare processes while assisting healthcare professionals in making informed clinical decisions.

At the same time, students expressed concerns regarding the possible loss of the human touch in patient care, dependence on technology, and the potential impact of AI on future nursing roles. These concerns are consistent with the recommendations of the World Health Organization (2021) and Castonguay et al. (2023), which emphasize that AI implementation in healthcare must be guided by ethical principles, transparency, human oversight, and the preservation of compassionate, patient-centered nursing care. Overall, the findings indicate that nursing students are receptive to AI integration but advocate for its ethical, human-centered, and supportive use in nursing education and clinical practice.

4.4 Students' Perspectives on Artificial Intelligence Integration

Table 5: Student Perspective in Integrating AI into Nursing Education.

No.	Statement	Mean	SD	Interpretation
1	I realize that the low level of knowledge of students about AI tools hampers its integration into nursing education.	3.6822	0.8721	Agree
2	I know that diverse levels of digital literacy among the students will influence the effectiveness of AI-based education.	3.7256	0.8815	Agree
3	I am aware that AI technologies intimidate students due to their complexity.	3.6512	0.9412	Agree
4	I know that inadequate training on AI tools limits students' ability to use them in an effective manner.	3.8140	0.8931	Agree
5	I am aware that some students may not have access to personal devices or	3.9008	0.8720	Agree

	technology needed to use AI tools.			
6	I recognize that students may prefer old ways of learning to AI-based ways.	3.5845	0.9495	Agree
7	I understand that students may be afraid to use AI tools because of the fear of making mistakes.	3.7364	0.9251	Agree
8	I am aware that the students may not understand fully why AI is relevant to their nursing practice.	3.6992	0.8966	Agree
9	I believe that students need extra help to properly use AI in their studies.	3.8605	0.9320	Agree
10	I know that students' attitudes toward the adoption of AI can make them ready to learn.	3.7597	0.9356	Agree
Overall		3.7414	0.9142	Agree

Legend: 4.21 – 5.00 Strongly Agree (SA); 3.41 – 4.20 Agree (A); 2.61 – 3.40 Slightly Agree (SLA); 1.81 – 2.60 Disagree (D); 1.00 – 1.80 Strongly Disagree (SD)

In Table 5, the respondents generally agreed on the factors influencing the integration of AI into nursing education ($M = 3.7414$, $SD = 0.9142$), indicating a positive yet cautious perspective toward AI adoption. The highest-rated item, limited access to personal devices and technology ($M = 3.9008$), highlights technological accessibility as a key challenge. This finding is consistent with Ronquillo *et al.* (2021) and the World Health Organization (2021), which identified inequitable access to digital technologies, technological infrastructure, and digital resources as significant barriers to the successful implementation of AI and digital health innovations in healthcare education. Students also recognized the need for additional training and AI literacy, supporting the findings of De Gagne (2023) and Booth *et al.* (2024), who emphasized that structured AI education and hands-on learning experiences improve nursing students' confidence, competence, and readiness to use AI responsibly in clinical practice.

Respondents further agreed that digital literacy, attitudes toward AI, and fear of making mistakes influence students' readiness to adopt AI. This finding is consistent with the Technology Acceptance Model (TAM), which proposes that perceived usefulness and perceived ease of use influence technology acceptance. Similarly, Robert (2019) and Booth *et al.* (2024) reported that students who perceive AI as useful and receive adequate educational support demonstrate greater acceptance of AI technologies. Although preference for traditional learning methods received the lowest mean ($M = 3.5845$), it remained within the Agree category, suggesting that resistance to AI is less of a concern than access to technology and adequate training. This finding is further supported by Castonguay *et al.* (2023), who emphasized that appropriate institutional support, faculty preparedness, and curriculum integration facilitate the successful adoption of AI in nursing education.

The findings emphasize that successful AI integration requires equitable access to digital technologies, structured AI education, faculty development, and institutional support to prepare nursing students for increasingly technology-driven healthcare environments (World Health Organization, 2021; Booth *et al.*, 2024).

4.5 Technological Barriers

Table 6: Technological Barriers.

No.	Statement	Mean	SD	Interpretation
1	I appreciate that given the limited access to many AI tools and technologies, their integration within nursing education could be challenging.	3.8000	0.9031	Agree
2	I acknowledge that there may be problems of outdated infrastructure in most of the nursing institutions regarding AI technologies.	3.8543	0.8473	Agree
3	I know that in order to integrate AI systems in learning, substantial financial resources are required.	3.8434	0.8839	Agree
4	I know that with poor internet connectivity, effective application of AI in nursing education may be difficult.	4.0155	0.8898	Agree
5	I understand that learners might be put off during AI-impacted courses because of the absence of specific technology or software-related problems.	3.8651	0.8463	Agree
6	I accept that integration of AI in nursing schools is likely to be obstructed due to low levels of IT support.	3.8744	0.8766	Agree
7	I understand that many challenges regarding the adoption of AI systems in education are related to the absence of a concrete standard AI platform.	3.8295	0.8752	Agree
8	I know that technical difficulties concerning AI tools may inhibit the use of these technologies in nursing education.	3.8868	0.8676	Agree
9	I understand that the changing dynamics of AI and other IT tools makes it challenging to update nursing education systems.	3.9209	0.8387	Agree
10	I know that the limited number of AI training programs for educators may	3.9395	0.8494	Agree

also serve as a hindrance
towards timely
implementation of AI.

