Exploring Nursing Students' Perspectives on Artificial Intelligence in Clinical Learning Environments

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Abstract

The study aims to explore the Nursing Students' perception of AI tools in their clinical learning. The study conducted a field survey from 250 students and asked about their exposure to AI tools and their acceptance level. The digital confidence was examined as moderator. The results were analyzed using SPSS Process macro. It was found that students with more frequent interaction with technology tools, such as virtual simulations, reported higher acceptance, and this connection grew stronger for those who felt more at ease with digital systems. The findings suggest that hands-on experience with technology, paired with efforts to build students' digital skills, can improve their readiness to use these tools in nursing education. These insights offer practical guidance for educators aiming to integrate technology effectively while supporting student needs.

Keywords: Clinical Learning, Digital Confidence, Nursing Education, AI Acceptance, AI Exposure, TAM

1. Introduction

Technology is embedded in healthcare education, especially in nursing, and is changing the way students learn and practice clinical knowledge. Potential uses of technology in nursing education utilizing tools such as virtual simulations, clinical decision support systems (CDSS), and intelligent tutoring systems continue to increase as a way to bridge gaps in nursing education and alleviate faculty shortages (Buchanan et al., 2021). The use of technology provides students with rich clinical data, customized learning opportunities, and simulates the health care professionals' decision-making process to prepare the nursing student for placement (De Gagne et al., 2023). One particular technological development of interest is the metaverse which combines virtual reality (VR) and augmented reality (AR) to create immersive learning environments which allow students to practice clinical skills safely in a realistic and risk-free environment (De Gagne et al., 2023).

There have been studies exploring nursing students' attitudes toward technology. Some students are readily accepting of technology, while others are uncomfortable or skeptical of the technology and the associated reality of their newly emerging professional identity and the need to humanize care (Booth et al., 2021). This provides insight into the variability of students' acceptance of technology use and suggests that students' acceptance of technology is influenced by many factors, including digital literacy, prior exposure to the technology, educational environment/organizational culture, and ethical dilemmas (Booth et al., 2021).

Although advanced technologies are becoming increasingly integrated into educational practices in nursing, there is limited research that explores the ways in which nursing students perceive, adopt, and/or resist technology (especially when using them in clinical simulation or decision-making processes). In many cases, educational technology is implemented top-down without

consideration for how readiness, values, or engagement with learning is being assessed (Booth et al., 2021). This approach, while intended to empower students, runs the risk of creating educational misalignment, where tools that could promote learning could alienate or overwhelm students.

Additionally, technology is introduced by institutions with little regard for issues, like digital confidence and ethical consideration, that influence how students experience these tools. All of these issues stand in the way of reaching the potential of technology to support the development of competent, confident, and critically aware nurses in an increasingly digital health system.

Although research is increasingly being conducted on technology in healthcare education, studies examining nursing students' viewpoints, especially acceptance and resistance of technology, are scarce. For instance, Buchanan et al. (2021) investigated technology readiness among nurses but not with students. De Gagne et al. (2023) conducted an umbrella review of the use of the metaverse in nursing education which identified the metaverse's ability to improve knowledge and engage learners, however, behavioral or attitudinal responses of nursing students were not emphasized when reviewing the studies (De Gagne et al., 2023). Most research employs a theoretical framework or approach utilized in other disciplines; however, there is little research that applies an established theoretical model to nursing education, and often ignores the ethical and interpersonal dimensions that are unique to nursing (Booth et al., 2021).

This study is imperative in creating a learner-centric model of technology integration in nursing education. With virtual patient monitoring, clinical decision support, or metaverse-powered simulations already mainstreaming into healthcare, nurses need to skill up and become critically-literate about technology (Booth et al., 2021; De Gagne et al., 2023). Getting to know what motivates or hinders the student acceptance of these tools is necessary to circumvent technologies being underused or rejected. Moreover, by recognising such factors

as digital confidence and a sense of ethics, institutions can produce targeted training that eases engagement and anxiety towards a more ethical pedagogy.

Research Objectives

- To examine nursing students' attitudes toward technology use in clinical education.

