

ORIGINAL ARTICLE

**Students' Perceptions of the Integration of Artificial Intelligence Nursing Education:
A Study at a Private Chilean University**FERNANDO VERA¹ <https://orcid.org/0000-0002-4326-1660>¹University of the Basque/Euskal Herriko Unibertsitatea, EspañaEmail: fernandovera@rediie.cl**Article history:**

Received: 10/21/2024

Revised: 11/25/2024

Accepted: 11/30/2024

keywords:*Artificial intelligence**Nursing education**Faculty training**Student perception**Higher education***Abstract:**

The use of artificial intelligence (AI) in higher education has gained significant attention, particularly in health-related fields. This study explores the perceptions of AI use among nursing students at a private Chilean university. The research aimed to assess students' attitudes and experiences with AI in their learning process. A sample of 36 nursing students participated, and data were collected using a Likert-scale questionnaire measuring various dimensions of AI integration. Results indicated moderate perceptions of AI use, with an average score of $M = 3.15$. While students recognized the potential of AI to enhance learning efficiency and access to information, concerns were raised regarding the limited practical implementation and insufficient training opportunities. The findings suggest that to fully leverage AI in nursing education, improvements such as targeted training programs and expanded technological resources are essential. Future efforts should focus on fostering AI literacy to better prepare nursing students for technologically advanced healthcare environments.

Introduction

Artificial Intelligence (AI) has emerged as a transformative force across multiple sectors, particularly in education and healthcare (Bahroun et al., 2023; Mhlanga, 2021; Vera, 2023). In higher education, AI-driven technologies are reshaping traditional learning and teaching methods, particularly in health-related disciplines such as nursing. Specifically, AI has the capability to revolutionize how nurses deliver personalized, evidence-based care that is tailored to meet patients' specific needs and priorities (Glauberman et al., 2023). For instance, tools like adaptive learning systems, intelligent tutoring programs, and virtual simulations provide individualized learning experiences, enhancing both knowledge acquisition and practical skills (Cheung et al., 2021). These advancements promote self-paced learning and foster critical thinking, which are essential for navigating real-world clinical challenges (Vera, 2024).

Furthermore, AI creates immersive training environments that simulate complex healthcare scenarios, offering students opportunities to practice decision-making and clinical interventions in a risk-free setting (Glauber et al., 2023; Kollerup et al., 2024). This advanced simulation technology bridges the gap between theoretical knowledge and real-world practice, enhancing critical thinking and clinical reasoning. However, the successful integration of AI in nursing education depends on addressing significant challenges such as technological accessibility, faculty preparedness, and student adaptability. Institutions must invest in infrastructure, provide faculty with professional development programs, and ensure students are equipped with the digital literacy required to engage effectively with AI tools. By overcoming these barriers, AI can empower nursing students with the competencies needed to excel in modern, dynamic healthcare environments, fostering a highly skilled and future-ready workforce.

In addition, AI technologies play a vital role in modern education by improving instructional effectiveness and delivering personalized support tailored to individual student needs (Chen et al., 2020). Within healthcare education, AI applications—including diagnostic tools and predictive analytics—contribute significantly to patient care management and clinical decision-making, strengthening practical skills among future healthcare professionals (Alowais et al., 2023). Specifically, AI-driven learning platforms and simulation tools offer nursing students adaptive, hands-on experiences that closely replicate real-world clinical situations. As a result, these tools not only improve students' technical competencies but also enhance their critical thinking and decision-making abilities, essential for effective healthcare delivery. However, the successful implementation of AI requires resolving key challenges, such as equitable access to technology, comprehensive faculty training, and students' readiness to embrace these innovations. Addressing these issues will unlock AI's full potential to transform nursing education and meet the demands of an increasingly complex healthcare environment.

Moreover, nursing education plays a critical role in preparing future professionals to navigate intricate clinical settings where AI technologies are becoming increasingly prevalent. Applications such as diagnostic tools, virtual simulations, and decision-support systems complement traditional teaching methods, offering innovative ways to improve both theoretical knowledge and practical skills. However, nursing students' perceptions and attitudes toward AI are key determinants for the successful adoption of these tools. Understanding their experiences and addressing potential gaps in knowledge, acceptance, and confidence are vital steps to ensure the effective integration of AI. Thus, fostering AI literacy and building awareness will not only bridge these gaps but also encourage a culture of innovation and adaptability in nursing education.

Building on this premise, the present study explores nursing students' perceptions of AI use in their educational experiences at a private Chilean university. By evaluating their attitudes and experiences through a structured questionnaire, this research aims to identify key strengths, challenges, and opportunities associated with AI integration. Additionally, the findings will contribute to the development of strategies that enhance AI implementation, improve learning outcomes, and prepare a technology-ready healthcare workforce.