Overall **3.8829** **0.8693** **Agree**

Legend: 4.21 – 5.00 Strongly Agree (SA); 3.41 – 4.20 Agree (A); 2.61 – 3.40 Slightly Agree (SLA); 1.81 – 2.60 Disagree (D); 1.00 – 1.80 Strongly Disagree (SD)

Table 6 shows that the respondents agreed that technological barriers affect the integration of AI in nursing education ($M = 3.8829$, $SD = 0.8693$), indicating awareness of challenges related to infrastructure, connectivity, funding, and technical support. The highest-rated barrier was poor internet connectivity ($M = 4.0155$), emphasizing the importance of reliable internet access for AI-supported learning. This finding is consistent with the World Health Organization (2021) and Ronquillo *et al.* (2021), which identified inadequate digital infrastructure, limited technological resources, and disparities in digital access as significant barriers to implementing AI and digital health innovations in healthcare education and practice.

Respondents also recognized that limited AI training for educators, rapidly evolving technologies, inadequate information technology support, and financial constraints hinder AI implementation. Similar findings were reported by De Gagne (2023) and Booth *et al.* (2024), who emphasized that successful AI integration requires faculty development, continuous curriculum enhancement, institutional investment, and ongoing professional training to ensure educators and students are prepared to use AI technologies effectively. Likewise, Castonguay *et al.* (2023) highlighted the importance of organizational readiness and institutional support in promoting sustainable AI adoption within nursing education.

Although limited access to AI tools received the lowest mean ($M = 3.8000$), it remained within the Agree category, suggesting that students perceive infrastructure and institutional readiness as greater concerns than the availability of AI applications alone. These findings underscore the need to strengthen digital infrastructure, enhance faculty competence, provide adequate technical support, and expand institutional investments to facilitate the effective and ethical integration of AI into nursing education (World Health Organization, 2021; Booth *et al.*, 2024; Robert, 2019).

4.6 Andragogical Barriers

Table 7: Andragogical Barriers.

No.	Statement	Mean	SD	Interpretation
1	I understand that AI integration in nursing education calls for modifications in traditional teaching methods.	3.9287	0.8658	Agree
2	I am aware that some instructors do not have the competencies to teach effectively using AI tools.	3.8388	0.9218	Agree

3	I understand that AI infusion into the curriculum demands significant course material redesign.	3.8667	0.8710	Agree
4	I am aware that there is a challenge in finding a balance between traditional nursing education methods and AI tools.	3.8946	0.8871	Agree
5	I understand that nursing educators will face challenges in aligning AI-based learning outcomes with clinical practice.	3.8946	0.9010	Agree
6	I understand that resistance to change in educators can hinder the process of introducing AI in nursing education.	3.8992	0.9007	Agree
7	I acknowledge that training educators on the AI tools and applications consumes much time.	3.8155	0.9233	Agree
8	I realize that students may have trouble adjusting to AI-based learning environments.	3.7504	0.9627	Agree
9	I understand that equal learning opportunities for all students are likely to be denied when AI tools are introduced.	3.8372	0.9173	Agree
10	I find that relying on AI in nursing education diminishes the importance of interpersonal skills training.	3.8729	0.9338	Agree

Overall **3.8598** **0.9095** **Agree**

Legend: 4.21 – 5.00 Strongly Agree (SA); 3.41 – 4.20 Agree (A); 2.61 – 3.40 Slightly Agree (SLA); 1.81 – 2.60 Disagree (D); 1.00 – 1.80 Strongly Disagree (SD)

Table 7 results show that the respondents agreed that andragogical barriers influence the integration of AI in nursing education ($M = 3.8598$, $SD = 0.9095$), indicating that successful AI adoption requires changes in teaching strategies, curriculum design, and educator preparedness. The highest-rated item, the need to modify traditional teaching methods ($M = 3.9287$), supports the findings of De Gagne (2023) and Booth *et al.* (2024), who emphasized that integrating AI into nursing education requires innovative instructional strategies, curriculum redesign, and personalized learning experiences to prepare students for increasingly technology-driven healthcare environments.

Respondents also recognized that educator resistance, curriculum redesign, faculty competence, and balancing AI with clinical practice are important challenges. These findings are consistent with Castonguay *et al.* (2023) and Ronquillo *et al.* (2021), who emphasized that successful AI implementation depends on faculty preparedness, organizational readiness, and institutional support for

curriculum transformation. Likewise, the World Health Organization (2021) underscored the importance of equipping educators with the competencies needed to integrate AI responsibly while ensuring that educational innovations remain aligned with ethical standards and patient-centered care.

Concerns that AI may reduce opportunities to develop interpersonal skills further support the view that technological innovations should enhance rather than replace the caring dimension of nursing. Robert (2019) and the World Health Organization (2021) emphasized that AI should complement professional judgment, communication, empathy, and compassionate care, preserving the humanistic values that are fundamental to nursing practice. Although students' adjustment to AI-based learning received the lowest mean ($M = 3.7504$), it remained within the Agree category, suggesting that most students are willing to adapt to technology-enhanced learning when appropriate educational support is provided. Overall, the findings highlight the need for curriculum innovation, faculty development, and instructional approaches that integrate AI while maintaining the humanistic and ethical foundations of nursing education (Booth *et al.*, 2024; De Gagne, 2023).