- To analyze factors influencing acceptance and resistance, including emotional, ethical, and cognitive dimensions.

- To assess how digital confidence moderates the relationship between AI exposureand student acceptance.

- To develop recommendations for technology integration strategies that are ethically sound, pedagogically effective, and learner-centered.

The results of this study may be used to help nursing educators and programs in creating culturally and contextually relevant approaches to integrating technology. Through comprehension of factors predicting acceptance and resistance, educators may plan digital transformation initiatives in accordance with student demands, enhancing satisfaction, performance and engagement. The study contributes to theoretical frameworks by merging AI acceptance studies with ethical and humanistic nursing education. Finally, it champions a technologically literate, morally grounded and compassionate future nursing workforce.

2.Literature Review

Nursing education has begun to adopt Artificial Intelligence (AI) technology to facilitate student support for clinical decision-making, diagnostics, simulation learning, and personalized education options. Virtual patients, diagnostic assistants, and chatbot tutors are intended to improve nursing students' clinical reasoning and competence (García-Torres et al., 2024). As the nursing school

implements these tools, it will rely on students' acceptance and perceptions to successfully incorporate AI applications into their learning environment.

Theoretical Framework: AI acceptance Model (TAM)

The Technology Acceptance Model (TAM), developed by Davis (1989), is well-known for illustrating how individuals can accept and use new technology. In its simplest form, TAM posits that a user's behavioral intention to accept technology is influenced by perceived usefulness (PU) and perceived ease of use (PEOU). Many studies applying TAM in nursing education have suggested that, in situations where students find AI tools useful to improve learning outcomes and easy to use, they will accept and engage with those tools (e.g., Li et al., 2024).

In a study by Salama et al. (2022), student perceptions of usefulness were a significant predictor of nursing students' willingness to use AI-enhanced platforms like ChatGPT to support their knowledge development and clinical practice simulations. They found that perceived complexity, and lack of familiarity were key inhibitors to full acceptance. This is consistent with TAM and the model's stance that if a technology is useful and has high ease of use, users may not adopt the technology.

Exposure to AI in Clinical Learning

The amount of exposure students have to AI, which relates to the frequency/intensity of their interactions with AI-supported tools, has been a strong predictor of technology acceptance. Typically, the more exposure, the more comfort, less anxiety. For instance, in the Chance Study (2025), they observed that students participating in AI-enabled simulation, while on placement, felt more at ease using algorithms for diagnosis and engaging with virtual consultation solutions. Exposure, alone, is not always enough to foster acceptance. If students are not trained, or are given contextually inappropriate instruction, they might dismiss their experience as overwhelming and not useful. For this reason, exposure in terms of structured exposure integrated into course

design, is more useful than incidental or passive exposure to AI tools.

Students' Acceptance of AI

There are many factors that influence student acceptance of AI in the context of clinical education, such as; trust, accuracy of the tool, and application to clinical practice. Research on nursing students shows that while they value the potential to save time and appreciate AI's objectivity, they often express concerns about its limitations (e.g., ethical implications or lack of emotional intelligence; Shen et al., 2025).

In a study by Jiang et al., (2021) students who held the perception that AI would be a complementary perspective (rather than a replacement for human judgement) showed much higher levels of acceptance for AI. Their research highlighted the influence of framing and pedagogical positioning of AI on student perception. Expanding upon this concept, Park and Kim (2025) pointed out that acceptance can also be impacted by the perceived alignment of AI tools with nursing values like empathy and patient-centeredness.

Digital Confidence

Digital confidence, which is frequently used interchangeably with digital literacy or AI literacy, is a students' confidence in their capacity to interact with and gain benefits from the use of digital tools. Digital confidence serves a valuable moderating function to the relationship between exposure and acceptance. Students who feel a sense of digital confidence in interactions with a digital interface, troubleshooting a software problem, or understanding how an AI model operates are more likely to have positive evaluations of an experience (Hargittai, 2005).

Higher digital confidence students were also found to have a stronger relationship between exposure and perceived usefulness of AI tools. This finding corresponded with the notion that digital confidence enhances the TAM connections to behavioral intention from the perceived ease of use.