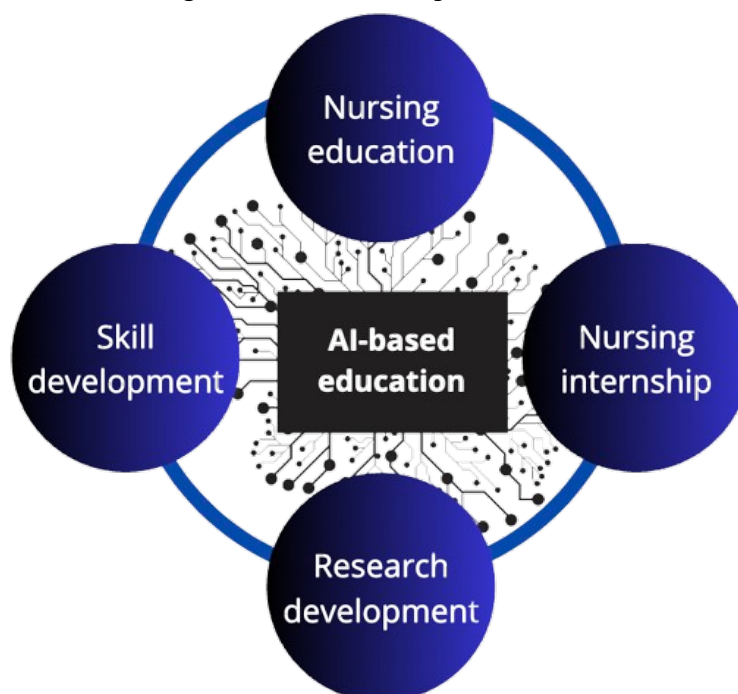
Research Questions:

1. What are nursing students' perceptions of the integration of AI in their education?
2. How do students evaluate the effectiveness and relevance of AI tools in their learning processes?
3. What challenges and opportunities do students identify in the use of AI within nursing education?

Integration of AI in Nursing Education

This approach offers transformative opportunities to enhance learning experiences, clinical decision-making, and personalized instruction. Indeed, AI has the potential to revolutionize healthcare delivery, improve patient outcomes, and redefine the role of nurses (Clancy, 2020). Specifically, AI-powered tools, such as virtual simulations and adaptive learning platforms, enable students to engage in realistic and interactive scenarios that closely replicate clinical environments. These technologies provide immediate feedback, allowing learners to systematically practice and refine their critical thinking and procedural skills in a safe, risk-free setting. Additionally, AI-driven systems can track student performance, identify areas of improvement, and deliver targeted support to address learning gaps. By integrating these tools into nursing education, students gain a deeper understanding of clinical processes while building confidence. Ultimately, this innovative approach ensures that future nurses are better equipped to navigate complex healthcare systems and deliver high-quality, patient-centered care (Figure 1).

Figure 1: AI-based nursing education



Source: Own elaboration.

Embracing artificial intelligence (AI) has the potential to transform nursing practice across multiple essential areas. Firstly, AI-driven clinical decision support systems provide nurses with valuable insights and evidence-based recommendations, enabling them to make more informed, accurate, and timely decisions regarding patient care (Van Bulck et al., 2023). By analyzing extensive datasets and identifying patterns, AI systems can improve the precision and effectiveness of patient diagnoses and treatments, reducing human error and enhancing outcomes (Buchanan et al., 2020). Additionally, AI enables nurses to identify emerging health trends or risks by uncovering subtle correlations that may otherwise go unnoticed. This technology empowers nurses to personalize care plans to meet individual patient needs, streamline workflows, and manage complex cases with greater confidence. Ultimately, integrating AI into nursing practice enhances clinical decision-making, optimizes care delivery, and supports improved patient outcomes in a more efficient and data-driven manner.

Secondly, AI significantly enhances patient monitoring and supports predictive analytics, revolutionizing how healthcare providers anticipate and address clinical needs. Through AI-powered technologies, nurses can continuously track patients' vital signs, such as heart rate, oxygen levels, and blood pressure, providing an uninterrupted flow of critical data. These systems have the ability to analyze trends and identify subtle changes that may indicate early signs of clinical deterioration, prompting timely alerts (Alazzam et al., 2022). By providing real-time notifications, AI enables nurses to intervene quickly, preventing adverse events such as cardiac arrest or respiratory failure. Predictive analytics further strengthens care delivery by anticipating potential risks and suggesting preemptive measures. This capability not only reduces patient mortality rates but also minimizes the length of hospital stays and associated costs. Ultimately, AI-driven monitoring tools empower nurses to deliver more proactive, precise, and effective care, improving both efficiency and patient outcomes (McGrow, 2019).