4.7 Ethical Concerns Related to Data Privacy, Security, and Algorithmic Bias

Table 8: Ethical Concerns Related to Data Privacy, Security, and Algorithmic Bias.

No.	Statement	Mean	SD	Interpretation
1	I understand that AI education in nursing might raise concerns about student data privacy.	3.9426	0.9131	Agree
2	There is a potential risk of experiencing data breaches when using AI-related tools in education.	3.9659	0.8734	Agree
3	I am aware that AI algorithms can produce biased outcomes and this will affect fairness in learning.	3.9566	0.9113	Agree
4	I understand how lack of transparency in AI would cause ethical dilemmas regarding nursing education.	3.9721	0.8557	Agree
5	I understand that obtaining students' consent is essential when their data is utilized by AI tools.	3.9426	0.9062	Agree
6	I understand that the security of AI systems is a key challenge in nursing education.	3.9504	0.8885	Agree
7	I realize that biased AI systems can reinforce stereotypes in nursing education.	3.9643	0.8724	Agree
8	I understand that ethical	3.9380	0.8772	Agree

standards for AI usage in education are still under development.

9 I am aware of the importance of having accountability mechanisms for errors in AI systems. 3.9705 0.9058 Agree

10 I realize that ethical issues can lower the trustworthiness of AI tools for nursing students and instructors. 3.9767 0.9163 Agree

Overall 3.9580 0.8916 Agree

Legend: 4.21 – 5.00 Strongly Agree (SA); 3.41 – 4.20 Agree (A); 2.61 – 3.40 Slightly Agree (SLA); 1.81 – 2.60 Disagree (D); 1.00 – 1.80 Strongly Disagree (SD)

In Table 8, the respondents agreed on the ethical concerns surrounding AI integration in nursing education ($M = 3.9580$, $SD = 0.8916$), indicating strong awareness of issues related to data privacy, security, transparency, accountability, and algorithmic bias. The highest-rated item, ethical issues reducing trust in AI tools ($M = 3.9767$), highlights the importance of trustworthy AI systems. This finding is consistent with the World Health Organization (2021), which emphasized that transparency, accountability, human oversight, and ethical governance are essential for the responsible adoption of artificial intelligence in healthcare and education. Similarly, Booth *et al.* (2024) emphasized that integrating AI into nursing education requires the promotion of ethical competence alongside technological proficiency to ensure safe and responsible AI utilization.

Respondents also recognized the importance of transparency, accountability, data security, informed consent, and preventing algorithmic bias, reflecting awareness of responsible AI use. These findings are consistent with Ronquillo *et al.* (2021) and De Gagne (2023), who emphasized that protecting patient information, maintaining transparency in AI-assisted decision-making, and minimizing algorithmic bias are fundamental ethical responsibilities when integrating AI into nursing education and healthcare practice. Likewise, Castonguay *et al.* (2023) highlighted the importance of establishing institutional policies, ethical guidelines, and governance mechanisms to ensure the responsible implementation of AI technologies.

Although awareness of evolving ethical standards for AI received the lowest mean ($M = 3.9380$), it remained within the Agree category, suggesting that students recognize the continuing development of AI governance. These findings underscore the importance of integrating AI ethics, data privacy, cybersecurity, and responsible AI practices into nursing curricula to ensure the safe, ethical, and patient-centered use of AI technologies while preparing future nurses for digitally enabled healthcare environments (World Health Organization, 2021; Robert, 2019).

4.8 Relationship Analyses

Table 9: Spearman's Rank Correlation Between Age and Level of Awareness (N = 645).

Variable Pair	Spearman rho	p-value	Decision on Ho	Interpretation
Age vs. Awareness	0.1406	0.0003	Reject Ho	Significant

Note: The level of significance was set at $\alpha = 0.05$. H = Kruskal-Wallis H statistic; rho = Spearman's rank correlation coefficient.
A positive Spearman rho indicates a direct relationship; rejection of Ho indicates a statistically significant relationship at the 0.05 level

The analysis in Table 9 revealed a significant positive relationship between age and AI awareness ($p = 0.1406$, $p = 0.0003$), leading to the rejection of the null hypothesis. Although the correlation was very weak, the findings suggest that older nursing students tend to have slightly higher awareness of AI, possibly due to greater academic maturity and increased exposure to clinical learning environments where digital health technologies are introduced. This finding is consistent with Booth et al. (2024) and De Gagne (2023), who reported that increased educational exposure and engagement with AI-related learning activities enhance nursing students' understanding of AI applications and their readiness to integrate these technologies into clinical practice. Similarly, Ronquillo et al. (2021) emphasized that developing digital health competencies through formal education strengthens students' awareness and preparedness for AI-enabled healthcare.

The findings also support the Technology Acceptance Model (TAM), which posits that perceived usefulness influences technology awareness and acceptance. As students gain greater exposure to AI concepts and recognize their relevance to nursing practice, they become more receptive to adopting AI technologies in education and healthcare (Robert, 2019). Despite the statistically significant relationship, the weak correlation indicates that age alone is not a strong predictor of AI awareness. This suggests that structured AI education and equitable learning opportunities should be provided to nursing students across all age groups to promote consistent AI literacy and preparedness (World Health Organization, 2021; Booth et al., 2024).