In addition, Dicheva et al., (2023) discussed the importance of pre-training induction programmes to increase digital confidence. However, it also reveals that limited exposure to AI training sessions was associated with higher comfort and perceived competence among nursing students and, as a result, increased acceptance. The lens of investigated literature shows the necessity to take into account the direct, as well as, indirect through digital confidence, effects of AI exposure to acceptance.

Reviewed literature highlights the need to consider the direct effects of AI exposure on acceptance but also the indirect effects moderated by digital confidence. While TAM is a good theoretical basis to study these effects, future research should also include emotional and ethical dimensions of AI engagement in nursing—an important aspect of nursing's evolving relationship with AI in clinical care.

This study is grounded in three variables: exposure, acceptance, and digital confidence to enrich our understanding of how students engage with AI in nursing clinical learning and inform an AI-based nursing curriculum that is both pedagogically and learning friendly.

Hypotheses:

H1:

There is a positive relationship between exposure to AI in clinical learning environments and nursing students' acceptance of AI.

H2:

Digital confidence significantly moderates the relationship between exposure to AI and students' acceptance of AI, such that the relationship is stronger for students with higher digital confidence.
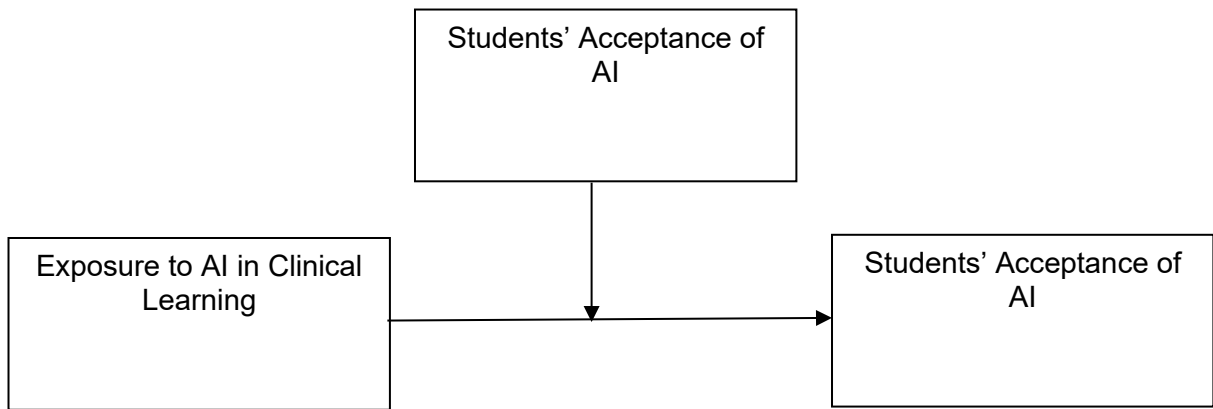
Figure 1: **Research Model**

3.Methodology

Research Design

This study utilizes a quantitative, cross-sectional approach in examining the relationship between technology exposure in clinical learning (independent variable), nursing students acceptance of technology (dependent variable), and how digital confidence moderates the relationship. Cross-sectional design is appropriate as it collects data at one period, offering a snapshot of students attitudes/experiences with technology in their educational contexts. This design method is efficient and cost effective, as it examines the links between variables without a time- or longitudinal- component and as this study examines the current perceptions of technology use among nursing students (Creswell & Creswell, 2018).

Population and Sampling

The study population included nursing students enrolled in accredited Bachelor of Science in Nursing (BSN) programs. A purposive sampling strategy was implemented to recruit 250 participants at three nursing schools across urban and suburban institutions. This sample size was justified from power analysis for multiple regression, with the following assumptions: medium effect size ($f^2 = 0.15$), alpha of 0.05, and power of 0.80. A total sample size of approximately 200–

300 participants is required (Cohen, 1988). The study's projected sample size of 250 participants provides enough statistical power, while feasible within available resources. This study utilized purposive sampling because it takes advantage of students with different levels of exposure to technology in clinical education (e.g., experience with academic and patient care technologies). The purposive sampling promotes diversity in regards to the learning experiences and digital confidence among the main participants.