Lastly, AI has the potential to optimize care coordination and significantly alleviate nurses' workload, allowing them to focus more on direct patient care. AI algorithms can automate routine administrative tasks such as scheduling, documentation, and managing patient records, reducing the time nurses spend on paperwork. These systems can also prioritize patient care needs by analyzing real-time data, identifying the most urgent cases, and allocating resources efficiently (Stokes & Palmer, 2020). Additionally, AI facilitates seamless communication within healthcare teams by centralizing information and enabling faster, more accurate exchanges of data across departments. This improved coordination helps prevent delays in treatment, minimizes errors, and enhances overall workflow efficiency. By streamlining operations and reducing unnecessary burdens, AI empowers nurses to dedicate their expertise to more critical tasks, improving both the quality of care and job satisfaction while ensuring better patient outcomes.

Furthermore, AI systems can analyze individual student performance data to identify specific learning gaps, facilitating the delivery of personalized educational resources that create efficient and targeted pathways to skill mastery. Through adaptive learning technologies, AI ensures that nursing students receive the support they need at their own pace, strengthening their understanding of critical concepts. By incorporating AI into curriculum design, nursing educators can develop dynamic and data-driven learning environments that respond to students' evolving needs. This integration enhances students' preparedness for increasingly complex healthcare systems, equipping them with the skills to address modern clinical challenges effectively. Additionally, AI-driven tools promote competency-based education by focusing on practical outcomes, ensuring graduates meet industry standards and excel in clinical practice. Ultimately, AI empowers educators to provide tailored instruction while fostering a new generation of nurses who are adaptable, proficient, and prepared for future healthcare demands.

In fact, AI has the ability to transform healthcare delivery, enhance patient outcomes, and redefine the role of nurses (Clancy, 2020). In this context, AI-powered tools, such as virtual simulations and adaptive learning platforms, enable students to engage in realistic, interactive scenarios that mimic clinical environments. These technologies provide immediate feedback, allowing learners to practice and refine their critical thinking and procedural skills without risk to patients. Moreover, AI can analyze individual student performance data to identify learning gaps and deliver targeted educational resources, ensuring a customized pathway for skill mastery. By incorporating AI into curriculum design, nursing educators can better prepare students for complex healthcare systems, improving their readiness to address real-world challenges while promoting competency-based education.

Here are some practical examples related to the topic:

- **AI in Data Analytics for Evidence-Based Practice:** Nursing students using *IBM Watson Health* or *Tableau* can analyze patient data to identify patterns, such as trends in infection rates, enabling evidence-based decisions. For example, students might identify a link between delayed post-op care and higher complication rates.
- **AI-Driven Assessments:** AI tools like *Gradescope* automate grading for nursing case studies and quizzes. These systems evaluate answers quickly and offer detailed feedback, reducing faculty workload while ensuring consistency in assessment.
- **AI Chatbots and Virtual Tutors:** Platforms like *ChatGPT* or *Ada Health* assist students in learning theoretical concepts. For example, a nursing student can ask an AI chatbot to explain the physiological basis of hypertension or clarify nursing interventions for diabetic care in real-time, supporting independent learning.

Therefore, incorporating AI tools like Body Interact, SIMSTAT, and other AI-driven technologies into nursing education enhances learning outcomes, fosters clinical competence, and prepares students for the challenges of modern healthcare. These tools enable evidence-based decision-making, streamline assessments, and provide accessible learning support, ensuring that future nursing professionals are equipped with the skills needed to deliver high-quality patient care. Moreover, AI fosters a culture of continuous learning and adaptability, encouraging both students and educators to embrace technological advancements. By simulating real-world clinical experiences and automating routine educational processes, AI creates a dynamic, interactive, and highly efficient learning environment that bridges the gap between classroom instruction and clinical practice. As healthcare continues to evolve, the integration of AI ensures that nursing education remains forward-looking, innovative, and aligned with the demands of modern patient care.

The integration of AI tools into nursing education significantly improves the acquisition of critical skills, ensuring students are well-prepared to handle the complexities of real-world healthcare settings. Advanced technologies, such as virtual patient simulations and AI-driven adaptive learning systems, foster immersive, interactive, and personalized learning experiences. For instance, platforms like Body Interact and SIMSTAT offer virtual environments where students can diagnose, treat, and manage simulated patients with various conditions, including chronic illnesses like diabetes or critical cases such as acute respiratory distress. These tools enable students to practice clinical reasoning, enhance decision-making skills, and gain confidence—all within a safe, controlled environment. By removing the risks associated with real patients, AI-based platforms ensure that nursing students acquire practical competencies and experience that are essential for delivering high-quality, patient-centered care in modern healthcare systems (Table 1).