Table 10: Kruskal-Wallis H Test: Year Level and Level of Awareness (N = 645).

Year Level	n	Mean Awareness Score
First Year	162	3.7690
Second Year	170	3.9017
Third Year	144	4.0784
Fourth Year	169	4.0685

Test Statistic	Value
H-statistic	27.1923

p-value	< 0.001
Decision on Ho	Reject Ho
Interpretation	Significant

Note: The level of significance was set at $\alpha = 0.05$. H = Kruskal-Wallis H statistic; rho = Spearman's rank correlation coefficient.
A positive Spearman rho indicates a direct relationship; rejection of Ho indicates a statistically significant relationship at the 0.05 level

Table 10 presents the results of the Kruskal–Wallis H test, which revealed a significant difference in AI awareness across year levels ($H = 27.1923$, $p < 0.001$), leading to the rejection of the null hypothesis. Third-Year students had the highest mean awareness score ($M = 4.0784$), followed closely by Fourth-Year students ($M = 4.0685$), suggesting that AI awareness increases with academic progression and exposure to clinical learning experiences. This finding is consistent with Booth et al. (2024) and De Gagne (2023), who reported that nursing students develop greater understanding and appreciation of AI as they progress through educational programs that incorporate digital health technologies, simulation, and AI-assisted learning. Likewise, Ronquillo et al. (2021) emphasized that exposure to digital health competencies during nursing education enhances students' preparedness to use emerging technologies in clinical practice.

The findings also support the Technology Acceptance Model (TAM), which proposes that increased exposure to technology enhances perceived usefulness and promotes technology acceptance. As nursing students advance through the curriculum and gain greater familiarity with AI applications, they are more likely to recognize the value of AI in improving learning outcomes and supporting evidence-based patient care (Robert, 2019). These results highlight the importance of introducing AI concepts early in the nursing curriculum and reinforcing them across all year levels through progressive learning experiences to promote consistent AI awareness, digital competence, and readiness for technology-enabled healthcare practice (World Health Organization, 2021; Booth et al., 2024).

Table 11. Kruskal-Wallis H Test: Socio-Economic Status and Level of Awareness (N = 645).

Monthly Family Income	n	Mean Awareness Score
Below ₱10,000	155	3.8627
₱10,001-₱19,999	117	3.8901
₱20,000-₱29,999	133	3.8443
₱30,000-₱39,999	86	4.0864
₱40,000-₱49,999	67	4.1322
₱50,000-₱59,999	42	4.0408
₱60,000-₱69,999	18	4.0873
₱70,000 and above	27	4.1481

Test Statistic	Value
H-statistic	20.8249

p-value	0.0040
Decision on Ho	Reject Ho
Interpretation	Significant

Note: The level of significance was set at $\alpha = 0.05$. H = Kruskal-Wallis H statistic; rho = Spearman's rank correlation coefficient.
A positive Spearman rho indicates a direct relationship; rejection of Ho indicates a statistically significant relationship at the 0.05 level

Table 11 presents the results of the Kruskal–Wallis H test, which revealed a significant difference in AI awareness across socio-economic groups ($H = 20.8249$, $p = 0.0040$), leading to the rejection of the null hypothesis. Students from higher-income households, particularly those earning ₱70,000 and above ($M = 4.1481$), demonstrated greater awareness of AI than those from lower-income groups, likely because they have greater access to digital technologies, internet connectivity, and educational resources. This finding is consistent with Ronquillo et al. (2021), who emphasized that access to digital technologies and digital health competencies influences individuals' readiness to adopt emerging healthcare technologies. Similarly, Booth et al. (2024) highlighted that adequate technological resources and educational opportunities facilitate the development of AI knowledge and competencies among nursing students.

The findings also support the Technology Acceptance Model (TAM), which suggests that greater exposure to technology enhances perceived usefulness and promotes technology acceptance. Students with better access to technological resources are more likely to recognize the educational value of AI and develop positive attitudes toward its integration into nursing education (Robert, 2019). Despite the significant differences across socio-economic groups, respondents generally demonstrated favorable awareness of AI, indicating that appropriate educational interventions can strengthen AI literacy regardless of economic background. These findings underscore the importance of providing equitable access to digital infrastructure, AI-related learning resources, and institutional support to reduce socio-economic disparities and ensure that all nursing students are adequately prepared for technology-enabled healthcare practice (World Health Organization, 2021; De Gagne, 2023).

Table 12: Spearman's Rank Correlation Between Age and Perceived Benefits (N = 645).

Variable Pair	Spearman rho	p-value	Decision on Ho	Interpretation
Age vs. Perceived Benefits	0.1020	0.0095	Reject Ho	Significant

Note: The level of significance was set at $\alpha = 0.05$. H = Kruskal-Wallis H statistic; rho = Spearman's rank correlation coefficient.
A positive Spearman rho indicates a direct relationship; rejection of Ho indicates a statistically significant relationship at the 0.05 level

Table 12 presents the results of Spearman's Rank Correlation, which revealed a significant positive relationship between age and the perceived benefits of AI ($\rho = 0.1020$, $p = 0.0095$), leading to the rejection of the null hypothesis. Although the correlation was very weak, older students tended to perceive slightly greater benefits of AI, possibly because of increased academic maturity and greater exposure to clinical learning environments where digital health technologies are utilized. This finding is consistent with Booth et al. (2024) and De Gagne (2023), who reported that educational exposure to AI and digital technologies enhances nursing students' recognition of AI's value in improving learning, clinical reasoning, patient care, and healthcare efficiency. Similarly, Ronquillo et al. (2021) emphasized that strengthening digital health competencies through nursing education increases students' appreciation of AI and other emerging healthcare technologies.