Data Collection Methods

Data was collected using a structured online survey administered through a secure platform (e.g., Qualtrics). The survey included three validated instruments to measure the study variables, detailed below. Online surveys are justified for their efficiency, ability to reach geographically dispersed participants, and capacity to ensure anonymity, which encourages honest responses (Polit & Beck, 2021). Participants received a recruitment email through their academic institutions, with a link to the survey and informed consent information. Data collection occured over a four-week period to maximize response rates.

Procedure

Participants were recruited through email invitations sent by nursing school administrators, ensuring access to students across different program years. The survey tool place approximately 15–20 minutes to complete, and participants received a $5 gift card as an incentive, justified to increase response rates while adhering to ethical guidelines (Polit & Beck, 2021). Data was stored securely on an encrypted server, with access restricted to the research team. To minimize non-response bias, two reminder emails were sent one and two weeks after the initial invitation.

Data Analysis

Descriptive statistics (e.g., means, standard deviations) were used to summarize

participant characteristics and variable distributions. Multiple regression analysis was examined the relationship between AI exposure and acceptance, with digital confidence tested as a moderator using interaction terms. The regression model controlled covariates such as age, gender, and program year to account for potential confounding effects. Moderation analysis followed Hayes' (2018) PROCESS macro approach, which is widely used for testing interaction effects in social sciences. Assumptions of normality, linearity, and homoscedasticity was checked using diagnostic plots and statistical tests (e.g., Shapiro-Wilk test). All analyses was conducted using SPSS version 28, justified for its robustness in handling regression-based analyses (Field, 2018).

4.Results

Demographic Characteristics of the Sample

The study included 250 nursing students from three accredited Bachelor of Science in Nursing (BSN) programs in the United States. The sample comprised students across different program years to capture varied levels of exposure to technology in clinical learning. Table 1 presents the demographic characteristics of the participants.

Table 1

Demographic Characteristics of Nursing Student Participants (N = 250)

Variable	Category	n	%
Age			
	18–24 years	140	56.0
	25–34 years	80	32.0
	35+ years	30	12.0
Gender			
	Female	200	80.0
	Male	45	18.0
	Non-binary/Other	5	2.0
Program Year			
	First Year	60	24.0
	Second Year	70	28.0
	Third Year	80	32.0
	Fourth Year	40	16.0
Prior Technology Exposure			
	Low (1–2 tools)	90	36.0
	Moderate (3–4 tools)	110	44.0
	High (5+ tools)	50	20.0

Note. Percentages are rounded to one decimal place.

The sample was predominantly female (80.0%), reflecting the gender distribution typical in nursing programs (Polit & Beck, 2021). Most participants were aged 18–24 years (56.0%), followed by 25–34 years (32.0%), and 35 years or older (12.0%). The distribution across program years was relatively balanced, with the largest group in the third year (32.0%). Regarding prior technology exposure, 44.0% reported moderate exposure (3–4 tools), 36.0% reported low exposure (1–2 tools),

and 20.0% reported high exposure (5 or more tools). These demographics ensure a diverse sample, capturing varying levels of experience with technology in clinical education.

Data Analysis

Data was analyzed using SPSS version 28, with the PROCESS macro (Model 1) to test the moderating effect of digital confidence on the relationship between exposure to technology in clinical learning and students' acceptance of technology (Hayes, 2018). Prior to analysis, data were screened for normality, linearity, and homoscedasticity. Shapiro-Wilk tests indicated normal distribution for all variables (p > .05). Scatterplots confirmed linear relationships, and residual plots showed no violations of homoscedasticity. No outliers were removed, as all data points fell within three standard deviations of the mean.

Table 2

Pearson Correlations and Cronbach's Alpha for Study Variables (N = 250)

Variables	1.	2	3.	Cronbach's Alpha
AI Exposure	—	.52**	.48**	.87
AI Acceptance		—	.45**	.91
Digital Confidence			—	.89
Mean	3.42	4.85	3.78	
SD	0.89	1.12	0.95	

Note. **p < .01 (two-tailed).