Table 1: Summary of IA tools applied in nursing

AI tool	Description	Location
Body Interact	This AI tool is an advanced AI-driven virtual patient simulation tool widely used in nursing education and practice. It creates realistic, interactive clinical scenarios where nurses and nursing students can diagnose, treat, and manage virtual patients in a safe, controlled environment.	https://bodyinteract.com/virtual-patient-simulator/
SIMSTAT	This AI tool enables nurses to refine their skills in critical care, acute patient management, and team coordination, leading to better patient outcomes and more efficient workflows.	https://provalisresearch.com/products/simstat/

Source: Own elaboration.

AI also supports nursing education by enhancing research capabilities and fostering innovative teaching methodologies. For instance, AI-driven data analytics allows nursing students to interpret large datasets for evidence-based practice, a key skill in modern healthcare. Additionally, AI facilitates automated assessments and virtual mentors, streamlining administrative processes and enabling educators to focus more on interactive, human-centered teaching. Chatbots and AI tutors provide instant clarification for theoretical concepts, supporting self-paced learning and improving retention rates. However, successful implementation requires balancing technology with human oversight to maintain empathy and ethical care principles. Integrating AI into nursing education not only enhances academic outcomes, but it also equips future nurses with technological fluency to navigate digital healthcare ecosystems effectively.

As demonstrated, the integration of AI in nursing education not only enhances academic outcomes, but it also equips future nurses to confidently navigate digital healthcare systems. By combining AI-driven innovation with a human-centered approach, educators can ensure that nursing students develop into technologically proficient, empathetic, and highly skilled professionals. This balanced approach prepares them to address the evolving challenges of modern healthcare while maintaining the essential human touch required in patient care. Additionally, the integration of AI technologies fosters collaboration between educators, students, and healthcare systems, creating a seamless connection between learning environments and clinical practice. Ultimately, AI empowers nursing professionals to thrive in a healthcare landscape that demands both advanced technical expertise and compassionate, patient-centered care.

Integration of AI into the nursing curriculum

As healthcare systems become increasingly digitized, the role of AI in clinical practice and patient care continues to grow (Alowais et al. 2023; Bajwa et al., 2021; Maleki Varnosfaderani et al., 2024). To ensure nursing graduates are prepared to meet the demands of modern healthcare, nursing education must evolve to incorporate AI-driven knowledge, skills, and practical applications. These action lines provide a structured approach to embedding AI content into nursing programs, equipping students with the necessary technological literacy, critical thinking, and ethical awareness to navigate AI-enhanced healthcare environments.

By focusing on curriculum redesign, faculty training, practical applications, ethical considerations, and collaboration with healthcare and technology sectors, this plan aims to create a balanced, forward-thinking educational framework. The goal is to prepare nurses who are not only technologically proficient but also empathetic and patient-centered professionals ready to leverage AI for improved healthcare outcomes. This holistic approach ensures nursing graduates can adapt to rapid technological advancements, promote ethical AI use in clinical settings, and address the complexities of patient care with confidence. Through continuous innovation and collaboration, educators can shape a new generation of nurses equipped to navigate digital transformation while upholding the core values of nursing: compassion, empathy, and patient advocacy.

The following is a set of action lines to drive the integration of AI into the nursing curriculum:

- **Curriculum Redesign and AI Integration:** Integrating AI into the nursing curriculum requires a strategic redesign of courses to incorporate AI topics such as clinical decision-making, diagnostics, patient monitoring, and personalized care. Students should engage with tools like machine learning, wearable devices, and predictive analytics to understand their practical healthcare applications. Embedding AI progressively into foundational courses ensures students grasp its role in improving care delivery, optimizing resources, and supporting clinical workflows. By aligning AI content with learning stages, nursing students develop essential competencies to utilize AI effectively in modern healthcare environments.
- **Faculty Training and Development:** Faculty training is a fundamental step to successfully integrate AI into the nursing curriculum. Institutions should organize professional development programs, including workshops, certifications, and webinars, to provide educators with the knowledge and confidence to teach AI-related topics. Collaborations with AI and healthcare technology experts can offer faculty members the necessary tools to understand and convey the principles of AI, its applications, and its limitations. This preparation ensures that educators can engage students with relevant, up-to-date content that bridges the gap between nursing practice and emerging technologies.
- **Development of Practical AI Applications in Clinical Training:** Practical exposure to AI tools is essential for nursing students to gain real-world experience with emerging technologies. Integrating AI-powered simulations into clinical training allows students to interact with virtual patient scenarios, learn predictive analytics, and understand AI's role in clinical decision-making. For instance, AI-driven software can provide real-time data on patient conditions, helping students analyze and respond to clinical information effectively. These tools also allow for repeated practice in low-risk environments, fostering confidence and competency in using AI for patient care.
- **Ethical and Humanistic Considerations:** Incorporating ethical considerations into AI education is crucial to maintain the humanistic aspect of nursing practice. While AI offers immense benefits, its use raises concerns about data privacy, bias, and the nurse-patient relationship. Courses must address ethical frameworks that govern AI use, ensuring students are aware of patient rights, confidentiality, and equity in care delivery. By encouraging critical discussions on issues like algorithmic bias and ethical decision-making, students will develop the skills to evaluate AI systems' fairness and reliability while prioritizing patient safety and dignity.