The findings also support the Technology Acceptance Model (TAM), which proposes that perceived usefulness is a key determinant of technology acceptance. As students become more familiar with AI applications and recognize their relevance to nursing education and practice, they are more likely to perceive AI as beneficial and valuable (Robert, 2019). However, the weak correlation suggests that age is only a minor factor influencing students' perceptions of AI benefits. Instead, structured AI education, experiential learning opportunities, and exposure to digital technologies appear to play a more important role in fostering positive perceptions of AI across all age groups (World Health Organization, 2021; Booth et al., 2024). These findings underscore the importance of integrating AI-related learning experiences throughout the nursing curriculum to strengthen students' appreciation of AI in contemporary nursing practice.

Table 13: Kruskal-Wallis H Test: Year Level and Level of Perceived Benefits (N = 645).

Year Level	n	Mean Benefits Score
First Year	162	3.8333
Second Year	170	3.9695
Third Year	144	4.0423
Fourth Year	169	4.0699

Test Statistic	Value
H-statistic	12.5720
p-value	0.0057
Decision on Ho	Reject Ho
Interpretation	Significant

Note: The level of significance was set at $\alpha = 0.05$. H = Kruskal-Wallis H statistic; rho = Spearman's rank correlation coefficient.
A positive Spearman rho indicates a direct relationship; rejection of Ho indicates a statistically significant relationship at the 0.05 level

Table 13 presents the results of the Kruskal–Wallis H test, which revealed a significant difference in the perceived benefits of AI across year levels ($H = 12.5720$, $p = 0.0057$),

leading to the rejection of the null hypothesis. Fourth-Year students reported the highest perceived benefits ($M = 4.0699$), followed by Third-Year students ($M = 4.0423$), indicating that appreciation of AI increases with academic progression and clinical exposure. This finding is consistent with Booth *et al.* (2024) and De Gagne (2023), who reported that nursing students become more aware of the educational and clinical benefits of AI as they gain greater exposure to digital health technologies, simulation-based learning, and AI-supported educational experiences. Similarly, Ronquillo *et al.* (2021) emphasized that the development of digital health competencies throughout nursing education strengthens students' recognition of AI as a valuable tool for improving patient care, clinical decision-making, and healthcare efficiency.

The findings also support the Technology Acceptance Model (TAM), which posits that perceived usefulness is a key determinant of technology acceptance. As students' progress through the nursing curriculum and gain greater familiarity with AI applications, they are more likely to appreciate its relevance to evidence-based practice and contemporary healthcare delivery (Robert, 2019). Although significant differences were observed across year levels, all respondents reported positive perceptions of AI, suggesting that students generally recognize its value regardless of academic standing. These findings underscore the importance of integrating AI concepts progressively throughout the nursing curriculum to strengthen students' digital competencies, technological readiness, and preparedness for technology-driven healthcare environments (World Health Organization, 2021; Booth *et al.*, 2024).

Table 14: Kruskal-Wallis H Test: Socio-Economic Status and Level of Perceived Benefits ($N = 645$).

Monthly Family Income	n	Mean Benefits Score
Below ₱10,000	155	3.8780
₱10,001-₱19,999	117	3.9184
₱20,000-₱29,999	133	3.9467
₱30,000-₱39,999	86	4.0909
₱40,000-₱49,999	67	4.1750
₱50,000-₱59,999	42	4.1147
₱60,000-₱69,999	18	3.9040
₱70,000 and above	27	3.9495

Test Statistic	Value
H-statistic	19.1454
p-value	0.0077
Decision on Ho	Reject Ho
Interpretation	Significant

Note: The level of significance was set at $\alpha = 0.05$. H = Kruskal-Wallis H statistic; ρ = Spearman's rank correlation coefficient. A positive Spearman ρ indicates a direct relationship; rejection of H_0 indicates a statistically significant relationship at the 0.05 level

Table 14 presents the results of the Kruskal–Wallis H test, which revealed a significant difference in the perceived benefits of AI across socio-economic groups ($H = 19.1454$, $p = 0.0077$), leading to the rejection of the null hypothesis. Students from middle-income households, particularly those earning ₱40,000–₱49,999 ($M = 4.1750$), reported the highest perceived benefits of AI, whereas those earning below ₱10,000 ($M = 3.8780$) reported the lowest. This finding suggests that access to digital technologies and educational resources may influence students' appreciation of AI and its applications in nursing education. Similar observations were reported by Ronquillo *et al.* (2021), who emphasized that digital health competencies and access to technological resources contribute to learners' readiness to adopt emerging healthcare technologies. Likewise, Booth *et al.* (2024) highlighted that sufficient technological infrastructure and educational opportunities enhance nursing students' understanding of AI and its potential to improve learning and clinical practice.