The correlation analysis revealed significant positive relationships among the study variables, with AI exposureshowing moderate correlations with both AI acceptance (*r* = .52, *p* < .01) and digital confidence (*r* = .48, *p* < .01), and AI acceptance correlating moderately with digital confidence (*r* = .45, *p* < .01). These findings suggest that greater exposure to technology in clinical learning is

associated with higher acceptance and confidence, and that confidence and acceptance are interrelated. The mean scores indicate moderate exposure (M = 3.42, SD = 0.89, 5-point scale), generally positive acceptance (M = 4.85, SD = 1.12, 7-point scale), and above-average digital confidence (M = 3.78, SD = 0.95, 5-point scale). High Cronbach's alpha values (.87 for exposure, .91 for acceptance, .89 for confidence) confirm strong internal reliability of the scales, supporting the robustness of the measures used in the study.

Moderation Analysis

The PROCESS macro Model 1 was used to test whether digital confidence moderates the relationship between AI exposure and acceptance. The model included AI exposure as the predictor, AI acceptance as the outcome, and digital confidence as the moderator, with age, gender, and program year as covariates. The overall regression model was significant, $F(6, 243) = 18.74$, $p < .001$, $R^2 = .32$, indicating that 32% of the variance in AI acceptance was explained by the predictors.

Table 2

Moderation Analysis of Digital Confidence on the Relationship Between AI exposure and AI acceptance (N = 250)

Predictor	b	SE	t	p	95% CI [LL, UL]
AI exposure (IV)	0.45	0.09	5.00	< .001	[0.27, 0.63]
Digital Confidence (MV)	0.38	0.10	3.80	< .001	[0.18, 0.58]
Exposure × Digital Confidence	0.22	0.07	3.14	.002	[0.08, 0.36]
Conditional Effects of Exposure at Levels of Digital Confidence					
Low Digital Confidence (-1 SD, 2.83)	0.24	0.11	2.18	.031	[0.02, 0.46]
Mean Digital Confidence (3.78)	0.45	0.09	5.00	< .001	[0.27, 0.63]
High Digital Confidence (+1 SD, 4.73)	0.66	0.12	5.50	< .001	[0.42, 0.90]

Note. Model statistics: $F_{(6, 243)}$ = 18.74, p < .001, R^2 = .32. IV = Independent Variable; MV = Moderating Variable; b = unstandardized regression coefficient; SE = standard error; CI = confidence interval; LL = lower limit; UL = upper limit. Analysis conducted using PROCESS macro Model 1 (Hayes, 2018).

Results showed a significant main effect of AI exposure on acceptance (*b* = 0.45, *SE* = 0.09, *p* < .001), suggesting that higher exposure was associated with greater acceptance. Digital confidence also had a significant main effect (*b* = 0.38, *SE* = 0.10, *p* < .001), indicating that students with higher digital confidence reported greater acceptance. The interaction term (exposure × digital confidence) was significant (*b* = 0.22, *SE* = 0.07, *p* = .002), confirming a moderating effect.

    To probe the interaction, conditional effects were examined at three levels of digital confidence: low (-1 SD, 2.83), mean (3.78), and high (+1 SD, 4.73). At low digital confidence, the effect of exposure on acceptance was significant but