- **Collaboration with Healthcare and Technology Sectors:** Collaboration with healthcare institutions and technology companies is essential to integrate AI effectively into nursing education. Universities should establish partnerships with hospitals, AI developers, and healthcare technology providers to offer students exposure to real-world applications. Internships, research opportunities, and collaborative projects can allow students to engage directly with AI tools, such as machine learning systems for diagnostics, robotic surgical aids, and virtual care platforms. These experiences will provide students with practical skills and insights into the evolving healthcare landscape.

Therefore, incorporating AI into the nursing curriculum is not just a step toward innovation but a necessity for preparing future nurses to thrive in an increasingly digitized healthcare landscape. By blending technical knowledge, practical experience, and ethical understanding, nursing education can empower students to become confident, competent, and compassionate professionals. Future nurses must develop technological literacy to effectively utilize AI tools, including decision-support systems, predictive analytics, and patient monitoring technologies. However, it is equally essential to emphasize humanistic values, such as empathy, emotional intelligence, and patient-centered care, to maintain the human connection that defines nursing practice. This comprehensive approach ensures that nurses can integrate AI tools seamlessly into their workflows, improve clinical outcomes, and address the challenges of modern healthcare, while preserving the dignity and well-being of their patients. AI enhances their ability to provide timely, efficient, and personalized care.

Through strategic curriculum redesign, faculty development, real-world applications, and industry collaborations, nursing programs can bridge the gap between technology and practice. By doing so, they will produce graduates who are not only proficient in leveraging AI to improve clinical outcomes but also capable of maintaining the empathy, critical thinking, and ethical awareness essential for delivering high-quality, patient-centered care in the 21st century.

Materials and Methods

This study is framed within the positivist paradigm, adopting a purely quantitative approach, which involves gathering and analyzing numerical data to address specific research questions (Rana et al., 2021). This method is characterized by its objectivity and reliance on measurable evidence, enabling researchers to summarize and average data, identify patterns, make predictions, and examine causal relationships. The quantitative approach is particularly valuable for identifying trends across populations and generalizing findings to broader contexts, ensuring scientific rigor and replicability. By focusing on numerical evidence, researchers can test hypotheses, measure variables systematically, and generate reliable conclusions. This approach aligns with the study's goal of uncovering precise insights into nursing students' perceptions of AI integration, providing a solid foundation for evidence-based recommendations that can inform curriculum design and policy development in higher education.

Moreover, a non-experimental, cross-sectional design was employed (Green et al., 2006), allowing for the collection of data at a single point in time to describe and analyze the phenomenon under investigation. The research has a descriptive scope and utilizes a field design, enabling the assessment of participants' perceptions in their natural educational environment. The study was conducted at a private Chilean university with national coverage, offering a bachelor's degree in nursing. The institution's nursing program provides an ideal context for evaluating the integration and perceptions of artificial intelligence (AI) in higher education. This methodological approach ensures robust, context-specific data collection while adhering to established quantitative research principles.

Participants

The study involved 76 second-year nursing students enrolled in a research methodology course at a private Chilean university. Participants were divided into two groups: Group 1 included 36 students, while Group 2 comprised 40 students, with a notable predominance of female participants. Specifically, 55 students were women and 21 were men, reflecting a gender imbalance typical in nursing education programs. The average age of participants was approximately 25 years, indicating a relatively young cohort commonly observed in undergraduate nursing studies.

The diverse gender and group distribution provided a comprehensive representation of the student population, contributing valuable insights into their perceptions and experiences regarding the integration of technology and AI in education. This demographic information establishes the context for the study's findings and ensures a robust foundation for analyzing the educational challenges and opportunities in this specific setting.