The findings also support the Technology Acceptance Model (TAM), which suggests that exposure to technology enhances perceived usefulness and technology acceptance. Students with greater access to digital resources are more likely to recognize the educational and clinical value of AI, thereby developing more favorable perceptions of its integration into nursing education (Robert, 2019). Despite the significant differences across socio-economic groups, all respondents demonstrated positive perceptions of AI, indicating that students generally acknowledge its value regardless of economic background. These findings underscore the importance of ensuring equitable access to digital infrastructure, AI-related educational resources, and institutional support so that all nursing students can benefit from AI-enhanced education and develop the competencies needed for technology-enabled healthcare practice (World Health Organization, 2021; De Gagne, 2023).

Table 15: Spearman's Rank Correlation Between Age and Student Perspective ($N = 645$).

Variable Pair	Spearman rho	p-value	Decision on Ho	Interpretation
Variable Pair	Spearman rho	p-value	Decision	Interpretation
Age vs. Overall Perspective	0.0702	0.0746	Fail to Reject Ho	Not Significant

Note: The level of significance was set at $\alpha = 0.05$. H = Kruskal-Wallis H statistic; ρ = Spearman's rank correlation coefficient. A positive Spearman ρ indicates a direct relationship; rejection of H_0 indicates a statistically significant relationship at the 0.05 level

Table 15 presents the results of Spearman's Rank Correlation, which showed no significant relationship between age and students' perspectives on AI integration ($\rho = 0.0702$, $p = 0.0746$), leading to the failure to reject the null hypothesis. Although a very weak positive correlation was observed, age did not significantly influence students' perspectives on AI integration. This suggests that nursing students, regardless of age, share similar views regarding the opportunities and challenges associated with AI in nursing

education. This finding is consistent with Booth *et al.* (2024) and De Gagne (2023), who reported that positive perceptions of AI are primarily influenced by educational exposure, AI literacy, and experience with digital technologies rather than by demographic characteristics such as age. Similarly, Ronquillo *et al.* (2021) emphasized that developing digital health competencies through structured educational experiences enhances students' readiness to adopt AI regardless of demographic differences.

The findings also support the Technology Acceptance Model (TAM), which emphasizes that perceived usefulness and perceived ease of use are the primary determinants of technology acceptance rather than demographic characteristics. As students recognize the educational and clinical value of AI, they become more willing to adopt AI technologies regardless of age (Robert, 2019). Overall, these results suggest that AI integration initiatives can be implemented across all age groups while prioritizing AI literacy, experiential learning, and practical exposure to digital health technologies. Such educational strategies are consistent with the recommendations of the World Health Organization (2021), which advocates strengthening digital competencies and responsible AI use among future healthcare professionals.

Table 16: Kruskal-Wallis H Test: Year Level and Student Perspective (N = 645).

Year Level	n	Mean Perspective Score
First Year	162	3.8074
Second Year	170	3.7865
Third Year	144	3.9158
Fourth Year	169	3.9389

hypothesis. Likewise, no significant differences were found in student readiness, technological barriers, andragogical challenges, and ethical concerns (all $p > 0.05$), indicating that nursing students, regardless of academic level, share similar perspectives on AI integration. Although Fourth-Year students ($M = 3.9389$) and Third-Year students ($M = 3.9158$) reported slightly higher perspective scores than junior students, these differences were not statistically significant.

This finding is consistent with Booth *et al.* (2024) and De Gagne (2023), who reported that nursing students generally demonstrate positive attitudes toward AI when they receive appropriate educational exposure and opportunities to develop digital competencies. Similarly, Ronquillo *et al.* (2021) emphasized that the development of digital health competencies throughout nursing education contributes to comparable levels of readiness for AI integration regardless of students' academic progression. These findings suggest that structured AI education can foster positive perceptions among nursing students across different year levels.

The findings also support the Technology Acceptance Model (TAM), which posits that technology acceptance is primarily influenced by perceived usefulness and perceived ease of use rather than academic level alone (Robert, 2019). Consequently, AI integration initiatives may be implemented consistently across all year levels, provided that nursing curricula include progressive AI literacy, experiential learning opportunities, and ethical guidance. This approach is further supported by the World Health Organization (2021), which advocates integrating digital health competencies throughout health professions education to prepare graduates for technology-enabled healthcare environments.

Table 17: Kruskal-Wallis H Test: Socio-Economic Status and Student Perspective (N = 645).

Monthly Family Income	n	Mean Perspective Score
Below ₱10,000	155	3.8561
₱10,001-₱19,999	117	3.7395
₱20,000-₱29,999	133	3.8538
₱30,000-₱39,999	86	3.9166
₱40,000-₱49,999	67	4.0063
₱50,000-₱59,999	42	3.8363
₱60,000-₱69,999	18	3.7653
₱70,000 and above	27	4.0046

Dimension	H-statistic	p-value	Decision on Ho	Interpretation
Dimension	H-statistic	p-value	Decision	Interpretation
Overall Perspective	10.4966	0.1621	Fail to Reject Ho	Not Significant
Student Readiness	7.0722	0.4214	Fail to Reject Ho	Not Significant

Note: The level of significance was set at $\alpha = 0.05$. H = Kruskal-Wallis H statistic; rho = Spearman's rank correlation coefficient. A positive Spearman rho indicates a direct relationship; rejection of Ho indicates a statistically significant relationship at the 0.05 level

Table 16 presents the results of the Kruskal-Wallis H test, which showed no significant difference in students' overall perspectives on AI integration across year levels ($H = 5.3243$, $p = 0.1495$), leading to the failure to reject the null

Technological Barriers	6.6940	0.4614	Fail to Reject Ho	Not Significant
Andragogical Challenges	11.9387	0.1026	Fail to Reject Ho	Not Significant
Ethical Concerns	12.2077	0.0939	Fail to Reject Ho	Not Significant

Note: The level of significance was set at $\alpha = 0.05$. H = Kruskal-Wallis H statistic; rho = Spearman's rank correlation coefficient.