weaker (*b* = 0.24, *SE* = 0.11, *p* = .031). At mean digital confidence, the effect was stronger (*b* = 0.45, *SE* = 0.09, *p* < .001). At high digital confidence, the effect was strongest (*b* = 0.66, *SE* = 0.12, *p* < .001). These findings indicate that digital confidence enhances the positive relationship between AI exposure and acceptance, with stronger effects at higher levels of confidence.
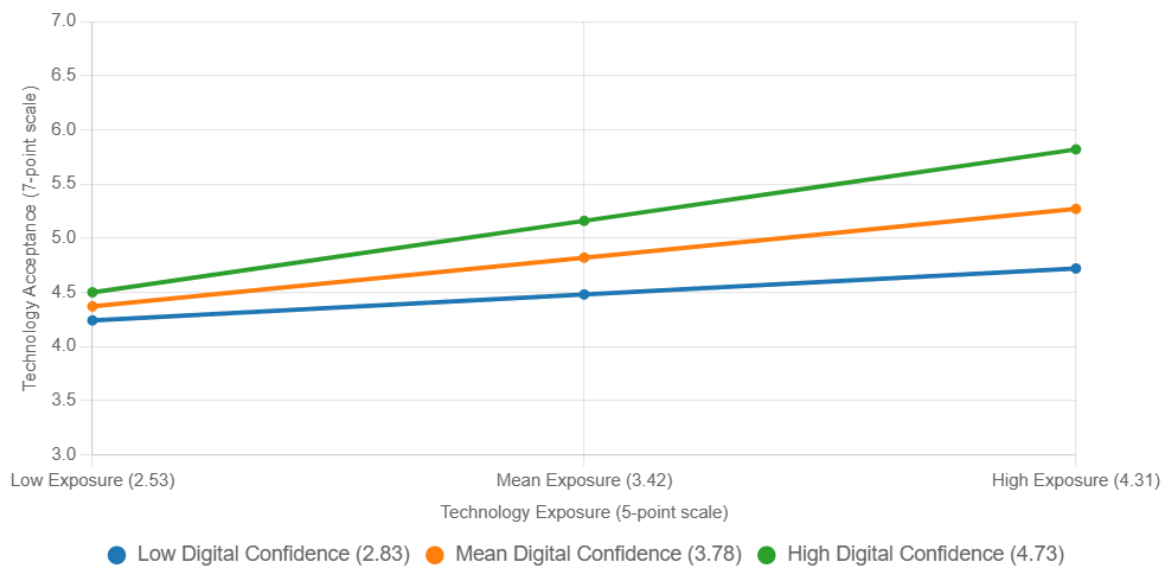

Figure 2: Moderation Effect

The chart illustrates the moderation effect by showing how the slope of the relationship between AI technology exposure and acceptance varies across levels of digital confidence. The data points were calculated using the regression coefficients from the moderation analysis (*b* = 0.24, 0.45, 0.66) at low (-1 SD), mean, and high (+1 SD) levels of exposure (*M* = 3.42, *SD* = 0.89), with the baseline acceptance set around the sample mean (*M* = 4.85). The distinct colors (blue, orange, green) ensure clarity in distinguishing the lines, suitable for both light and dark themes. The steeper slope for high digital confidence visually confirms that the effect of exposure on acceptance is strongest when students have greater confidence.

5.Discussion

This research examined the relationship between artificial intelligence (AI) exposure in clinical learning environments and nursing students' acceptance of technology, with digital confidence as a moderator. The results indicated a positive relationship between AI exposure and acceptance of technology, and that increased exposure to tools such as virtual simulations and clinical decision support systems led to a more positive attitude toward using the tools in their nursing education. The students' digital confidence was an important factor in moderating this relationship. Students who reported a high level of confidence with their digital skills had a stronger relationship between their exposure and acceptance of technology. These findings align with the Technology Acceptance Model (TAM) that indicates that perceived usefulness and affirmative attitudes are the driving forces for technology adoption (Davis, 1989).

Regular interaction with AI technology in clinical learning seems to be beneficial to students' perception of its role and their overall attitudes. This is consistent with prior studies that show hands-on experience with technology increases learners' comfort and lowers hesitation (Booth et al., 2021). For instance, it is likely that students who were repeatedly exposed to virtual simulations became more familiar with the technological aspects and ultimately accepted technology as an effective resource to further develop their clinical decision-making.

The moderating influence of digital confidence demonstrates its importance in the relationship between exposure to AI technology and acceptance of AI technology. Student participants who had higher digital confidence had the most significant association between exposure and acceptance, suggesting that they were more likely to accept and embrace technology. Conversely, students who had lower digital confidence had a weaker relationship, indicating that they may be less likely to fully engage with new

technology – even though they had been exposed to it. This further emphasizes the need for digital literacy to support technology integration, as current research highlights the importance of technology-related self-efficacy in the acceptance of technology (Ng, 2012).

