Artificial Intelligence in Nursing Education

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Abstract

This study uses a quantitative research design and regression analysis to examine the impact of artificial intelligence (AI) integration on nursing students' attitudes and academic performance. A sample of 300 nursing students was surveyed to identify key factors influencing their acceptance and use of AI technology in their education. Results revealed that technological proficiency and positive attitudes toward AI significantly predicted improved academic performance using AI. These findings have significant practical implications for curriculum development in nursing education, emphasizing the importance of integrating AI and enhancing students' technological skills.

Keywords: Artificial Intelligence, Nursing Education, Technological Proficiency, Academic Performance, Regression Analysis

Introduction

Background and Rationale

Artificial intelligence (AI) is increasingly being recognized as a transformative force in healthcare education, particularly in the training of future nurses. AI tools can provide personalized learning experiences, support decision-making through advanced simulations, and enhance clinical training by offering real-time feedback (Smith et al., 2023). As AI becomes more prevalent in nursing education, there is a pressing need to understand how nursing students perceive and interact with these technologies, making our study particularly relevant (Chen et al., 2022).

However, the adoption of AI in nursing education is challenging. Students' attitudes toward technology, their technological proficiency, and their experiences with AI can all influence the effectiveness of AI integration in the curriculum (Gaur et al., 2021). While some studies have explored the potential of AI in nursing education, few have investigated the technological proficiency and attitudes toward AI to improve academic performance using AI, particularly concerning their academic performance (Johnson et al., 2020).

Despite the growing interest in AI's role in nursing education, more empirical research is needed on the factors influencing nursing students' acceptance of AI and the impact of these factors on their academic performance. This study aims to fill this gap by exploring the relationships between nursing students' technological proficiency, attitudes toward AI, and academic performance.

Research Question

1. How does AI integration affect nursing students' academic performance?

Methods

Study Design

This study employed a cross-sectional, quantitative design to investigate the relationships between technological proficiency, attitudes toward AI, and academic performance among nursing students. Data were collected using a structured survey, and multiple regression analysis was conducted to examine the predictive relationships among the variables.

Sample and Sampling Procedure

The sample comprised 300 nursing students enrolled in undergraduate nursing programs at three universities. A random sampling technique was used to ensure that the sample was representative of the broader nursing student population. Inclusion criteria included current enrollment in a nursing program, willingness to participate, and consent to complete the survey.

Instruments

1. Demographic Questionnaire: This included age, gender, year of study, prior experience with technology, and prior exposure to AI.

2. AI Attitudes Scale (AIA): A 20-item scale was used to measure nursing students' attitudes toward AI in education. The scale-covered dimensions included perceived usefulness, ease of use, and overall acceptance of AI (Cronbach's alpha = .85).

3. Technological Proficiency Scale (TPS): A 15-item self-report measure assessed students' skills and comfort levels with various forms of technology, including computers, mobile devices, and educational software (Cronbach's alpha = .88).

4. Academic Performance Scale (APS): This scale measured students' academic performance, focusing on GPA, engagement in coursework, and participation in clinical simulations (Cronbach's alpha = .82).

Data Collection

Data collection was conducted over two months. Surveys were distributed electronically via the university's email system, with reminders sent to non-respondents after two weeks. Participation was voluntary, and students were informed of the study's purpose and assured of their anonymity and confidentiality.

Data Analysis

Data were analyzed using SPSS version 26. Descriptive statistics were calculated to summarize the demographic characteristics of the sample. Multiple regression analysis was then used to explore the relationships between technological proficiency, attitudes toward AI, and academic performance. The level of statistical significance was set at $p < .05$.

Results

Demographic Characteristics

The study sample consisted of 300 nursing students, of whom 225 (75%) were female and 75 (25%) were male. The mean age of participants was 22.5 years (SD = 3.4), with the majority of students (45%) in their third year of study. Forty percent of the students reported prior experience with AI technology.

Table 1. Demographic Characteristics of the Sample

Variable	N	%
Gender		
Male	75	25%
Female	225	75%
Age		
18-21	140	46.7%
22-25	120	40.0%
+26	40	13.3%
Year of Study		
1st	50	16.7%
2nd	115	38.3%
3rd	135	45.0%
Prior Experience with AI		
yes	120	40%
No	180	60%

Regression Analysis

The regression analysis showed that both technological proficiency (β = 0.35, $p < .001$) and positive attitudes toward AI (β = 0.42, $p < .001$) were significant predictors of academic performance using AI. The overall model was statistically significant, $F(2, 297) = 98.76$, $p < .00 1$, and explained 50% of the variance in academic performance ($R^2 = .50$).

Table 2. Regression Analysis Summary

Predictor	B	SE B	β	p
Technological Proficiency	0.25	0.05	0.35	< .001
Attitudes toward AI	0.30	0.04	0.42	< .001

Subgroup Analysis

An additional subgroup analysis was conducted to examine whether the relationships between technological proficiency, attitudes toward AI, and academic performance differed by year of study. The analysis revealed that third-year students showed a stronger relationship between attitudes toward AI and academic performance using AI (β = 0.47, $p < .001$) compared to first- and second-year students.

Table 3. Regression Analysis by Year of Study

Year of Study	Technological Proficiency (β)	Attitudes toward AI (β)	R^2	p
1st Year	0.31	0.29	0.45	< .001
2nd Year	0.34	0.35	0.48	< .001
3rd Year	0.35	0.47	0.55	< .001
4thYear	0.31	0.29	0.45	< .001

Discussion

Interpretation of Findings

The findings from this study support the hypotheses that technological proficiency and positive attitudes toward AI are significant predictors of academic performance using AI among nursing students. These results are consistent with previous research suggesting that students who are more technologically proficient and hold favorable views of AI are more likely to engage effectively with AI-driven educational tools, leading to better academic outcomes (Smith et al., 2023; Gaur et al., 2021).

The stronger relationship between attitudes toward AI and academic performance among third-year students may reflect their greater exposure to clinical environments where AI applications are more prevalent. This exposure may enhance their understanding of AI's relevance and usefulness, positively influencing their academic performance (Johnson et al., 2020).

Implications for Nursing Education

These findings have important implications for nursing education. Educators should consider incorporating AI-focused training into the curriculum to enhance students' technological proficiency and to foster positive attitudes toward AI. Such initiatives could include workshops, simulations, and hands-on experiences with AI tools used in clinical practice (Chen et al., 2022).

Furthermore, the curriculum should be designed to gradually introduce AI concepts in the early years of study, with more advanced applications being integrated as students progress. This approach could help build confidence and competence in using AI technologies, ultimately leading to better academic and professional outcomes (Smith et al., 2023).

Limitations

This study has several limitations. First, the cross-sectional design limits the ability to draw causal inferences. Longitudinal studies are needed to explore how attitudes toward AI and technological proficiency evolve and how these changes impact academic performance. Second, self-reported measures may introduce response bias, as students might overestimate their proficiency or attitude levels. Future studies should consider using objective assessments of technological skills and AI engagement.

Future Research

Future research should explore the long-term effects of AI integration in nursing education on students' academic and professional development. Additionally, qualitative research could provide deeper insights into students' experiences with AI, including the challenges they face and the strategies they use to overcome them. Understanding these aspects could inform the development of more effective AI training programs in nursing education.

Conclusion

This study contributes to the growing literature on AI in nursing education by identifying key factors influencing students' acceptance and use of AI. The findings underscore the importance of technological proficiency and positive attitudes toward AI in enhancing academic performance using AI . As AI continues to evolve, nursing educators must proactively integrate these technologies into the curriculum to prepare students for the future of healthcare.

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