A positive Spearman rho indicates a direct relationship; rejection of Ho indicates a statistically significant relationship at the 0.05 level

Table 17 presents the results of the Kruskal–Wallis H test, which showed no significant difference in students' overall perspectives on AI integration across socio-economic groups ($H = 10.4966$, $p = 0.1621$), leading to the failure to reject the null hypothesis. Likewise, student readiness, technological barriers, andragogical challenges, and ethical concerns did not differ significantly across income groups (all $p > 0.05$), indicating that students shared similar perspectives regardless of socio-economic status. Although respondents with monthly family incomes of ₱40,000–₱49,999 ($M = 4.0063$) and ₱70,000 and above ($M = 4.0046$) reported slightly higher perspective scores, these differences were not statistically significant.

This finding is consistent with Booth et al. (2024) and De Gagne (2023), who reported that nursing students generally demonstrate favorable perceptions of AI when they receive appropriate educational support and opportunities to develop digital competencies, regardless of their demographic background. Similarly, Ronquillo et al. (2021) emphasized that strengthening digital health competencies through nursing education promotes readiness to adopt AI technologies across diverse student populations. These findings suggest that equitable educational opportunities can minimize differences in students' perceptions of AI despite variations in socio-economic status.

The findings also align with the Technology Acceptance Model (TAM), which posits that perceived usefulness and perceived ease of use are stronger determinants of technology acceptance than socio-economic characteristics (Robert, 2019). As students recognize the educational and clinical value of AI and are provided with adequate learning opportunities, their perspectives become increasingly positive regardless of economic background. Overall, the results indicate that AI integration initiatives can be implemented equitably across all socio-economic groups, provided that nursing institutions ensure equitable access to digital resources, AI literacy programs, and institutional support. This recommendation is consistent with the World Health Organization (2021), which advocates promoting equitable access to digital health education to prepare all healthcare professionals for technology-enabled practice.

Table 18: Spearman's Rank Correlation Between Level of Awareness and Student Perspective (N = 645).

Variable Pair	Spearman rho	p-value	Decision on Ho	Interpretation
Awareness vs. Overall Perspective	0.4437	< 0.001	Reject Ho	Significant
Awareness vs. Student Readiness	0.4160	< 0.001	Reject Ho	Significant
Awareness vs. Technological Barriers	0.4039	< 0.001	Reject Ho	Significant
Awareness vs. Andragogical Challenges	0.4312	< 0.001	Reject Ho	Significant
Awareness vs. Ethical Concerns	0.3758	< 0.001	Reject Ho	Significant

Note: The level of significance was set at $\alpha = 0.05$. H = Kruskal-Wallis H statistic; rho = Spearman's rank correlation coefficient.

A positive Spearman rho indicates a direct relationship; rejection of Ho indicates a statistically significant relationship at the 0.05 level

Table 18 presents the results of Spearman's Rank Correlation, which revealed significant positive relationships between AI awareness and students' overall perspectives ($\rho = 0.4437$, $p < 0.001$) and all its dimensions, leading to the rejection of the null hypothesis. The moderate positive correlation indicates that students with higher levels of AI awareness tend to have more favorable perspectives toward AI integration. The strongest relationship was observed with student readiness ($\rho = 0.4160$), followed by andragogical challenges ($\rho = 0.4312$) and technological barriers ($\rho = 0.4039$), suggesting that greater awareness enhances students' preparedness and understanding of the educational and technological requirements associated with AI. Awareness was also significantly associated with ethical concerns ($\rho = 0.3758$), indicating that more knowledgeable students are better able to recognize issues related to privacy, security, transparency, and algorithmic bias.

These findings support the Technology Acceptance Model (TAM), which posits that increased knowledge enhances perceived usefulness and facilitates technology acceptance (Robert, 2019). Likewise, Booth et al. (2024) and De Gagne (2023) reported that greater AI literacy and educational exposure foster more positive attitudes toward AI integration by strengthening students' confidence, readiness, and understanding of AI applications in nursing education. Furthermore, the World Health Organization (2021) emphasized that AI education should incorporate ethical principles, transparency, accountability, and responsible AI use to ensure that future healthcare professionals are prepared to utilize AI safely and effectively. Similarly, Ronquillo et al. (2021) highlighted that strengthening digital health competencies through curriculum integration enhances students' readiness to adopt AI while promoting ethical and evidence-based healthcare practice.

The findings underscore the importance of strengthening AI awareness through curriculum integration, experiential

learning, and structured AI literacy programs to foster informed, responsible, and positive perspectives toward AI in nursing education. Such initiatives can better prepare future nurses to integrate AI technologies into clinical practice while maintaining ethical standards and patient-centered care (Booth *et al.*, 2024; World Health Organization, 2021).