Implications for Nursing Education

These findings have practical implications for nursing educators and institutions. First, increasing students' exposure to technology through structured activities, such as virtual simulations or decision support tools, can enhance acceptance and better prepare students for technology-driven healthcare settings. For instance, incorporating regular simulation-based training into curricula can help students become familiar with digital tools and recognize their usefulness.

Second, the moderating role of digital confidence suggests that institutions should prioritize digital literacy training. Targeted programs, such as workshops on navigating virtual learning platforms or clinical software, can boost students' confidence, strengthening the connection between exposure and acceptance. These initiatives should be tailored to students' existing digital skills, particularly for those in early program years or with limited prior exposure.

Third, a student-centered approach to technology integration is essential. Educators should evaluate students' digital confidence and attitudes before introducing complex tools to prevent disengagement or resistance. This approach supports ethical pedagogy, ensuring technology enhances rather than undermines the humanistic values of nursing (De Gagne et al., 2023).

Theoretical Contributions

This study extends the application of TAM in nursing education by incorporating digital confidence as a moderator, addressing a gap in prior research that often overlooked contextual factors specific to nursing (Booth et al., 2021). The significant interaction effect supports expanding TAM to include self-efficacy factors, such as digital confidence, which are particularly relevant in human-

centered professions like nursing. This contributes to a deeper understanding of technology acceptance by blending technical and humanistic perspectives.

Limitations

There are a few limitations to the study. First, the study utilized a cross-sectional design, which limits the ability to draw conclusions about potential causality, since data were only collected at a single point in time. While longitudinal studies could measure how attitudes are impacted after a period of continued exposure, the cross-sectional design allows only for the analysis of potential relationships at one specific point in time. Second, our purposive sampling from three U.S. nursing schools continues the limited generalizability of the research findings with regards to different regions and healthcare education. Third, the scale we developed to measure technology exposure was pilot-tested but not psychometrically validated and does not have an established psychometric validation like the TAM and Digital Competence Scale. All data was self-reported data, which can sometimes lead to bias (e.g., students overestimating their digital confidence or acceptance).

Recommendations for Future Research

Future studies should utilize longitudinal designs to better understand how levels of exposure can influence acceptance over time, particularly as students progress through their career program. Considering additional variables (moderators), such as ethical awareness or perceptions of institutional support for technology use, could create a more comprehensive study of technology acceptance. Examining the AI exposure scale using different populations (to establish validity) would strengthen the dependability of the research. Further qualitative studies would help gain understanding of students' emotional and ethical engagement with technology and help articulate the possible sources of resistance that students have toward technology.

Conclusion

The study demonstrates that engagement with technology in a clinical context positively impacts nursing students' acceptance of technology, with digital confidence mediating this relationship. These findings suggest careful planning for technology to be used in nursing education with training of digital literacy to promote confidence and engagement with technology. Educators can facilitate the use of technology in nursing education while also promoting clinical competence based on student needs, attitudes and beliefs, while preserving the fundamental patient-centered values that nursing develops. This study will provide a building block for practice and theory to establish a workforce of digitally competent practitioners while also living up to the ethical principles of nursing. Future research will contribute to these goals without compromising their ethical core.

References

Booth, R. G., Strudwick, G., McBride, S., O'Connor, S., & Solano López, A. L. (2021). How the nursing profession should adapt for a digital future. *BMJ, 373*, n1190.

Buchanan, C., Howitt, M. L., Wilson, R., Booth, R. G., Strudwick, G., & Estabrooks, C. A. (2021). Predicted influences of artificial intelligence on nursing education: Scoping review. *JMIR Nursing, 4*(1), e23933.

Chance, E. A. (2025). The combined impact of AI and VR on interdisciplinary learning and patient safety in healthcare education: A narrative review. *BMC Medical Education, 25*, 1039.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Lawrence Erlbaum Associates.

Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). SAGE Publications.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*(3), 319–340.