Instrument

The instrument used in this study was the Questionnaire on Artificial Intelligence in Higher Education (Q-AIHE), a 20-item questionnaire specifically designed to evaluate undergraduate students' perceptions of AI integration in educational settings. It utilizes a five-point Likert scale, ranging from "Strongly Disagree" to "Strongly Agree," enabling a nuanced understanding of student opinions. The questionnaire items are systematically grouped into three dimensions to capture different aspects of AI's impact on education. Each dimension is tailored to explore students' attitudes toward AI's potential to transform learning processes, improve access to educational resources, and address concerns such as data privacy and fairness, providing comprehensive insights into their perceptions. The items are systematically grouped into three dimensions:

- Impact on Learning (*il*) – Includes 7 items assessing AI's role in enhancing learning processes, personalization, and resource access.
- Institutional Benefits (*ib*) – Comprises 9 items that focus on the advantages of AI for administrative efficiency, communication, and institutional support.
- Social Concerns (*sc*) – Contains 4 items addressing ethical issues, equity concerns, and data privacy related to AI use.

It is important to highlight that this instrument underwent a rigorous review process conducted by a panel of expert judges. These professionals, possessing extensive experience in both nursing education and AI implementation, evaluated the content for clarity, relevance, and alignment with educational objectives. Their feedback ensured the instrument's validity and reliability, making it a robust tool for integrating AI technologies into nursing education. This expert validation process not only enhances the instrument's credibility, but it also confirms its potential to deliver meaningful insights and improvements within academic and clinical settings.

Additionally, the questionnaire features four demographic questions to collect participants' background information, such as, gender, age and semester. This well-structured instrument ensures a thorough and balanced assessment of AI's educational impact, institutional benefits, and related ethical concerns.

Results

The descriptive statistics reveal a generally positive perception of AI in higher education, with most statements receiving means between 3.5 and 4.1, indicating agreement or strong agreement. The highest-rated statements include *"AI facilitates access to higher education in more contexts and regions"* (4.079), *"AI has facilitated my adaptation to online classes"* (4.079), and *"Chatbots offer academic and administrative support"* (4.118). These results suggest that participants value AI's capacity to expand accessibility, streamline online learning, and provide institutional support. Similarly, personalization of learning experiences (3.868) and adaptability to student progress (4.118) were also highly rated, reinforcing AI's role in enhancing tailored education. However, ethical challenges surrounding AI algorithms (4.145) remain a notable concern, reflecting participants' awareness of potential ethical dilemmas and the need for responsible AI implementation.

Interestingly, the statement *"I believe that AI can positively transform learning and teaching"* received a comparatively lower mean of 2.461, suggesting notable skepticism about AI's transformative impact on pedagogy. This contrasts sharply with the higher agreement regarding AI's practical benefits, such as improving autonomous learning (3.934) and access to educational resources (3.947). Participants also expressed concerns about inequalities in access to education (3.868) and data privacy issues (3.500), which highlight ongoing anxieties that may hinder full acceptance of AI tools. These concerns reflect broader debates on the ethical implications of AI adoption in education. Moreover, the relatively high standard deviations, particularly in statements addressing data privacy (1.013) and communication improvement (1.045), indicate significant variability in participants' experiences and perspectives. Overall, while participants acknowledge AI's functional advantages, ethical and implementation-related concerns create clear tensions regarding its adoption.

Table 2: Descriptive Statistics of the Q-AIHE

	Valid	Mean	Std. Deviation
1. I am concerned about the privacy of my personal data when using AI systems.	76	3.500	1.013
2. AI enables the personalization of students' learning experiences.	76	3.711	0.921
3. I believe that AI could increase inequalities in access to education.	76	3.868	0.838
4. I am aware of the implementation of AI tools in my educational institution.	76	3.750	0.954
5. AI personalizes educational content according to my needs and preferences.	76	3.868	0.900
6. I believe that AI can positively transform learning and teaching.	76	2.461	0.958
7. AI has improved my access to learning resources efficiently.	76	3.947	1.018
8. AI has improved my ability to learn autonomously.	76	3.934	0.869
9. AI facilitates access to higher education in more contexts and regions.	76	4.079	0.891
10. AI has improved my communication with peers and instructors.	76	3.618	1.045
11. AI will play an even more significant role in the future of higher education.	76	3.855	0.812
12. I have accessed educational resources that use AI to adapt to my progress.	76	4.118	0.848
13. The current implementation of AI in my institution has been positive.	76	4.118	0.832
14. I perceive ethical challenges in the use of AI algorithms in education.	76	4.145	0.860
15. AI has facilitated my adaptation to online classes.	76	4.079	0.860
16. AI can offer concrete benefits in university education.	76	4.066	0.772
17. Chatbots offer academic and administrative support.	76	4.118	0.799
18. AI will improve the quality of learning in the coming years.	76	3.789	0.838
19. AI has improved academic and administrative management in my institution.	76	3.934	0.838
20. I believe AI will significantly benefit specific areas of higher education.	76	3.974	0.848

Source: Own elaboration.