4.6 Discussion

The findings indicate that nursing students have a favorable perception of integrating Artificial Intelligence (AI) into nursing education, recognizing its potential to enhance learning, clinical reasoning, and future nursing practice. This is consistent with Booth *et al.* (2024), De Gagne (2023), and Ronquillo *et al.* (2021), who highlighted the role of AI in improving learner engagement, competency development, and digital health education.

Students' AI awareness was significantly associated with demographic characteristics, suggesting that educational exposure and access to technological resources influence AI literacy. However, demographic factors did not significantly affect students' overall perspectives, indicating that positive attitudes toward AI are shared regardless of age, academic level, or socio-economic status (Booth *et al.*, 2024; World Health Organization, 2021).

The strongest finding was the significant positive relationship between AI awareness and students' perspectives, supporting the Technology Acceptance Model (Robert, 2019), which emphasizes that perceived usefulness promotes technology acceptance. Likewise, Kolb's Experiential Learning Theory and Locsin's Technological Competency as Caring in Nursing Theory reinforce that AI should enhance learning and technological competence while preserving compassionate, patient-centered care.

Despite these favorable perceptions, respondents identified ethical concerns—including data privacy, cybersecurity, transparency, accountability, and algorithmic bias—as important considerations. These findings highlight the need to integrate AI ethics, responsible AI use, and digital competencies into nursing curricula, consistent with the recommendations of the World Health Organization (2021) and Ronquillo *et al.* (2021).

The findings support strengthening AI literacy, faculty development, technological infrastructure, curriculum innovation, and ethical governance to prepare nursing graduates for safe, ethical, and technology-enabled healthcare practice (Booth *et al.*, 2024; De Gagne, 2023; World Health Organization, 2021).

5. CONCLUSIONS

5.1 Major Findings

This study examined nursing students' perspectives on Artificial Intelligence (AI) in nursing education as a basis for developing an enhancement program. The findings

demonstrated that nursing students generally possess a high level of awareness regarding AI and recognize its potential to improve teaching and learning, clinical decision-making, and healthcare delivery. Respondents likewise reported a positive perception of the benefits of AI, particularly in enhancing personalized learning, improving access to evidence-based information, strengthening critical thinking, and supporting the development of clinical competencies.

Despite these favorable perceptions, respondents identified ethical concerns, including data privacy, cybersecurity, confidentiality, and algorithmic bias, as the most significant challenges associated with AI integration. Technological limitations, such as inadequate internet connectivity and unequal access to digital resources, together with instructional challenges related to faculty preparedness and curriculum integration, were also recognized as important barriers to successful implementation.

Inferential analyses revealed that demographic characteristics, specifically age, year level, and socio-economic status, were significantly associated with students' level of awareness and perceived benefits of AI. However, these demographic variables did not significantly influence students' overall perspectives toward AI integration, suggesting that favorable attitudes toward AI are shared across diverse student groups. Most importantly, the study established a moderate positive relationship between students' level of awareness and their perspectives toward AI integration, indicating that greater knowledge and understanding of AI contribute to more positive attitudes and greater acceptance of its educational applications.

The findings indicate that nursing students are receptive to the integration of AI into nursing education, provided that its implementation is accompanied by appropriate technological support, ethical guidance, faculty development, and curriculum enhancement.

5.2 Implications

The findings of this study have important implications for nursing education, academic institutions, educators, curriculum developers, researchers, and policymakers. The demonstrated positive awareness and acceptance of AI among nursing students suggest that higher education institutions should begin integrating AI competencies into undergraduate nursing curricula to prepare graduates for increasingly digital and technology-driven healthcare environments. AI-related topics, including prompt engineering, clinical decision support systems, nursing informatics, digital health, data analytics, and ethical AI utilization, should be incorporated into classroom instruction, laboratory activities, and clinical simulations.

For nursing educators, the findings underscore the need for continuous faculty development in AI literacy and digital pedagogy. Faculty members should be equipped with the competencies necessary to integrate AI effectively into teaching while ensuring that technology complements, rather than replaces, critical thinking, clinical judgment, and

compassionate nursing care. Institutions should also invest in reliable technological infrastructure, digital learning platforms, and equitable access to AI-supported educational resources to minimize disparities among students from different socio-economic backgrounds.

The prominence of ethical concerns highlights the necessity of establishing institutional policies and educational guidelines governing the responsible use of AI in nursing education. Emphasis should be placed on data privacy, cybersecurity, academic integrity, transparency, algorithmic fairness, and patient confidentiality to ensure that future nurses develop both technological competence and ethical accountability.

The significant relationship between AI awareness and students' perspectives supports the implementation of the proposed Enhancement Program, which aims to strengthen AI literacy, technological readiness, ethical competence, and responsible AI utilization among nursing students. By adopting structured educational interventions, nursing schools can better prepare graduates who are technologically competent, ethically grounded, and capable of delivering safe, evidence-based, and patient-centered care in an increasingly AI-enabled healthcare system.

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CONFLICTS OF INTEREST

The author(s) declare no conflicts of interest.

ETHICAL APPROVAL AND CONSENT TO PARTICIPATE

A set of guidelines known as ethical considerations direct the study's research methods and methodologies before the start of the study, the Philippine Women's University provided the ethical guidelines with approved Ethics Review Protocol #ERB2025_181.

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