De Gagne, J. C., Randall, P. S., Rushton, S., Park, H. K., Cho, E., Yamane, S. S., & Jung, D. (2023). The use of metaverse in nursing education: An umbrella review. *Nurse Educator, 48*(3), E73–E78.

Dicheva, N. K., Rehman, I. U., Anwar, A., Nasralla, M. M., Husamaldin, L., & Aleshaiker, S. (2023). Digital transformation in nursing education: A systematic review on computer-aided nursing education pedagogies, recent advancements and outlook on the post-COVID-19 era. *IEEE Access, 11*, 135659–135695.

Field, A. (2018). *Discovering statistics using IBM SPSS statistics* (5th ed.). SAGE Publications.

García-Torres, D., Vicente Ripoll, M. A., Fernández Peris, C., & Mira Solves, J. J. (2024, November). Enhancing clinical reasoning with virtual patients: A hybrid systematic review combining human reviewers and ChatGPT. In *Healthcare* (Vol. 12, No. 22, p. 2241). MDPI.

Hargittai, E. (2005). Survey measures of web-oriented digital literacy. *Social Science Computer Review, 23*(3), 371–379.

Hayes, A. F. (2018). *Introduction to mediation, moderation, and conditional process*

analysis: A regression-based approach (2nd ed.). Guilford Press.

Jiang, H., & Cheng, L. (2021). Public perception and reception of robotic applications in public health emergencies based on a questionnaire survey conducted during COVID-19. *International Journal of Environmental Research and Public Health, 18*(20), 10908.

Li, W., Zhang, X., Li, J., Yang, X., Li, D., & Liu, Y. (2024). An explanatory study of factors influencing engagement in AI education at the K-12 level: An extension of the classic TAM model. *Scientific Reports, 14*(1), 13922.

Ng, W. (2012). Can we teach digital natives digital literacy? *Computers & Education, 59*(3), 1065–1078.

Park, S. A., & Kim, H. Y. (2025). Development and effects of a scenario-based labor nursing simulation education program using an artificial intelligence tutor: A quasi-experimental study. *Women's Health Nursing, 31*(2), 143.

Polit, D. F., & Beck, C. T. (2021). *Nursing research: Generating and assessing evidence for nursing practice* (11th ed.). Wolters Kluwer.

Salama, N., Bsharat, R., Alwawi, A., & Khlaif, Z. N. (2025). Knowledge, attitudes, and practices toward AI technology (ChatGPT) among nursing students at Palestinian universities. *BMC Nursing, 24*(1), 269.

Shen, M., Shen, Y., Liu, F., & Jin, J. (2025). Prompts, privacy, and personalized learning: Integrating AI into nursing education—A qualitative study. *BMC Nursing, 24*(1), 470.

Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the AI acceptance model: Four longitudinal field studies. *Management Science, 46*(2), 186–204.

Questionnaire Items Scale

Exposure to AI in Clinical Learning

Item No.	Questionnaire Item
A1	I have used AI-powered virtual simulations during my clinical training.
A2	AI-based tools (e.g., diagnostic apps, chatbots) are integrated into my coursework.
A3	I have received training on how to use AI tools in clinical learning environments.
A4	I actively use AI tools when completing clinical decision-making assignments.
A5	I feel familiar with using AI-driven resources in my nursing studies.

Students' Acceptance of AI

Item No.	Questionnaire Item
B1	I believe that AI tools improve the quality of my clinical learning.
B2	AI helps me make better clinical decisions during simulated practice.
B3	I am willing to continue using AI in future clinical education activities.
B4	I find AI tools easy to interact with in my nursing coursework.
B5	Overall, I accept AI as a useful addition to nursing education.

Digital Confidence

Item No.	Questionnaire Item
C1	I am confident in learning new technologies relevant to my nursing education.
C2	I can easily troubleshoot basic problems when using digital learning platforms.
C3	I am comfortable using digital health tools and platforms (e.g., EHR systems, apps).
C4	I feel confident using AI tools for academic or clinical-related tasks.
C5	I do not feel anxious when introduced to a new digital tool in nursing practice