Reliability of the Instrument

To evaluate the internal consistency of the instrument, Cronbach's Alpha coefficient was calculated. The analysis yielded a Cronbach's Alpha value of 0.96 for the 20 items included in the instrument. This result indicates excellent reliability, as values above 0.9 are generally considered to demonstrate a very high level of consistency among the items (Table 2).

Table 2: Cronbach's Alpha

Cronbach's Alpha	Number of Items
0.96	22

Key Findings

The following section presents some key findings derived from this study:

1. Perception of AI's Role in Education:

- Participants expressed strong agreement with statements highlighting AI's positive contributions to education, particularly:
 - AI facilitates access to education in diverse contexts and regions (mean = 4.079, SD = 0.891).
 - AI supports adaptation to online learning (mean = 4.079, SD = 0.860).
 - AI offers academic and administrative support via chatbots (mean = 4.118, SD = 0.799).
 - AI personalizes learning resources according to progress (mean = 4.118, SD = 0.848).
 -

2. Concerns and Ethical Challenges:

- There are notable concerns regarding the ethics and inequalities in AI use:
 - Participants agreed with statements about ethical challenges (mean = 4.145, SD = 0.860).
 - AI's potential to increase inequalities in access to education (mean = 3.868, SD = 0.838).

3. Positive Impact of AI Tools:

- Respondents believe that AI has enhanced:
 - Access to learning resources efficiently (mean = 3.947, SD = 1.018).
 - Autonomous learning (mean = 3.934, SD = 0.869).
 - Quality of learning and teaching in higher education (mean = 4.066, SD = 0.772).

4. Mixed Awareness and Future Expectations:

- Participants reported moderate awareness of AI implementation in their institutions (mean = 3.750, SD = 0.954).
- The belief that AI will significantly shape the future of higher education remains strong (mean = 3.855, SD = 0.812).

5. Less Consensus on AI's Transformative Power:

- Interestingly, AI's potential to transform learning and teaching received lower agreement (mean = 2.461, SD = 0.958), suggesting mixed opinions or a lack of observed impact.

Discussion

The findings of this study reveal a generally positive perception of AI integration in nursing education, with most students acknowledging its role in enhancing accessibility, resource efficiency, and personalized learning. For instance, tools such as AI-driven simulations and adaptive platforms were valued for their ability to provide tailored educational support and immediate feedback, aligning with previous research (Glauberman et al., 2023). However, the comparatively lower perception of AI's transformative potential in learning and teaching ($M = 2.46$) indicates skepticism regarding AI's pedagogical impact. This result may stem from insufficient practical exposure or inadequate AI literacy, highlighting the need for curriculum adjustments to incorporate AI effectively.

The concerns surrounding ethical issues, particularly data privacy and algorithmic bias, are consistent with broader discussions on AI in healthcare education (Clancy, 2020). Although students appreciated AI's capacity to streamline learning processes, the findings suggest a lingering unease regarding the ethical implications and potential inequities in AI deployment. Addressing these concerns through ethical training and transparent AI frameworks is essential for fostering trust and confidence among future healthcare professionals. Moreover, the variability in responses (notably in data privacy and communication) suggests diverse student experiences, possibly influenced by differences in access to technology and familiarity with AI tools.

Conclusion

In conclusion, the study highlights both the opportunities and challenges of integrating AI into nursing education. While students recognize AI's benefits in facilitating personalized learning, improving access to educational resources, and enhancing clinical preparedness, concerns regarding its ethical implications and limited practical exposure remain significant barriers. To address these gaps, nursing programs must prioritize comprehensive AI literacy training, ethical considerations, and hands-on experience with AI tools.

Moving forward, strategic initiatives, including curriculum redesign, faculty development, and collaboration with healthcare technology providers, will be critical to ensuring a balanced and effective integration of AI. By equipping nursing students with the necessary skills, technological proficiency, and ethical awareness, institutions can prepare a future-ready nursing workforce capable of leveraging AI to improve patient care and navigate the complexities of modern healthcare environments.

References

- Alazzam, M. B., Tayyib, N., Alshawwa, S. Z. & Ahmed, M. K. (2022). Nursing care systematization with case-based reasoning and artificial intelligence. *Journal of Healthcare Engineering*, 1–9. 10.1155/2022/1959371. <https://doi.org/10.1155/2022/1959371>
- Alowais, S.A., Alghamdi, S.S., Alsuhebany, N. et al. Revolutionizing healthcare: the role of artificial intelligence in clinical practice. *BMC Med Educ* **23**, 689 (2023). <https://doi.org/10.1186/s12909-023-04698-z>
- Bahroun, Z., Anane, C., Ahmed, V. & Zacca, A. (2023). Transforming Education: A Comprehensive Review of Generative Artificial Intelligence in Educational Settings through Bibliometric and Content Analysis. *Sustainability*, *15*, Article 12983. <https://doi.org/10.3390/su151712983>
- Bajwa, J., Munir, U., Nori, A. & Williams, B. (2021). Artificial intelligence in healthcare: transforming the practice of medicine. *Future Healthc J* **8**(2):e188-e194. doi: 10.7861/fhj.2021-0095. PMID: 34286183; PMCID: PMC8285156. <https://pmc.ncbi.nlm.nih.gov/articles/PMC8285156/>
- Buchanan, C., Howitt, M. L., Wilson, R., Booth, R. G., Risling, T. & Bamford, M. (2020a). Nursing in the age of artificial intelligence: Protocol for a scoping review. *JMIR Research Protocols*, *9*(4), e17490. 10.2196/17490. <https://doi.org/10.2196/17490>
- Cheung, S. K. S., Kwok, L. F., Phusavat, K. & Yang, H. H. (2021). Shaping the Future Learning Environments with Smart Elements: Challenges and Opportunities. *International Journal of Educational Technology in Higher Education*, *18*, 1-9. <https://doi.org/10.1186/s41239-021-00254-1>
- Clancy, T. R. (2020). Artificial intelligence and nursing: The future is now. *The Journal of Nursing Administration*, *50*(3), 125–127. 10.1097/NNA.0000000000000855. https://journals.lww.com/jonajournal/abstract/2020/03000/artificial_intelligence_and_nursing_the_future_is.4.aspx
- Glaubergerman G, Ito-Fujita A, Katz S, Callahan J. Artificial Intelligence in Nursing Education: Opportunities and Challenges. *Hawaii J Health Soc Welf*. 2023 Dec;82(12):302-305. PMID: 38093763; PMCID: PMC10713739. <https://pmc.ncbi.nlm.nih.gov/articles/PMC10713739/>
- Green, J., Camilli, G. & Elmore, P. (2006). *Complementary methods in education research*. New York: Routledge.
- Kollerup, K., N., Johansen, S. S., Tolsgaard, M. G., Lønborg Friis, M., Skov, M. B., & van Berkel, N. (2024). Clinical needs and preferences for AI-based explanations in clinical simulation training. *Behaviour & Information Technology*, 1–21. <https://doi.org/10.1080/0144929X.2024.2334852>
- Maleki Varnosfaderani, S., & Forouzanfar, M. (2024). The Role of AI in Hospitals and Clinics: Transforming Healthcare in the 21st Century. *Bioengineering*, *11*(4), 337. <https://doi.org/10.3390/bioengineering11040337>
- Mhlanga, D. (2021). Artificial Intelligence in the Industry 4.0, and Its Impact on Poverty, Innovation, Infrastructure Development, and the Sustainable Development Goals: Lessons from Emerging Economies? *Sustainability*, *13*, Article 5788. <https://doi.org/10.3390/su13115788>
- Rana, J., Gutierrez, P.L., Oldroyd, J.C. (2021). *Quantitative Methods*. In: Farazmand, A. (eds) *Global Encyclopedia of Public Administration, Public Policy, and Governance*. Springer, Cham. https://doi.org/10.1007/978-3-319-31816-5_460-1

- Stokes, F., & Palmer, A. (2020). Artificial intelligence and robotics in nursing: Ethics of caring as a guide to dividing tasks between AI and humans. *Nursing Philosophy*, 21(4), e12306. 10.1111/nup.12306. <https://www.mdpi.com/2076-3417/13/8/5212>
- Van Bulck, L., Couturier, R. & Moons, P. (2023). Applications of artificial intelligence for nursing: Has a new era arrived? *European Journal of Cardiovascular Nursing*, 22(3), e19–e20. 10.1093/eurjcn/zvac097. <https://doi.org/10.1093/eamia/ocz130>
- Vera, F. (2023). Integration of Artificial Intelligence Technology in Higher Education: Exploring Faculty Members' Experience. *Transformar*, 4(3), 17–22. <https://revistatransformar.cl/index.php/transformar/article/view/99>
- Vera, F. (2024). Student Performance in Writing Prompts for Text-based GenAI tools in a Research Methodology Course. *Transformar*, 5(2), 71–90. <https://revistatransformar.cl/index.php/transformar/article/view/129>